JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR COLLEGE OF ENGINEERING ANANTAPUR (Autonomous)

Computer Science and Engineering

Course Structure for B.Tech (Computer Science and Engineering)
(2013-14)

I B.Tech (CSE) – I Sem

S. No.		Subject	L	T	P	Credits
1	BS	Mathematics- I	3	1	0	3
2	ES	Environmental Studies	3	1	0	3
3	HS	Technical English	3	1	0	3
4	ES	Engineering Graphics	2	0	2	3
5	BS	Applied Physics	3	1	0	3
6	BS	Applied Physics Lab	0	0	3	2
7	HS	English Language Communication Skills Lab	0	0	3	2
8	ES	Engineering Workshop & IT Workshop	0	0	3	2
		Total	**14**	**4**	**11**	**21**

I B.Tech (CSE) – II Sem

S. No.		Subject	L	T	P	Credits
1	BS	Mathematics – II	3	1	0	3
2	BS	Mathematical Methods	3	1	0	3
3	ES	Basic Electrical Engineering	3	1	0	3
4	BS	Engineering Chemistry	3	1	0	3
5	HS	Technical Communication and Presentation Skills	3	1	0	3
6	ES	Computer Programming	3	1	0	3
7	BS	Engineering Chemistry Lab	0	0	3	2
8	ES	Computer Programming Lab	0	0	3	2
		Total	**18**	**6**	**6**	**22**

II B.Tech (CSE) – I Sem

S. No		Subject	L	T	P	Credits
1	HS	Managerial Economics and Financial Analysis	3	1	0	3
2	BS	Probability and Statistics	3	1	0	3
3	ES	Electronic Devices & Circuits	3	1	0	3
4	PC	Data Structures	3	1	0	3
5	ES	Digital Logic Design	3	1	0	3
6	BS	Discrete Mathematics	3	1	0	3
7	ES	Basic Electrical &Electronics Lab	0	0	3	2
8	PC	Data Structures Lab	0	0	3	2
		Total	**18**	**6**	**6**	**22**

II B.Tech (CSE) – II Sem

S. No		Subject	L	T	P	Credits
1	PC	Computer Organization	3	1	0	3
2	PC	Database Management Systems	3	1	0	3
3	PC	Java Programming	3	1	0	3
4	PC	Formal Languages and Automata Theory	3	1	0	3
5	PC	Principles of Programming Languages	3	1	0	3
6	PC	Design and Analysis of Algorithms	3	1	0	3
7		Human Values and Professional Ethics (Audit Course)	2	-	-	-
8	PC	Database Management Systems Lab	0	0	3	2
9	PC	Java Programming Lab	0	0	3	2
		Total	**20**	**6**	**6**	**22**

III B.Tech (CSE) – I Sem

Sl. No	Course Code	Subject	L	T	P	Credits
1	PC	Operating Systems	3	1	0	3
2	PC	Compiler Design	3	1	0	3
3	PC	Unix and Shell Programming	3	1	0	3
4	PC	Software Engineering	3	1	0	3
5	ES	Microprocessors & Interfacing	3	1	0	3
6	PC	Advanced Computer Architecture	3	1	0	3
7	PC	Operating Systems and Shell Programming Lab	0	0	3	2
8	PC	Compiler Design and Assembly Language Programming Lab	0	0	3	2
		Total	**18**	**6**	**6**	**22**

III B.Tech (CSE) – II Sem

Sl. No	Course Code	Subject	L	T	P	Credits
1	PC	Computer Networks	3	1	0	3
2	PC	Object Oriented Analysis and Design Using UML	3	1	0	3
3	PC	Data Mining	3	1	0	3
4	PC	Internet Technologies	3	1	0	3
5	PC	Software Testing	3	1	0	3
6	PC	Data Analytics - I	3	1	0	3
7		Advanced English Language Communication Skills Lab (Compulsory Audit Course)	2	-	-	-
8	PC	Object Oriented Analysis and Design and Software Testing Lab	0	0	3	2
9	PC	Internet Technologies and Data Mining Lab	0	0	3	2
		Total	**20**	**6**	**6**	**22**

Course Structure for B.Tech (Computer Science and Engineering) (2013-14)

IV B.Tech (CSE) – I Sem

Sl. No	Course Code	Subject	L	T	P	Credits
1	PC	Software Architecture	3	1	0	3
2	PC	Cryptography and Network Security	3	1	0	3
3	PC	Mobile Application Development	3	1	0	3
4	PC	Cloud Computing	3	1	0	3
5	OE	**Open Elective/ CBCS (Annexure-I)**	3	1	0	3
6	PE	**Elective-I (MOOCs) (Annexure-II**)	3	1	0	3
7	PC	Security and Cloud Computing Lab	0	0	3	2
8	PC	Mobile Application Development Lab	0	0	3	2
9		Project Part-A - Seminar	-	-	-	2
		Total	**18**	**6**	**6**	**24**

IV B.Tech (CSE)– II Sem

Sl. No	Course Code	Subject	L	T	P	Credits
1	HS	Management Science	3	1		3
2	PC	Design Patterns	3	1		3
3	PE	**Elective-II** a. Mobile Computing b. Software Project Management c. Pattern Recognition d. Computer Graphics and Multimedia	3	1		3
4	PE	**Elective-III** a. Optimization Techniques b. Embedded Systems c. Natural Language Processing d. Data Analytics - III	3	1		3
5		Comprehensive Viva-Voce	-	-	-	3
6		Project Part-B	-	-	-	10
		Total	**12**	**4**		**25**

***BS** – Basic Sciences ***ES** – Engineering Science ***HS** – Humanities and Social Science
***PC** – Professional Subject –Core ***PE** – Professional Subject –Elective ***MC**- Mandatory Course
***OE**- Open Elective, **MOOCs** – Massive Open Online Course

Open Elective/ CBCS
(Annexure-I)

1. Data Analytics - II
2. Artificial Intelligence
3. Introduction to Machine Learning
4. Software Process Management
5. Artificial Neural Networks
6. Service Oriented Architecture

Elective-I (MOOCs)
(Annexure-II)

1. Introduction to Big Data by Harward Univ via edx
2. Scalable Machine Learning by California Univ via edx
3. Human Computer Interaction by California Univ via corsevera
4. Visual Design by Harward Univ via edx
5. Big Data Analytics by IIT Madras, Chennai
6. Computer Maintenances
7. Web Performance Optimization
8. Introduction to Hadoop and Mapreduce
9. Introduction to Reverse Engineering Software

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Department of Computer Science & Engineering

I Year B.Tech (Common to all Branches) - I Semester

T	L	C
3+1*	0	3

MATHEMATICS – I
(Common to All Branches)

Objectives

- To train the students thoroughly in Mathematical concepts of ordinary differential equations and their applications in electrical circuits, deflection of beams, whirling of shafts.
- To prepare students for lifelong learning and successful careers using mathematical concepts of differential and Integral calculus, ordinary and partial differential equations.
- To develop the skill pertinent to the practice of the mathematical concepts including the students abilities to formulate the problems, to think creatively and to synthesize information.

UNIT – I

Exact, linear and Bernoulli equations. Applications to Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax}, sin ax, cos ax, polynomials in x, e^{ax} V(x), xV(x), method of variation of parameters. Applications to oscillatory electrical circuits, Deflection of Beams, whirling of shafts.

UNIT – II

Taylor's and Maclaurin's Series - Functions of several variables – Jacobian – Maxima and Minima of functions of two variables, Lagrange's method of undetermined Multipliers with three variables only. Radius of curvature, center of curvature, Involutes, evolutes and envelopes..

UNIT – III

Curve tracing – Cartesian, polar and parametric curves. Length of curves.

UNIT – IV

Multiple integral – Double and triple integrals – Change of Variables – Change of order of integration. Applications to areas and volumes, surface area of solid of revolution in Cartesian and polar coordinates using double integral.

UNIT – V

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Method of separation of variables – Solutions of one dimensional wave equation, heat equation and two-dimensional Laplace's equation under initial and boundary conditions.

TEXT BOOKS:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Engineering Mathematics, Volume - I, E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.

REFERENCES:

1. Engineering Mathematics Volume-I, by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S.Chand publication.
2. Engineering Mathematics, Volume - I, by G.S.S.Raju, CENGAGE publisher.

3. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.
4. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
5. Advanced Engineering Mathematics, by Alan Jeffrey, Elsevier.

Outcomes:

- The students become familiar with the application of differential and integral calculus, ordinary and partial differential equations to engineering problems.
- The students attain the abilities to use mathematical knowledge to analyze and solve problems in engineering applications.

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I Year B.Tech (Common to all Branches) I Semester	**T**	**L**	**C**
	3+1*	**0**	**3**

ENVIRONMENTAL STUDIES

OBJECTIVE: *To make the students to get awareness on environment, to understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life to save earth from the inventions by the engineers.*

UNIT – I

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES: – Definition, Scope and Importance – Need for Public Awareness.

NATURAL RESOURCES : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

UNIT – II

ECOSYSTEMS : Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological sucession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem.
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

BIODIVERSITY AND ITS CONSERVATION : Introduction 0 Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-soports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – III

ENVIRONMENTAL POLLUTION : Definition, Cause, effects and control measures of :

a. Air Pollution.
b. Water pollution
c. Soil pollution

d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

SOLID WASTE MANAGEMENT : Causes**,** effects and control measures of urban and industrial wates – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT – IV

SOCIAL ISSUES AND THE ENVIRONMENT : From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT – V

HUMAN POPULATION AND THE ENVIRONMENT : Population growth, variation among nations. Population explosion – Family Welfare Proggramme. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

FIELD WORK : Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, birds – river, hill slopes, etc..

Text books :

(1) Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press.
(2) Environmental Studies by Palaniswamy – Pearson education
(3) Environmental Studies by R.Rajagopalan, Oxford University Press.

References :

(1) Textbook of Environmental Science by Deeksha Dave and E.Sai Baba Reddy, Cengage Pubilications.
(2) Text book of Environmental Sciences and Technology by M.Anji Reddy, BS Publication.
(3) Comprehensive Environmental studies by J.P.Sharma, Laxmi publications.
(4) Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Printice hall of India Private limited.
(5) Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Printice hall of India Private limited.

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I Year B.Tech (Common to all Branches) - I Semester	**T**	**L**	**C**
	3+1*	**0**	**3**

TECHNICAL ENGLISH

1. INTRODUCTION:

English is an international language as well as a living and vibrant one. People have found that knowledge of English is a passport for better career, better pay, advanced knowledge and for communication with the entire world. As it is a language of opportunities in this global age, English is bound to expand its domain of use everywhere. The syllabus has been designed to enhance communication skills of the students of engineering and technology. The prescribed books serve the purpose of preparing them for everyday communication and to face the global competitions in future.

The first text prescribed for detailed study focuses on LSRW skills and vocabulary development. The teachers should encourage the students to use the target language. The classes should be interactive and student-centered. They should be encouraged to participate in the classroom activities keenly.

The text for non-detailed study is meant for extensive reading/reading for pleasure by the students. They may be encouraged to read some select topics on their own, which could lead into a classroom discussion. In addition to the exercises from the texts done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements, promotional material etc.

2. OBJECTIVES:

1. To enable the students to communicate in English for academic and social purpose
2. To enable the students to acquire structure and written expressions required for their profession.
3. To develop the listening skills of the students
4. To inculcate the habit of reading for pleasure
5. To enhance the study skills of the students with emphasis on LSRW skills

3. SYLLABUS:

UNIT –I

Chapter entitled *Humour* from "Using English"

Chapter entitled '*Homi Jehangir Bhabha'* from "New Horizons"

L- Listening -Techniques - Importance of phonetics
L- Meet & Greet and Leave taking, Introducing Oneself and Others (Formal and Informal situations)
R- -Reading Strategies -Skimming and Scanning
W- Writing strategies- sentence structures
G-Parts of Speech –Noun-number, pronoun-personal pronoun, verb- analysis
V-Affixes-prefix and suffix, root words, derivatives

UNIT –II

Chapter entitled *Inspiration* from "Using English"

Chapter entitled 'My Struggle for an Education' from "New Horizons"

L- Listening to details
S- Apologizing, Interrupting, Requesting and Making polite conversations
R-note making strategies
W- Paragraph-types- topic sentences, unity, coherence, length , linking devices
G-Auxiliary verbs and question tags
V- synonyms-antonyms, homonyms , homophones, homographs, words often confused

UNIT –III

Chapter entitled *Sustainable Development* from "Using English"
Chapter entitled 'The Autobiography of Abraham Lincoln' from "New Horizons"

L- Listening to themes and note taking
S- Giving instructions and Directions, making suggestions, Accepting ideas, fixing a time and Advising
R- Reading for details -1
W- Resume and cover letter
G- Tenses – Present tense, Past tense and Future tense
V-Word formation and One-Word Substitutes

UNIT –IV

Chapter entitled *Relationships* from "Using English"

Chapter entitled ' T*he Happy Prince* from "New Horizons"

L- Listening to news
S- Narrating stories, Expressing ideas and opinions and telephone skills
R- Reading for specific details and Information
W- Technical Report writing-strategies, formats-types-technical report writing
G- Voice and Subject – Verb Agreement
V- Idioms and prepositional Phrases

UNIT –V

Chapter entitled Science and Humanism from "Using English"
Chapter entitled 'If'from "New Horizons"
L- Listening to speeches
S- Making Presentations and Group Discussions
R- Reading for Information
W- E-mail drafting
G- Conditional clauses and conjunctions
V- Collocations and Technical Vocabulary and using words appropriately

4.EXPECTED OUTCOME:
The students will get the required training in LSRW skills through the prescribed texts and develop communicative competence

Prescribed Books:
1. **Using English (for detailed study)** published by Orient Black Swan, 2013
2. **New Horizons** published by Pearson, 2013

Suggested Reading:

1. **Raymond Murphy's English Grammar with CD,** Murphy, Cambridge University Press, 2012.
2. **English Conversation Practice –**Grant Taylor, Tata McGraw Hill, 2009.
3. **Communication Skills, Sanjay Kumar & Pushpalatha** Oxford University Press, 2012.
4. **A Course in Communication Skills**- Kiranmai Dutt & co. Foundation Books, 2012.
5. **Current English grammar and usage-**S M Guptha, PHI, 2013.
6. **Modern English Grammar-**Krishna SWAMI .McMillan, 2009.
7. **Powerful Vocabulary Builder**- Anjana Agarwal New Age International Publishers, 2011.
8. **Writing with a Purpose, Tickoo and Sasi Kumar, OUP, 2011**
9. **Strengthen Your Writing, Orient Blackswan**

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I- Year B.Tech. I-Sem	T	P	C
	3	0	3

ENGINEERING GRAPHICS
(CIVIL, EEE, ECE, CSE & CHEMICAL)

Unit-I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their significance Drawing Instruments and their Use – BIS Conventions in drawing and Lettering.

Curves used in practice:

a) Conic sections including the Rectangular Hyperbola
b) Cycloid, Epicycloid and Hypocycloid –Normals and Tangents
c) Involute of a circle –Normals and Tangents

Principles of orthographic projection, I and III angle projections –Conventions –Projections of points.

Unit –II

Projection of lines inclined to both planes –traces, Projection of plane figures inclined to both planes.

Unit –III

Projection of simple solids inclined to both planes.

Unit –IV

Sections and Developments: Sections and Sectional views of Regular solids –Prism, Cylinder, Pyramid, Cone – True shapes.

Unit –V

Isometric projections: Principles of pictorial representations-Isometric projection- Isometric scale-Isometric views- conventions- Isometric views of plane figures, solids-Isometric projection of objects with non isometric lines-Isometric projection of spherical parts.

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhat, Charotar Publishers
2. Engineering Drawing, K.L. Narayana& P. Kannaih, Scitech Publishers, Chennai.

REFERENCES:

1. Engineering Drawing, Johle, Tata McGraw-Hill Publishers.
2. Engineering Drawing, Shah and Rana,2/e, Pearson Education
3. Engineering Drawing and Graphics, Venugopal/New age Publishers
4. Engineering Graphics, John&john.

Suggestions:

Student is expected to buy a book mentioned under 'Text books' for better understanding.
Student should prepare rough sketches for all the problems given at the end of each chapter to improve his / her imaginations.
Student should also practice Auto CAD or any other drawing software to help understanding better.

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I Year B.Tech I Semester	**T**	**L**	**C**
	3+1*	**0**	**3**

APPLIED PHYSICS

(Common to EEE, ECE, CSE)

UNIT 1: PHYSICAL OPTICS, LASERS AND FIBRE OPTICS

Physical Optics: Introduction - Interference in thin films by reflection – Newton's Rings – Fraunhofer diffraction due to single slit, double slit and diffraction grating.

Lasers: Introduction - Characteristics of laser – Spontaneous and stimulated emission of radiation –- Einstein's coefficients — Population inversion – Pumping mechanisms - Ruby laser - He-Ne laser – Applications of lasers.

Fibre optics: Introduction– Construction and working principle of optical fiber –Numerical aperture and acceptance angle – Types of optical fibers –Optical fiber communication system – Applications of optical fibers.

UNIT 2: CRYSTALLOGRAPHY AND QUANTUM MECHANICS

Crystallography: Introduction – Space lattice –Unit cell – Lattice parameters –Bravias lattice – Crystal systems – Packing fractions of SC, BCC and FCC -Directions and planes in crystals – Miller indices – Interplanar spacing in cubic crystals – X-ray diffraction - Bragg's law –Bragg's Spectrometer.

Quantum Mechanics: Introduction to matter waves – de'Broglie hypothesis - Schrodinger's time independent wave equation – Significance of wave function - Particle in a one dimensional infinite potential well.

UNIT 3: FREE ELECTRON THEORY AND SEMICONDUCTORS

Free electron theory: Classical free electron theory –- Sources of electrical resistance - Equation for electrical conductivity - Quantum free electron theory – Fermi-Dirac distribution –Kronig-Penny model(qualitative) – Origin of bands in solids – Classification of solids into conductors, semiconductors and insulators.

Semiconductor physics: Introduction – Intrinsic and extrinsic semiconductors – Drift & diffusion currents and Einstein's equation – Continuity equation -Hall Effect.

UNIT 4: DIELECTRICS AND MAGNETIC MATERIALS

Dielectrics: Introduction – Dielectric Polarization – Types of Polarization – Lorentz field – Clausius-Mosotti equation – Dielectric strength, loss, breakdown.

Magnetic materials: Introduction and basic definitions – Origin of magnetic moment – Classification of magnetic materials into dia, para, ferro, antiferro and ferri magnetic materials – Hysteresis - Soft and hard magnetic materials – Applications of magnetic materials.

UNIT 5: **SUPERCONDUCTIVITY AND PHYSICS OF NANOMATERIALS**

Superconductivity: Introduction - Properties of superconductors – Meissner effect– Type I and type II superconductors – Flux quantization – London penetration depth – ac and dc Josephson effects – BCS theory(qualitative) - Applications of superconductors.

Physics of Nanomaterials: Introduction - Significance of nanoscale - Surface area and quantum confinement – Physical properties, optical, thermal, mechanical and magnetic properties – Synthesis of nanomaterials: ball milling, chemical vapour deposition, sol-gel – Carbon nanotubes & its properties.

Prescribed Text books:

1. Engineering physics – S. ManiNaidu, Pearson Education
2. Engineering Physics – P.K.Palanisamy, Scitech Publications

Reference Books:

1. Engineering Physics – V. Rajendran, K.Thyagarajan Tata MacGraw Hill Publishers
2. Engineering Physics – D K Pandey, S. Chaturvedi, Cengage Learning
3. Engineering Physics - Sanjay D. Jain, D. Sahasrambudhe and Girish University Press
4. Engineering Physics – M. Arumugam, Anuradha Publications
5. Engineering physics – M.N. Avadhanulu and P.G. KrshiSagar, Chand and Co
6. Nanomaterials – A.K.Bandopadhyaya, New Age Publishers
7. Carbon nanotubes and Graphene Device Physics – H.S. Philip Wong, Deji Akinwande, Cambridge University Press

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I B.Tech.-I Sem. **T P C**
0 3 2

APPLIED PHYSICS LABORATORY

Any EIGHT of the following experiments has to be performed during the SEMESTER

1. Determination of wavelengths of various colours of mercury spectrum using diffraction grating in normal incidence method.
2. Determination of dispersive power of the prism
3. Determination of thickness of thin object by wedge method.
4. Determination of radius of curvature of lens by Newton's rings.
5. Laser : Diffraction due to single slit
6. Laser : Diffraction due to double slit
7. Laser: Determination of wavelength using diffraction grating
8. Determination of Numerical aperture of an optical fiber.
9. Meldes experiment: Determination of the frequency of tuning fork
10. Sonometer: Verification of the three laws of stretched strings
11. Energy gap of a material using p-n junction diode
12. Electrical conductivity by four probe method
13. Determination of thermistor coefficients (α, β)
14. Hall effect : Determination of mobility of charge carriers in semiconductor
15. B-H curve
16. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method.
17. Determination of lattice constant using X-ray spectrum.

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I Year B.Tech - I Semester

T	L	C
0	3	2

ENGLISH LANGUAGE COMMUNICATION SKILLS (ELCS) LAB

The **Language Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

OBJECTIVES:

- To train students to use language effectively in everyday conversations, to participate in group discussions, to help them face interviews, and sharpen public speaking skills
- To expose the students to a varied blend of self-instructional learner-friendly modes of language learning through computer-aided multi-media instruction.
- To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.
- To help the second language learners to acquire fluency in spoken English and neutralize mother tongue influence
- To train students to use language appropriately for interviews, group discussion and public speaking

SYLLABUS:

UNIT- I

Phonetics – Introduction to Sounds of Speech – Vowels – Consonants – Phonetic Transcription & Orthographic Transcription

UNIT – II

Syllabification – Word Stress – Rules of word stress – Intonation – Falling tone and Rising tone

UNIT – III

Situational Dialogues – Role-play – Expressions in various situations – Self Introduction – Introducing others – Greetings – Apologies – Requests – Social and Professional etiquettes – Telephone Etiquettes

UNIT – IV

JAM – Describing object/person/place/situation – Giving directions

UNIT – V

Debates and Group Discussions

EXPECTED OUTCOMES :

- Becoming active participants in the learning process and acquiring proficiency in spoken English of the students
- Speaking with clarity and confidence thereby enhancing employability skills of the students

MINIMUM REQUIREMENT FOR ELCS LAB:

The English Language Lab shall have two parts:

1. Computer Assisted Language Learning (CALL) Lab:
   The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.
2. The Communication Skills Lab with movable chairs and audio-visual aids with a P.A. system, Projector, a digital stereo-audio & video system and camcorder etc.

System Requirement (Hardware component):

Computer network with LAN with minimum 60 multimedia systems with the following specifications:

- i) P – IV Processor
  - a) Speed – 2.8 GHZ
  - b) RAM – 512 MB Minimum
  - c) Hard Disk – 80 GB
- ii) Headphones of High quality

Suggested software:

1. Clarity Pronunciation Power – Part I (Sky Pronunciation)
2. Clarity Pronunciation Power – part II
3. K-Van Advanced Communication Skills
4. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
5. *DELTA's key to the Next Generation TOEFL Test: Advanced Skills Practice.*
6. Lingua TOEFL CBT Insider, by Dreamtech
7. English Pronunciation in Use (Elementary, Intermediate, Advanced) CUP
8. Cambridge Advanced Learners' English Dictionary with CD.

Reference books:

1. **A Textbook of English Phonetics for Indian Students** 2nd Ed T. Balasubramanian. (Macmillian),2012.
2. **A Course in Phonetics and Spoken English**, Dhamija Sethi, Prentice-Hall of India Pvt.Ltd
3. **Speaking English Effectively**, 2nd Edition Krishna Mohan & NP Singh, 2011. (Mcmillan).
4. **A Hand book for English Laboratories**, E.Suresh kumar, P.Sreehari, Foundation Books,2011
5. **English Pronunciation in Use. Intermediate & Advanced** ,Hancock, M. 2009. CUP
6. **Basics of Communication in English** ,Soundararaj, Francis. 2012.. *New Delhi: Macmillan*
7. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.

English Pronouncing Dictionary, Daniel Jones Current Edition with CD.Cambridge, 17th edition, 2011.

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I B.Tech.-I Sem.

T	P	C
0	3	2

Engineering & IT Workshop
(Common to All Branches)

Part – A: Engineering Workshop Lab

1. TRADES FOR EXERCISES:

At least 2 exercise In each:

1. Carpentry
2. Fitting
3. House-wiring
4. Black Smithy
5. Tin smithy
6. Power Tools Demonstration

TEXT BOOK:

1. Work shop Manual / P.Kannaiah/ K.L.Narayana/ Scitech Publishers.

Objective : The objective of this subject is to provide the basic concepts about different manufacturing processes and use of various workshop tools the exposer to the Power tools used in the inclusion

Codes / Tables : Nil

Question Paper pattern : Test in any two out of 6 trades.

PART – B: IT Workshop

Course Objectives

- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations
- To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system
- Disassemble and Assemble a Personal Computer and prepare the computer ready to use
- Prepare the Documents using Word processors
- Prepare Slide presentations using the presentation tool
- Install single or dual operating systems on computer

Preparing your Computer (4 weeks)

Task 1: Identify the internal parts of a computer of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram.

Task 2: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available. Students should record the process of assembling and trouble shooting a computer.

Task 3: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Task 4: Students should record the various features that are supported by the operating system installed and submit it.

Productivity tools (3 weeks)

Task 5: Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables etc, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages etc at the end of the task. Students should submit a user manual of the word processor considered.

Task 6: Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet application considered.

Task 7: Presentations : creating, opening, saving and running the presentations; Selecting the style for slides, formatting the slides with different fonts, colours; creating charts and tables, inserting and deleting text, graphics and animations; bulleting and numbering; hyperlinking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

References:

1. "Introduction to Computers", Peter Norton, Mc Graw Hill
2. "LaTeX Companion" – Leslie Lamport, PHI/Pearson.
3. "MOS study guide for word, Excel, Powerpoint & Outlook Exams", Joan Lambert, Joyce Cox, PHI.
4. "Introduction to Information Technology", ITL Education Solutions limited, Pearson Education.
5. "Networking your computers and devices", Rusen, PHI "Trouble shooting, Maintaining & Repairing PCs", Bigelows, TMH.

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MATHEMATICS - II

(Common to All Branches)

Objectives: Our emphasis will be more on conceptual understanding and application of Fourier series, Fourier, Z and Laplace transforms and vector calculus.

UNIT – I

Fourier Series: Determination of Fourier coefficients – Fourier series – Even and odd functions – Fourier series in an arbitrary interval – Even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

UNIT – II

Fourier integral theorem (only statement) – Fourier sine and cosine integrals. Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – Finite Fourier transforms.

UNIT – III

z-transform – Inverse z-transform – Properties – Damping rule – Shifting rule – Initial and final value theorems. Convolution theorem – Solution of difference equations by z-transforms.

UNIT – IV

Laplace transform of standard functions – Inverse transform – First shifting Theorem, Transforms of derivatives and integrals – Unit step function – Second shifting theorem – Dirac's delta function – Convolution theorem – Laplace transform of Periodic function.

Differentiation and integration of transform – Application of Laplace transforms to ordinary differential equations of first and second order.

UNIT – V

Vector Calculus: Gradient – Divergence – Curl and their properties; Vector integration – Line integral - Potential function – Area – Surface and volume integrals. Vector integral theorems: Green's theorem – Stoke's and Gauss's Divergence Theorem (Without proof). Application of Green's, Stoke's and Gauss's Theorems.

TEXT BOOKS:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Engineering Mathematics, Volume - II, E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.

REFERENCES:

1. Engineering Mathematics, Volume - II, by G.S.S.Raju, CENGAGE publisher.
2. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad S. Chand publication.
3. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
4. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.

Outcomes:

- The student gains the knowledge to tackle the engineering problems using the concepts of Fourier series, various transforms and vector calculus.

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MATHEMATICAL METHODS
(Common to All Branches)

Objectives:

- This course aims at providing the student with the concepts of Matrices, Numerical Techniques and Curve fitting.

UNIT – I

Elementary row transformations-Rank – Echelon form, normal form – Consistency of System of Linear equations. Linear transformations. Hermitian, Skew-Hermitian and Unitary matrices and their properties. Eigen Values, Eigen vectors for both real and complex matrices. Cayley – Hamilton Theorem and its applications – Diagonolization of matrix. Calculation of powers of matrix. Quadratic forms – Reduction of quadratic form to canonical form and their nature.

UNIT – II

Solution of Algebraic and Transcendental Equations: The Bisection Method – The Method of False Position– Newton-Raphson Method.

UNIT – III

Interpolation: Newton's forward and backward interpolation formulae – Lagrange's formulae. Gauss forward and backward formula, Stirling's formula, Bessel's formula,

UNIT – IV

Curve fitting: Fitting of a straight line – Second degree curve – Exponentional curve-Power curve by method of least squares. Numerical Differentiation and Integration – Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule.

UNIT – V

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Methods – Predictor-Corrector Method – Milne's Method. Numerical solutions of Laplace equation using finite difference approximation.

TEXT BOOKS:

3. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
4. Introductory Methods of Numerical Analysis, S.S. Sastry, PHI publisher.

REFERENCES:

3. Engineering Mathematics, Volume - II, E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.
4. Engineering Mathematics, Volume - II, by G.S.S.Raju, CENGAGE publisher.
5. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S. Chand publication.
4. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
5. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.

Outcomes:

The student will be able to analyze engineering problems using the concepts of Matrices and Numerical methods.

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BASIC ELECTRICAL ENGINEERING

Objective:

Basic Electrical Engineering contains basic Electrical Laws, Network theorems, AC & DC generators and motors which are widely used in industry are covered and their performance aspects will be studied.

UNIT – I INTRODUCTION TO ELECTRICAL ENGINEERING

Ohm's Law, Basic Circuit Components, Kirchhoff's Laws, Types of Sources, Resistive Networks, Inductive Networks, Capacitive Networks, Series Parallel Circuits, Star Delta and Delta Star Transformation. Principle of AC Voltages, Root Mean Square and Average Values of Alternating Currents and Voltage, Form Factor and Peak Factor, Phasor Representation of Alternating Quantities, The J Operator and Phasor Algebra, Analysis of Ac Circuits With Single Basic Network Element, Single Phase Series and Parallel Circuits.

UNIT- II NETWORK THEOREMS & TWO PORT NETWORKS

Network Theorems: Thevenin's, Norton's, Maximum Power Transfer and Millman's Theorems for DC and Sinusoidal Excitations. Tellegen's, Superposition, Reciprocity and Compensation Theorems for DC And Sinusoidal Excitations.

Two Port Networks: Two Port Network Parameters – Impedance, Admittance, Transmission and Hybrid Parameters and Their Relations. Concept of Transformed Network - Two Port Network Parameters Using Transformed Variables.

UNIT-III DC MACHINES

DC Generators: Principle of Operation, Constructional details, Types of DC Generators, E.M.F Equation, DC Generator characteristics and Applications.

DC Motors: Principle of Operation of DC Motors, Types of DC Motors, Torque Equation, Losses and Efficiency Calculation in DC Motor- Swinburne's Test and Applications.

UNIT-IV AC MACHINES

Transformers: Principles of Operation, EMF equation, Losses and Efficiency, Regulation of Transformer, Testing: OC & SC Tests.

Three Phase Induction Motors: Principle of Operation, Slip and Rotor Frequency, Slip- Torque characteristics (Problems).

Alternators: Principle of operation, EMF equation, Regulation of alternator by Synchronous Impedance method.

UNIT V MEASURING INSTRUMENTS

Introduction, Classification of Instruments, Operating Principles, Essential Features of Measuring Instruments, Moving Coil Permanent Magnet (PMMC) And Moving Iron Instruments (Voltmeters And Ammeters)- Extension of Range of the Meters.

OUTCOME:

After going through this course the student gets a thorough knowledge on basics of Network theorems, Two port networks, DC & AC Machines with which he/she can able to apply the above conceptual things to real-world problems and applications.

TEXT BOOKS:

1. Basic Electrical Engineering - By M.S.Naidu and S. Kamakshiah – TMH.
2. Basic Electrical Engineering –By T.K.Nagasarkar and M.S. Sukhija Oxford University Press.
3. Electrical and Electronic Technology-By Hughes – Pearson Education.

REFERENCES:

1. Theory and Problems of Basic Electrical Engineering by D.P.Kothari & I.J. Nagrath PHI.
2. Principles of Electrical Engineering by V.K Mehta, S.Chand Publications.
3. Fundamentals of Electrical Electronics Engineering by T.Thyagarajan, SCITECH Publications 5th Edition-2007

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I Year B.Tech - II Semester

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ENGINEERING CHEMISTRY

(Common to EEE,ECE,CSE)

Knowledge in chemistry serves as basic nutrient for the understanding and thereby design of materials of importance in life. Thus the advancement in Engineering depends on the outcome of basic sciences. Many advances in engineering either produce a new chemical demand as in the case of polymers or wait upon chemical developments for their applications as in the case of implants and alloys. Currently the electronics and computer engineers are looking forward for suitable biopolymers and nano materials for use in miniature super computers, the electrical materials engineers are in search of proper conducting polymers, the mechanical engineers are on lookout for micro fluids and the civil engineers are looking for materials that are environmental friendly, economical but long lasting.

COURSE OBJECTIVES (CO):

- The Applied Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial/engineering applications.
- The main aim of the course is to impart in-depth knowledge of the subject and highlight the role of chemistry in the field of engineering.
- The lucid explanation of the topics will help students to understand the fundamental concepts and apply them to design engineering materials and solve problems related to them. An attempt has been made to logically correlate the topic with its application.
- The extension of fundamentals of electrochemistry to energy storage devices such as commercial batteries and fuel cells is one such example.
- After the completion of the course, the student would understand about the concepts of chemistry in respect of Electrochemical cells, fuel cells, mechanism of corrosion and factors to influence, polymers with their applications and engineering materials.

UNIT.1: ELECTROCHEMISTRY

i).Review of electrochemical cells, Numerical calculations, Batteries: Rechargeable batteries (Lead acid, Ni-Cd, Lithium Ion Batteries),Fuels cells: (Hydrogen-Oxygen and Methanol-Oxygen)

ii).Electrochemical sensors: Potentiometric Sensors and voltammetric sensors. Examples : analysis of Glucose and urea

iii).Corrosion: Electrochemical Theory of corrosion, Factors affecting the corrosion. Prevention: Anodic and cathodic protection and electro and electroless plating

UNIT.2: POLYMERS

i).Introduction to polymers, Polymerisation process, mechanism: cationic, anionic, free radical and coordination covalent.

Elastomers (rubbers), Natural Rubber; Compounding of Rubber

Synthetic Rubber: Preparation, properties and engineering applications of Buna-S, buna-N, Polyurethene, Polysulfide (Thiokol) rubbers

Plastomers: Thermosetting and Thermoplatics, Preparation, properties and Engineering applications , PVC, Bakelite, nylons.

ii).Conducting polymers: Mechanism, synthesis and applications of polyacetyline, polyaniline.

iii).Liquid Crystals: Introduction, classification and applications

iii).Inorganic Polymers: Basic Introduction, Silicones, Polyphospazins (-(R)2-P=N-) applications

UNIT.3: FUEL TECHNOLOGY

i).Classifications of Fuels – Characteristics of Fuels- Calorific Value – Units, Numerical Problems. Solid Fuels–Coal, Coke : Manufacture of Metallurgical Coke by Otto Hoffmann's by product oven processes.

ii).Liquid Fuels:

Petroleum: Refining of Petroleum, Gasoline: Octane Number, Synthetic Petrol: Bergius Processes, Fischer Troph's synthesis

Power Alcohol: Manufacture, Advantages and Disadvantages of Power Alcohol

iii). Gaseous Fuels: Origin, Production and uses of Natural gas, Producer gas, Water gas, Coal gas and Biogas.

iv). Nuclear Fuels: Controlled and uncontrolled reactions. Breeder reactor and Power reactors.

UNIT.4: CHEMISTRY OF ENGINEERING MATERIALS

i).Electrical Insulators or Dielectric materials: Definition and classification, Characteristics of electrical insulators. Applications of electrical insulating materials (Gaseous, liquid and solid insulators)

iii).Semiconducting and Super Conducting materials-Principles and some examples

iii).Magnetic materials – Principles and some examples

UNIT.5: PHOTOCHEMISTRY & COMPOSITE MATERIALS

i). Photochemical Reactions, Difference between Photochemical reactions and thermo chemical reactions. Absorption of light: Beer-Lambert's law . Photo-physical Processes: a) Fluorescence, (b) Phosphorescence and (c) Chemi-luminiscence and their applications

ii). Composite Materials: Classification of Composites materials, Constituents of Composite materials. Disperse Phase composite materials Ex. a) Glass fibre reinforced polymer composite and b) Carbon fibre reinforced polymer composite materials. Advantages and applications of Composites.

EXPECTED OUTCOMES (EO): The student is expected to:

- Understand the electrochemical sources of energy
- Understand industrially based polymers, various engineering materials.
- Differentiation and uses of different kinds of Photochemical reactions.

Text Books:

1. Engineering Chemistry by KNJayaveera, GVSubba Reddy and C. Ramachandraiah, McGraw Hill Higher Education, Foruth Edition, New Delhi
2. A Text book of Engineering Chemistry by SS Dhara, S. Chand Publications, New Delhi

References:

1. A Text Book of Enigneering Chemistry, Jain and Jain, Dhanapathi Rai Publications, New Delhi
2. Engineering Chemistry by K.B.Chandra Sekhar, UN.Das and Sujatha Mishra, SCITECH Pubblications India Pvt Limited.
3. Concepts of Engineering Chemistry- Ashima Srivastavaf and N.N. Janhavi
4. Text Book of Engineering Chemistry – C. Parameswara Murthy, C.V.Agarwal and Andra Naidu
5. Chemistry of Engineering Materials, C.V.Agarwal, C.Parameswaramurthy and Andranaidu
6. Text Book of Engineering Chemistry, Shashichawla, Dhanapathirai Publications.

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TECHNICAL COMMUNICATION & PRESENTATION SKILLS (Theory)

Preamble:

In the increasingly globalized world, technical communication and presentation skills are assuming great importance. Industries and employers constantly complain that young engineers have adequate technical knowledge, but no communication and presentation skills. Success is defined these days in terms of possessing these skills. The syllabus has been designed to develop communicative competencies of the students.

Objectives:

1. To develop awareness in students of the relevance and importance of technical communication and presentation skills.
2. To prepare the students for placements
3. To provide students with interactive practice sessions to make them internalize these skills

Outcome:

Turning out the students with a clear concept of communication and presentation skills, getting them ready for placements and equipping them with readiness to implement them at work place.

UNIT 1:

Basics of Technical Communication – Introduction – Objectives & Characteristics of Technical Communication – Importance and need for Technical communication - LSRW Skills – Barriers to effective communication

UNIT II

Informal and Formal Conversation - Verbal and Non-verbal communication –Kinesics, Proxemics, Chronemics, Haptics, Paralanguage

UNIT III

Written communication – Differences between spoken and written communication – Features of effective writing –Advantages and disadvantages of spoken and written communication

UNIT IV

Presentation Skills – Nature and importance of oral presentation – Defining the purpose – Analyzing the audience - Planning and preparing the presentation, organizing and rehearsing the presentation – Individual and group presentations - Handling stage fright

UNIT V

Interview Skills – The Interview process –Characteristics of the job interview – Pre-interview preparation techniques – Projecting the positive image – Answering Strategies

Prescribed Books

1. Effective Technical Communication, Ashrif Rizvi, TataMcGrahill, 2011
2. Technical Communication by Meenakshi Raman & Sangeeta Sharma, O U Press 2009

Reference Books

2013-2014

1. Communication Skills by Pushpalatha & Sanjay Kumar, Oxford Univsesity Press
2. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/Cambridge University Press.2012.
3. Soft Skills for Everyone, Butterfield Jeff, Cengage Publications, 2011.
4. Management Shapers Series by Universities Press (India) Pvt Ltd., Himayatnagar, Hyderabad 2008.
5. Handbook for Technical Writing by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
6. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hill 2009.

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COMPUTER PROGRAMMING

Course Objective:

- To understand the core aspects of computer problem solving techniques
- To understand the programming language constructs
- To understand the programming paradigms
- To understand the compound data types
- To understand dynamic memory allocation concepts

Course Outcomes

- Able to design the flowchart and algorithm for real world problems
- Able to learn and understand new programming languages
- Able to construct modular and readable programs
- Able to write C programs for real world problems using simple and compound data types
- Adapt programming experience and language knowledge to other programming language contexts
- Employee good programming style, standards and practices during program development

Unit - I

Introduction to Computers: Computer Systems, Computing Environment, Computer Languages, Creating and Running Programs, System Developments.

Introduction to the C Language: Introduction, C programs, Identifiers, Types, Variables, Constants, Input and Output, Programming Examples.

Introduction to Computer Problem Solving: Introduction , The Problem-Solving Aspect, Top-down Design, Bottom - up Approach, Flowcharts, Implementation of Algorithms, Program Verification, The Efficiency of Algorithms, The Analysis of Algorithms.

Unit – II

Structure of C program: Expressions, Precedence and Associatively, Evaluating Expressions, Type Conversion, Statements, Sample Programs.

Selections and Making Decisions: Logical Data and Operators, Two way Selection, Multiway Selection.

Repetition: Concept of Loop, Pretest and Posttest Loops, Initialization and Updation, Event and Counter Controller Loop, Loops in C, Looping Applications.

Fundamental Algorithms: Exchanging the values between two variables, Counting, Summation of a set numbers, Factorial Computation, Sine Function Computation, Generation of the Fibonacci Sequence, Reversing the digits of a integer, Basic conversions, Character to Number Conversion

Unit – III

Factoring Methods: Finding Square root of a Number, The Smallest Deviser of an Integer, The GCD of two Integers, Generating Prime Numbers, Computing Prime Factor of an Integer, Computing the prime factors of an Integer, Generation of Pseudo Random Number, Raising the number to Large Power, Computing the n^{th} Fibonacci.

Functions: Introduction, User Defined Functions, Inter Function Communication, Standard Functions, Scope, Programming Examples.

Array Techniques: Array Order Reversal, Array Counting, Finding the Maximum Number Set, Removal Duplicates from an Ordered Array, Partitioning an Array, Finding k^{th} smallest Element, Longest Monotone Subsequence.

Arrays: Introduction, Two Dimensional Arrays, Multi Dimensional Arrays, Inter Function Communication, Array Applications, Exchange Sort, Binary Search, Linear Search.

Unit – IV

Strings: String Concepts, C Strings, Sting Input/Output Functions, Arrays of Strings, String Manipulation Functions, String/Data Conversion.

Enumerated, Structure, and Union Types: The Type Definition, Enumerated Types, Structure, Unions, Programming Applications.

Bitwise Operators: Exact Size Integer Types, Logical Bitwise Operators, Shift Operators, Mask.

Unit – V

Pointers: Introduction, Pointers for Inter Function Communication, Pointers to Pointers, Compatibility, Lvalue and Rvalue.

Pointer Applications: Array and Pointers, Pointer Arithmetic and Arrays, Passing an Array to a Function, Memory Allocation Functions, Array of Pointers, Programming Applications.

Binary Input/output: Text Versus Binary Streams, Standard Library Functions for Files, Converting File Type.

Text Books :

1. How to Solve it by Computer by R.G. Dromey, Pearson
2. Computer Science, A Structured Programming Approach Using C by Behrouz A. Forouzan & Richard F. Gilberg, Third Edition, Cengage Learning

Reference Books :

1. Programming in C: A Practical Approach, Ajay Mittal, Pearson.
2. The C programming Language, B. W. Kernighan and Dennis M. Ritchi, Pearson Education.
3. Problem Solving and Programming Designs in C, J. R. Hanly and E.B. Koffman.,
4. Programming with C Rema Theraja, Oxford
5. Problem Solving with C, M.T.Somashekara, PHI
6. C Programming with problem solving, J.A. Jones & K. Harrow,Dreamtech Press
7. Programming with C, R.S.Bickar, Universities Press.

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ENGINEERING CHEMISTRY LAB

The experiments are designed in a manner that the students can validate their own theory understanding in chemistry by self involvement and practical execution. Thus the execution of these experiments by the student will reinforce his/her understanding of the subject and also provide opportunity to refine their understanding of conceptual aspects. As a result, the student gets an opportunity to have feel good factor at the laboratory bench about the chemical principles that he/she learned in the classroom.**Programme Objective**:

- Will learn practical understanding of the redox reaction
- Will able to understand the function of fuel cells, batteries and extend the knowledge to the processes of corrosion and its prevention
- Will learn the preparation and properties of synthetic polymers and other material that would provide sufficient impetus to engineer these to suit diverse applications
- Will also learn the hygiene aspects of water would be in a position to design methods to produce potable water using modern technology

LIST OF EXPERIMENTS

1. Determination of total hardness of water by EDTA method.
2. Determination of Copper by EDTA method.
3. Estimation of Dissolved Oxygen by Winkler's method
4. Determination of Copper by Iodometry
5. Estimation of iron (II) using diphenylamine indicator (Dichrometry – Internal indicator method).
6. Determination of Alkalinity of Water
7. Determination of acidity of Water
8. Preparation of Phenol-Formaldehyde (Bakelite)
9. Determination of Viscosity of oils using Redwood Viscometer I
10. Determination of Viscosity of oils using Redwood Viscometer II
11. Conductometric titration of strong acid Vs strong base (Neutralization titration).
12. Conductometric titration of Barium Chloride vs Sodium Sulphate (Precipitation Titration)
13. Determination of Corrosion rate and inhibition efficiency of an inhibitor for mild steel in hydrochloric acid medium.
14. Estimation of Chloride ion using potassium Chromite indicator (Mohrs method)

(Any 10 experiments from the above list)

Course Outcomes:

- Would be confident in handling energy storage systems and would be able combat chemical corrosion
- Would have acquired the practical skill to handle the analytical methods with confidence.
- Would feel comfortable to think of design materials with the requisite properties
- Would be in a postion to technically address the water related problems.

Text Books:

1. Vogel's Text book of Quantitative Chemical Analysis, Sixth Edition – J. Mendham et al, Pearson Education.
2. Chemistry Practical – Lab Manual by Chandra Sekhar, GV Subba Reddy and Jayaveera.

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COMPUTER PROGRAMMING LAB

(Common to Civil, EEE, ME, CSE, Chemical)

Week-1

1) Write an algorithm and draw a flowchart to make the following exchange between the variables a-> b -> c->d - > a
2) Write an algorithm and draw a flowchart to generate the first n terms of the sequence. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.
3) Write a algorithm and draw a flowchart to carry out the arithmetic operations addition, subtraction, multiplication, and division between two variables
4) Write a algorithm and draw a flowchart for printing prime numbers between 1 and n.

Week-2

1) Write a C program to construct a multiplication table for a given number.
2) Write a program to reverse the digit of a given integer.
1) Write a C program to calculate the factorial of a given number

Week-3

Write a program to calculate tax, given the following conditions:

a) If income is less than 1,50,000 then no tax.
b) If taxable income is in the range 1,50,001 – 300,000 then charge 10% tax
c) If taxable income is in the range 3,00,001 – 500,000 then charge 20% tax
d) If taxable income is above 5,00,001 then charge 30% tax

Week-4

1) Write a program to print the calendar for a month given the first Week- day of the month.

Input the first day of the month (Sun=0,Mon=1,Tue=2,Wed=3,.....) :: 3

Total number of days in the month : 31

Expected output

Sun	*Mon*	*Tue*	*Wed*	*Thu*	*Fri*	*Sat*
-	-	-	*1*	*2*	*3*	*4*
5	*6*	*7*	*8*	*9*	*10*	*11*
12	*13*	*14*	*15*	*16*	*17*	*18*
19	*20*	*21*	*22*	*23*	*24*	*25*
25	*26*	*27*	*28*	*29*	*30*	*31*

Week-5

1) Write a program to print the Pascal triangle for a given number
2) Write a program to calculate the following expression for given x value

$$f(x) = a_0 + \sum_{n=1}^{\infty}\left(a_n \cos\frac{n\pi x}{L} + b_n \sin\frac{n\pi x}{L}\right)$$

Week-6

1) Write C code to define a function cash_dispense, which takes an amount as its input, and returns the number of 1000, 500, 100, 50, 20, 10, 5, 2, 1 rupee denomination that make up the given amount.
2) Write C code to reverse the contents of the array. For example, [1,2,3,4,5] should become [5,4,3,2,1]
3) Write a program that will search and find out the position where the given key element exist in a user chosen array and print it as output.

Week-7

1) Write C code to compute the frequency table of survey responses given by 20 users. The survey responses range from 1 to 5 and are stored in an array. For example, 10 responses are stored in the array [1,1,5,2,3,3,5,5,2,2]. The frequency table will be as shown below:
   a. 1 = 2
   b. 2 = 3
   c. 3 = 2
   d. 4 = 0
   e. 5 = 3
2) Write a program to define a function to sort an array of integers in ascending order by using exchange sort.

Week-8

1) Write a C program to check whether a given string is a palindrome or not, without using any built-in functions
2) Write a function that accepts a string and delete the first character.
3) Write a function that accepts a string and delete all the leading spaces.

Week-9

Write a program to accept a string from user and display number of vowels, consonants, digits and special characters present in each of the words of the given string.

Week-10

1) Write a C program to define a union and structure both having exactly the same numbers using the sizeof operators print the sizeof structure variables as well as union variable
2) Declare a structure *time* that has three fields *hr, min, secs.* Create two variables, *start_time* and *end_time.* Input there values from the user. Then while *start_time* is not equal to *end_time* display GOOD DAY on screen.

Week-11

1) Write a program to read in an array of names and to sort them in alphabetical order. Use sort function that receives pointers to the functions strcmp, and swap, sort in turn should call these functions via the pointers.
2) Write a program to read and display values of an integer array. Allocate space dynamically for the array using the *malloc().*
3) Write a program to calculate area of a triangle using function that has the input parameters as pointers as sides of the triangle.

Week-12

1) Two text files are given with the names text1 and text2. These files have several lines of text. Write a program to merge (first line of text1 followed by first line of text2 and so on until both the files reach the end of the file) the lines of text1 and text2 and write the merged text to a new file text3.
2) Write a program to split a given text file into n parts. Name each part as the name of the original file followed by .part<**n**> where n is the sequence number of the part file.

Reference Books:

1. Computer Science, A Structured Programming Approach Using C by Behrouz A. Forouzan & Richard F. Gilberg, Third Edition, Cengage Learning
2. C Programming A Problem-Solving Approach, Behrouz A. Forouzan & E.V. Prasad, F. Gilberg, Third Edition, Cengage Learning
3. Programming with C Rema Theraja, Oxford
4. "C Test Your Skills", Kamthane, Pearson Education
5. Programming in C: A Practical Approach, Ajay Mittal, Pearson
6. Problem solving with C, M.T.Somasekhara, PHI
7. C Programming with problem solving, J.A. Jones & K. Harrow,Dreamtech Press

Programming withc, Byron S Gottfried, Jitender Kumar Chhabra, TMH, 2011

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MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS

Course Objective: The objectives of this course are to equip the student with the basic inputs of Managerial Economics and Economic Environment of business and to enrich analytical skills in helping them take sound financial decisions for achieving higher productivity.

Unit I: INTRODUCTION TO MANAGERIAL ECONOMICS

Managerial Economics - Definition, nature and scope – contemporary importance of Managerial Economics - Demand Analysis: Determinants- Law of Demand - Elasticity of Demand. Significance – types – measurement of elasticity of demand - Demand forecasting- factors governing demand forecasting- methods of demand forecasting –Relationship of Managerial Economics with Financial Accounting and Management.

UNIT II :THEORY OF PRODUCTION AND COST ANALYSIS

Production Function – Short-run and long- run production - Isoquants and Isocosts, MRTS, least cost combination of inputs - Cobb-Douglas production function - laws of returns - Internal and External economies of scale - **Cost Analysis**: Cost concepts - Break-Even Analysis (BEA) - Managerial significance and limitations of BEA - Determination of Break Even Point (Simple Problems)

UNIT III: INTRODUCTION TO MARKETS AND NEW ECONOMIC ENVIRONMENT

Market structures: Types of Markets - Perfect and Imperfect Competition - Features, Oligopoly - Monopolistic competition. Price-Output determination - Pricing Methods and Strategies. Forms of Business Organization – Sole Proprietorship- Partnership – Joint Stock Companies – Public Sector Enterprises – New Economic Environment- Economic systems – Economic Liberalization – Privatization and Globalization

UNIT IV INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS

Financial Accounting – Concept - emerging need and importance - Double-Entry Book Keeping- Journal - Ledger – Trial Balance - Financial Statements - - Trading Account – Profit & Loss Account – Balance Sheet (with simple adjustments). Financial Analysis – Ratios – Techniques – Liquidity, Leverage, Profitability, and Activity Ratios (simple problems).

UNIT V: CAPITAL AND CAPITAL BUDGETING

Concept of Capital - Over and Under capitalization – Remedial measures - Sources of Shot term and Long term capital - Estimating Working Capital requirement – Capital budgeting – Features of Capital budgeting proposals – Methods and Evaluation of Capital budgeting – Pay Back Method – Accounting Rate of Return (ARR) – Net Present Value (NPV) – Internal Rate Return (IRR) Method (simple problems).

Learning Outcome: The thorough understanding of Managerial Economics and Analysis of Financial Statements facilitates the Technocrats – cum – Entrepreneurs to take-up decisions effectively and efficiently in the challenging Business Environment.

TEXT BOOKS:

1. VijayaKumar.P. and Apparao. N. Managerial Economics and Financial Analysis,Cengage,2012
2. Aryasri: Managerial Economics and Financial Analysis, 4/e, TMH, 2009.

REFERENCES

1. Subhash Sharma & Vithal .M.P.Financial Accounting for Management, Macmillan,2010.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.
3. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International, 2009.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage, 2009.
5. Shailaja & Usha: Managerial Economics and Financial Analysis, University Press, 2012.

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PROBABILITY AND STATISTICS
(Common for CSE, Chemical)

Objectives: To help the students in getting a thorough understanding of the fundamentals of probability and usage of statistical techniques like testing of hypothesis, ANOVA, Statistical Quality Control and Queuing theory

UNIT – I

Conditional probability – Baye's theorem. Random variables – Discrete and continuous Distributions – Distribution functions. Binomial and poison distributions Normal distribution – Related properties.

UNIT – II

Test of Hypothesis: Population and Sample - Confidence interval of mean from Normal distribution - Statistical hypothesis - Null and Alternative hypothesis - Level of significance - Test of significance - Test based on normal distribution - Z test for means and proportions; Small samples - t- test for one sample and two sample problem and paired t-test, F-test and Chi-square test (testing of goodness of fit and independence).

UNIT – III

Analysis of variance one way classification and two way classification (Latic square Design and RBD)

UNIT – IV

Statistical Quality Control: Concept of quality of a manufactured product -Defects and Defectives - Causes of variations - Random and assignable - The principle of Shewhart Control Chart-Charts for attribute and variable quality characteristics- Constructions and operation of X- bar Chart, R-Chart, P-Chart and C-Chart.

UNIT – V

Queuing Theory: Pure Birth and Death process, M/M/1 & M/M/S & their related simple problems.

TEXT BOOKS:

1. Probability & Statistics for engineers by Dr. J. Ravichandran WILEY-INDIA publishers.
2. Probability & Statistics by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S.Chand publications.

REFERENCES:

1. Probability & Statistics by E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.
2. Statistical methods by S.P. Gupta, S.Chand publications.
3. Probability & Statistics for Science and Engineering by G.Shanker Rao, Universities Press.
4. Probability and Statistics for Engineering and Sciences by Jay L.Devore, CENGAGE.
5. Probability and Statistics by R.A. Jhonson and Gupta C.B.

Outcomes: The student will be able to analyze the problems of engineering & industry using the techniques of testing of hypothesis, ANOVA, Statistical Quality Control and Queuing theory and draw appropriate inferences.

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ELECTRONIC DEVICES AND CIRCUITS

Course Objectives:

To give understanding on semiconductor physics of the intrinsic, p and n materials, characteristics of the p-n junction diode, diode's application in electronic circuits, Characteristics of BJT,FET,MOSFET, characteristics of special purpose electronic devices. To familiarize students with dc biasing circuits of BJT, FET and analyzing basic transistor amplifier circuits.

Course Outcomes:

Upon completion of the course, students will:

- Analyze the operating principles of major electronic devices, its characteristics and applications.
- Design and analyze the DC bias circuitry of BJT and FET.
- Design and analyze basic transistor amplifier circuits using BJT and FET.

UNIT- I

Junction Diode Characteristics : Open circuited p-n junction, Biased p-n junction, p-n junction diode, current components in PN junction Diode, diode equation, V-I Characteristics, temperature dependence on V-I characteristics, Diode resistance, Diode capacitance, energy band diagram of PN junction Diode.

Special Semiconductor Diodes: Zener Diode, Breakdown mechanisms, Zener diode applications, LED, LCD, Photo diode, Varactor diode, Tunnel Diode, DIAC, TRIAC, SCR, UJT. Construction, operation and characteristics of all the diodes is required to be considered.

UNIT- II

Rectifiers and Filters: Basic Rectifier setup, half wave rectifier, full wave rectifier, bridge rectifier, derivations of characteristics of rectifiers, rectifier circuits-operation, input and output waveforms, Filters, Inductor filter, Capacitor filter, L- section filter, Π- section filter, Multiple L- section and Multiple Π section filter ,comparison of various filter circuits in terms of ripple factors.

UNIT- III

Transistor Characteristics:

BJT: Junction transistor, transistor current components, transistor equation, transistor configurations, transistor as an amplifier, characteristics of transistor in Common Base, Common Emitter and Common Collector configurations, Ebers-Moll model of a transistor, punch through/ reach through, Photo transistor, typical transistor junction voltage values.

FET: FET types, construction, operation, characteristics, parameters, MOSFET-types, construction, operation, characteristics, comparison between JFET and MOSFET.

UNIT- IV

Transistor Biasing and Thermal Stabilization : Need for biasing, operating point, load line analysis, BJT biasing- methods, basic stability, fixed bias, collector to base bias, self bias, Stabilization against variations in V_{BE}, Ic, and β, Stability factors, (S, $S^{'}$, $S^{''}$), Bias compensation, Thermal runaway, Thermal stability.

FET Biasing- methods and stabilization.

UNIT- V

Small Signal Low Frequency Transistor Amplifier Models:

BJT: Two port network, Transistor hybrid model, determination of h-parameters, conversion of h-parameters, generalized analysis of transistor amplifier model using h-parameters, Analysis of CB, CE and CC amplifiers using exact and approximate analysis, Comparison of transistor amplifiers.

FET: Generalized analysis of small signal model, Analysis of CG, CS and CD amplifiers, comparison of FET amplifiers.

Text Books:

1. J. Millman, C. Halkias, "Electronic Devices and Circuits", Tata Mc-Graw Hill, Second Edition,2010.
2. David A.Bell, "Electronic Devices and Circuits", Fifth Edition, Oxford University Press, 2009.
3. Salivahanan, Kumar, Vallavaraj, "Electronic Devices and Circuits", Tata Mc-Graw Hill, Second Edition

References:

1. Jacob Millman, C. Halkies, C.D.Parikh, "Integrated Electronics", Tata Mc-Graw Hill, 2009.
2. R.L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits", Pearson Publications,,9thEdition,2006.
3. BV Rao, KBR Murty, K Raja Rajeswari, PCR Pantulu, "Electronic Devices and Circuits", Pearson, 2nd edition.

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DATA STRUCTURES

Course Objective

- To develop skills to design and analyze linear and non linear data structures.
- Develop algorithms for manipulating linked lists, stacks, queues, trees and graphs.
- Develop recursive algorithms as they apply to trees and graphs.
- To get acquaintance with frequently used data structures in Software Engineering and Programming practices.
- To Strengthen the ability to identify and apply the suitable data structure for the given real world problem
- To develop a base for advanced computer science study.

Unit - I :

Introduction and Overview: System Life Cycle, Definition, Concept of Data Structures, Overview of Data Structures, Implementation of Data Structures.

Stacks: Definition, The Abstract Data Type, Array Representation, Linked Representation.

Queues: Definition, The Abstract Data Type, Array Representation, Linked Representation, Circular Queues, Applications.

Linked Lists: Single Linked Lists – Insertion and Deletion, Double Linked Lists – Insertion and Deletion.

Unit – II

Sorting: Motivation, Quick Sort, Merge Sort, Insertion Sort, Heap Sort.

Trees: Introduction, Representation of Trees, Binary Trees, Binary Tree Traversal and Tree Iterators, Additional Binary Tree Operations, Threaded Binary Trees, Binary Search Trees, Selection Trees.

Unit – III

Graphs: The Graph Abstract Data Type, Elementary Graph Operations.

Skip Lists and Hashing: Dictionaries, Linear List Representation, Skip List Representation, Hash Table Representation, Static and Dynamic Hashing.

Unit – IV

Priority Queues: Definition and Applications, Single and Double Ended Priority Queues, Linear Lists, Heaps, Leftist Trees, Binomial Heaps, Fibonacci Heaps, Pairing Heaps.

Unit – V

Efficient Binary Search Trees: Optimal Binary Search Trees, AVL Trees, Red – Black Trees, Splay

Trees.

Multiway Search Trees: m – way Search Trees, B – Trees, B^+ - Trees

TEXT BOOKS:

1. Fundamentals of Data Structures in C++ by Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, Universities Press, Second Edition.
2. Data Structures, Algorithms and Applications in C++ by Sartaj Sahni, Universities Press, Second Edition

REFERENCES:

1. Data Structures and Algorithms Using C++ by Ananda Rao Akepogu and Radhika Raju Palagiri
2. Classic Data Structure by D. Samanta, Eastern Economy Edition.
3. Data Structures and Algorithms Made Easy by Narasimha Karumanchi, Second Edition, Written in C/C++, CareerMonk Publications, Hyderabad
4. ADTs, Data Structures and Problem Solving with C++, Larry Nyhoff, Pearson
5. Data Structures using C++, D.S.Malik, 2nd Edition, Cengage Learning
6. Data Structures through C++, Yashavant P.Kanetkar, BPB Publication
7. Data Structures using C and C++, Yedidyah Langsam.Moshe J.Augenstein Aaron M.Tenenbaum, 2nd Edition,PHI
8. Data Structures using C & C++, Rajesh K.Shukla, Wiley-India

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DIGITAL LOGIC DESIGN

Course Objective

- Ability to interpret, convert and represent different number systems and binary arithmetic.
- Acquire the skills to manipulate and examine Boolean algebra, logical operations, Boolean functions and their simplifications.
- Get familiarized with fundamental principles of digital design.
- Aquatinted with classical hardware design for both combinational and sequential logic circuits.
- To design different units of a digital computer.

Unit - I :

Binary Systems: Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Compliments, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, Binary Logic.

Boolean Algebra And Logic Gates: Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates, Integrated Circuits

Unit – II:

Gate – Level Minimization: The Map Method, Four Variable Map, Five-Variable Map, Product of Sums Simplification, Don’t-Care Conditions, NAND and NOR Implementation, Other Two Level Implementations, EX-OR Function, Other Minimization Methods

Unit – III :

Combinational Logic: Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers

Unit – IV :

Synchronous Sequential Logic: Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Design Procedure, Registers, Shift Registers, Ripple Counters, Synchronous Counters, Other counters

Unit – V :

Memory And Programmable Logic: Random access memory, memory decoding, Error Detection and Correction, Read-only Memory, Programmable Logic Array, Programmable Array Logic.

Digital Logic Circuits: RTL and DTL Circuits, Transistor-Transistor Logic (TTL), Emitter-Coupled Logic (ECL), MOS, CMOS Logic, Comparisons of Logic Families

Text Books :

1. Digital Design, M.Morris Mano & Micheal D. Ciletti, Pearson, 5th Edition, 2013.
2. Digital Logic & State Machine Design, David J. Comer, Oxford University Press, 3rd Reprinted Indian Edition, 2012

Reference Books :

1. Digital Logic Design, R.D. Sudhakar Samuel, Elsevier
2. Fundamentals of Logic Design, 5/e, Roth, Cengage
3. Switching and Finite Automata Theory,3/e,Kohavi, Jha, Cambridge.
4. Digital Logic Design, Leach, Malvino, Saha,TMH
5. Modern Digital Electronics, R.P. Jain, TMH

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DISCRETE MATHEMATICS

Course Objective

- Apply logical reasoning to solve a variety of problems.
- Understand and apply methods of discrete mathematics such as proofs, counting principles, number theory, logic and set theory to mathematical problems in a creative way.
- To apply the abstract concepts of graph theory in modelling and solving non-trivial problems in different fields of study.
- To provide a prerequisite for the courses like Fundamentals of Computer Organization, RDBMS, Analysis of Algorithms, Theory of Computation, Cryptography, Artificial Intelligence…

Unit - I :

The Language of Logic: Propositions, Logical Equivalences, Quantifiers, Arguments, Proof Methods.

The Language of Sets: The Concepts of a Set, Operations with Sets, Computer Operations with Sets, The Cardinality of a Set, Recursively Defined Sets.

Functions: The concept of Functions, Special Functions, Properties of Functions, The Pigeonhole principle, Composite Functions, Sequences and the Summation Notation.

Unit – II:

Relations: Boolean Matrices, Relations and Digraphs, Computer Representations of Relations, Properties of Relations, Operations on Relations, Transitive Closure, Equivalence Relations, Partial and Total Ordering.

Lattices & Boolean Algebra: Lattices as Partially Ordered Sets, Properties of Lattices, Lattices as Algebraic Systems, Sublattices, Direct Product and Homomorphism, Boolean Algebra, Boolean Functions

Unit – III :

Algebraic Structures: Algebraic Systems, Semigroups and Monoids, Groups, Subgroups and Homomorphisms, Normal Subgroups.

Combinatorics: The Fundamental Counting Principles, Permutations, Derangements, Combinations, Permutations and Combinations with Repetitions, The Binomial Theorem, The Generalized Inclusion-Exclusion Principle.

Unit – IV :

Induction and Algorithms: The Division Algorithm, Divisibility Properties, Nondecimal Bases, Mathematical Induction, Algorithm Correctness, The Growth Functions, Complexity of Algorithms.

Recursion: Recursively Defined Functions, Solving Recurrence Relations, Generating Functions, Recursive

Algorithms, Correctness of Recursive Algorithms, Complexities of Recursive Algorithms.

Unit – V :

Graphs: Computer Representation of Graphs, Isomorphic Graphs, Paths, Cycles, and Circuits, Eulerian and Hamiltonial Graphs, Planar Graphs, Graph Coloring, Digraphs, Dags, Weighted Digraphs, DFS and BFS Algorithms.

Trees: Trees, Spanning Trees, Minimal Spanning Trees, Kruskal's and Prim's Algorithm, Rooted Trees, Binary Trees, and Binary Search Trees.

Text Books:

1. Discrete Mathematics with Applications, Thomas Koshy, Elsevier Academic Press.
2. Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblay and R. Manohar, TMH

Reference Books:

1. *Discrete and Combinatorial Mathematics, Fifth Edition, R. P. Grimaldi, B.V. Ramana, Pearson*
2. *Discrete Mathematics Theory and Applications, D.S Malik and M.K. Sen, Cengage Learning*
3. *J .L.Mott, A.Kandel, T.P .Baker, Discrete Mathematics for Computer Scientists and Mathematicians, second edition 1986, Prentice Hall of India*
4. *C.L.Liu, Elements of Discrete Mathematics, Second Edition 1985, McGraw-Hill Book Company. Reprinted 2000*
5. *Discrete Mathematics, Norman L. Biggs, Second Edition, OXFORD Indian Edition.*
6. *K.H.Rosen, Discrete Mathematics and applications, 5th Edition 2003, TataMcGraw Hillpublishing Company*
7. Graph Theory with Applications to Engineering & Computer Science: Narsingh Deo, PHI (2004) "Discrete Mathematical Structures" Jayant Ganguly, Sanguine.

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BASIC ELECTRICAL AND ELECTRONICS LAB

PART – A: ELECTRICAL ENGINEERING LAB

1. Verification of Superposition Theorem.
2. Verification of Thevenin's Theorem.
3. Open Circuit Characteristics of D.C.Shunt Generator.
4. Swinburne's Test on DC Shunt Machine (Predetermination of Efficiency of a Given DC Shunt Machine Working as Motor and Generator).
5. Brake Test on DC Shunt Motor. Determination of Performance Characteristics.
6. OC & SC Tests on Single-Phase Transformer (Predetermination of Efficiency and Regulation at Given Power Factors).

PART – B: ELECTRONICS ENGINEERING LAB

1. CRO Operation and its Measurements

2. P-N Junction Diode Characteristics

3. Zener Diode Characteristics

Part A: V-I Characteristics

Part B: Zener Diode act as a Voltage Regulator

4. Rectifiers (without filter)

Part A: Half-wave Rectifier

Part B: Full-wave Rectifier

5. BJT Characteristics(CE Configuration)

Part A: Input Characteristics

Part B: Output Characteristics

6. BJT Characteristics (CB Configuration)

Part A: Input Characteristics

Part B: Output Characteristics

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Data Structures Lab

Course Objective

- To write and execute programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables and search trees.
- To write and execute write programs in C to implement various sorting and searching methods
- Exemplify and implement how abstract data types such as stack, queue and linked list can be implemented to manage the memory using static and dynamic allocations
- Understand and distinguish the conceptual and applicative differences in trees, binary trees, and binary search trees
- Examine and analyze why self balancing trees are necessary in real world dynamic applications
- Develop and compare the comparison-based search algorithms and sorting algorithms

Week 1

a) Write a Program to Implement Stack Operations by using Array and Linked Lists.
b) Write a Program to Implement the Operations of Double Linked Lists

Week 2

a) Write a C program that uses stack operations to convert a given infix expression into its postfix
b) Write a Program to Implement Queue Operations by using Array and Linked Lists.

Week 3

Write a Program to Implement Circular Queue Operations by using Array and Linked Lists.

Week 4

Write a Program to Sort the set of elements by using

i). Quick Sort   ii). Heap Sort.   iii). Merge Sort

Week 5

Write a Program to Implement the Binary Search Tree Operations.

Week 6

Write a Program to Perform the Tree Traversal Techniques by using the Iterative Method

Week 7

Write C programs for implementing the following graph traversal algorithms:

a)Depth first traversal   b)Breadth first traversal

.

Week 8

Write a Program to Implement All functions of a Dictionary by using Hashing

Week 9

Write a Program to Implement Skip List Operations.

Week 10

Write a Program to Implement Insertion, Deletion and Search Operations on SPLAY Trees.

Week 11

Write a program to Implement Insertion and Deletion Operations on AVL Trees

Week 12

Write a Program to Implement Insertion and Deletion Operations on B – Trees

Note: Use Classes and Objects to implement the above programs.

Reference Books:

9. Object Oriented Programming with ANSI & Turbo C++, Ashok N.Kamthane, Pearson Education
10. Data Structures using C++, D.S.Malik, 2nd Edition, Cengage Learning
11. Data Structures through C++, Yashavant P.Kanetkar, BPB Publication
12. Data Structures using C and C++, Yedidyah Langsam.Moshe J.Augenstein Aaron M.Tenenbaum, 2nd Edition,PHI
13. Data Structures using C & C++, Rajesh K.Shukla, Wiley-India
14. ADTs, Data Structures and Problem Solving with C++, Larry Nyhoff, Pearson

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Computer Organization

Course Objective

- To make the students understand the structure and behavior of various functional modules of a computer.
- To explore the memory and I/O organizations in depth
- To study the concepts of pipelining and multiprocessors

Course Outcomes

- Thorough understanding of the working of computer
- Optimize the algorithms to exploit pipelining and multiprocessors
- Algorithm design for bit level arithmetic
- Ability to use memory and I/O devices effectively

Unit - I :
Introduction to Computer Organization and Architecture
Basic Computer Organization – CPU Organization – Memory Subsystem Organization and Interfacing – I/O Subsystem Organization and Interfacing – A Simple Computer Levels of Programming Languages, Assembly Language Instructions, Instruction Set Architecture Design, A simple Instruction Set Architecture

Unit – II:
CPU Design: Instruction Cycle – Memory – Reference Instructions – Input/output and Interrupt – Addressing Modes – Data Transfer and Manipulation – Program Control.
Computer Arithmetic: Addition and Subtraction – Multiplication Algorithms – Division Algorithms – Floating-Point Arithmetic Operations – Decimal Arithmetic unit

Unit – III :
Register Transfer: Register Transfer Language – Register Transfer – Bus and Memory Transfers – Arithmetic Micro operations – Logic Micro operations – Shift Micro operations.
Control Unit: Control Memory – Address Sequencing – Micro program Example – Design of Control Unit

Unit – IV :
Memory Organization: Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory.
Input/output Organization: Input-Output Interface – Asynchronous Data Transfer – Modes of Transfer – Priority Interrupt – Direct Memory Access (DMA).

Unit – V :
Pipeline: Parallel Processing – Pipelining – Arithmetic Pipeline – Instruction Pipeline.
Multiprocessors: Characteristics of Multiprocessors – Interconnection Structures – Inter Processor Arbitration – Inter Processor Communication and Synchronization

Text Books :

1. "Computer Systems Organization and Architecture", John D. Carpinelli, PEA, 2009.
2. "Computer Systems Architecture", 3/e, M. Moris Mano, PEA, 2007

Reference Books :

1. "Computer Organization", Carl Hamacher, Zvonks Vranesic, SafeaZaky, 5/e, MCG, 2002.
2. "Computer Organization and Architecture", 8/e, William Stallings, PEA, 2010.
3. "Computer Systems Architecture a Networking Approach", 2/e, Rob Williams.
4. "Computer Organization and Architecture" Ghoshal, Pearson Education, 2011.
5. "Computer Organization and Architecture", V. Rajaraman, T. Radakrishnan.
6. "Computer Organization and Design", P. Pal Chaudhuri, PHI
7. "Structured Computer Organization", Andrew S. Janenbaum, Todd Austin
8. "Computer Architecture" Parahmi, Oxford University Press

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DataBase Management Systems

Course Objective
To provide the student with clear conceptual understandings related to databases. After this course, the student should gain knowledge in the relational model, SQL, database design, storage & indexing, failure recovery and concurrency control

Course Outcomes
- Students can design the simple database, and can use the SQL instructions in developing the database applications.
- Can apply the ER concepts to design the databases.
- Advanced concepts like triggers, assertions and constraints can be applied effectively in designing the business applications

Unit - I :
The Worlds of Database Systems -The Evolution of Database Systems - Overview of a Database Management System - Outline of Database System Studies. The Entitiy-Relationship Model – Elements of E/R Model – Design Principles – The Modeling of Constraints – Weak Entity Sets.

Unit – II:
The Relational Data Model – Basics of the Relational Model – From E/R Diagrams to Relational Designs – Converting Subclass Structures to Relations – Functional Dependencies – Rules about Functional Dependencies -- Design of Relational Database Schemas – Multivalued Dependencies

Unit – III :
Relational Algebra – An Algebra of Relational Operations – Relational Operations on Bags – Extended Operations of Relational Algebra – Constraints on Relations. The Database Language SQL – Simple Queries in SQL – Queries Involving More than One Relation – Subqueries – Full Relation Operations – Database Modifications – Defining a Relation Schema in SQL – View Definitions

Unit – IV :
Representing Data Elements – Data Elements and Fields – Records – Representing Block and Record Addresses – Variable Length Data and Records – Record Modifications. Index Structures – Indexes on Sequential Files – Secondary Indexes – B-Trees – Hash Tables

Unit – V :
Coping with System Failures – Issues and Models for Resilient Operation – Undo Logging – Redo Logging – Undo/Redo Logging – Protecting Against Media Failures. Concurrency Control – Serial and Serializable Schedules – Conflict Serializability – Enforcing Serializability by Locks – Locking Systems with Several Lock Modes -- Concurrency Control by Timestamps – Concurrency Control by Validation

Text Books :
1. "Database Systems, The Complete Book", Hector Garcia-Molina, Jeffrey D. Ullman and Jennifer Widom. Pearson Education.2nd Edition.

2. "Fundamentals of Database Systems", Elmasri Navrate Pearson Education

Reference Books :

1. "Data base Systems design", Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. "Data base Management Systems", Raghurama Krishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition.
3. "Introduction to Database Systems", C.J.Date, Pearson Education
4. "Data base System Concepts", Silberschatz, Korth, McGraw hill, V edition

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Java Programming

Course Objective

- Study the syntax, semantics and features of Java Programming Language
- Study the Object Oriented Programming Concepts of Java Programming language
- Learn the method of creating Multi-threaded programs and handle exceptions
- Learn Java features to create GUI applications & perform event handling
- To be able to develop high quality, working software that solves real problems
- Able to comprehend the art of programming and, in particular, the structure and meaning of basic Java programs

Unit - I :
The Java Language, The key attributes of object oriented programming language, JDK, simple program, Java keywords, identifiers in java, the java class libraries, introducing data types and operators, program control structures

Unit – II:
Introducing classes, objects, and methods, Arrays, multidimensional arrays, strings, a closer look at methods and classes, Inheritance

Unit – III :
Interface fundamentals, creating and implementing an interface, using interface references, implementing multiple interfaces, constants in interfaces, interfaces can be extended, nested interfaces, final thoughts on interface, packages, Exception handling

Unit – IV :
Byte streams and character streams, byte and character stream classes, using byte streams for reading and writing, reading and writing binary data, random access files, using character streams for file i/o, Multi threaded programming, Applet basics, a complete applet skeleton, applet initialization and termination, requesting repainting, using the status window, passing parameters to applets

Unit – V :
Swings – the origin and design philosophy of swing, components and containers, layout managers, event handling, using a push button, jtextfield, jlabel and image icon, the swing buttons, jtext field, jscrollpane, jlist, jcombobox, trees, jtable, an overview of jmenubar, jmenu and jmenuitem, creating a main menu, showmessagedialog, showconfirmdialog, showinputdialog, showoptiondialog, jdialog, create a modeless dialog

Text Books :

1. "Java Fundamentals A Comprehensive Introduction" Herbert Schildt and Dale Skrien, Mc Graw Hill.
2. "Java – How to Program", Paul Deitel, Harvey Deitel, PHI

Reference Books :

1. "Programming with Java" T.V.Suresh Kumar, B.Eswara Reddy, P.Raghavan Pearson Edition.
2. "Core Java", Nageswar Rao, Wiley Publishers.
3. "Thinking in Java", Bruce Eckel, Pearson Education.
4. "Programing In java", Malhotra, Oxford University Press
5. "Head First Java", Kathy Sierra, Bert Bates, O'Reilly
6. "SCJP – Sun Certified Programmer for Java Study guide" – Kathy Sierra, Bert Bates, McGrawHill
7. "Java in Nutshell", David Flanagan, O'Reilly
8. "Core Java : Volume I – Fundamentals, Cay S. Horstmann, Gary Cornell, The Sun Micro Systems Press

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Formal Languages and Automata Theory

Course Objective

The course aims to introduce the basic methods and conclusions of the Theory of Computation. At the end of the course, students learn to apply these methods to problems from different fields and be guided by the results in searching for computational solutions to the problems.

1. Understand formal definitions of machine models.
2. Classify machines by their power to recognize languages.
3. Understanding of formal grammars, analysis
4. Understanding of hierarchical organization of problems depending on their complexity
5. Understanding of the logical limits to computational capacity

Understanding of undecidable problems

Unit I

Preliminaries: Sets, Relations and functions, Methods of proof, Graphs, Languages: Basic Concepts.
Grammars: Definitions and classifications of grammar, Ambiguity, Simplification of CFGs, Normal forms.

Unit II

Finite State Automata: DFSA, NFSA, Regular Expressions
Finite State Automata: Characterization, Properties and decidability: FSA Regular Grammars, Pumping lemma for regular sets, Closure Properties, Decidability theorems.
Finite State Automata with Output and Minimization: Myhill-Nerode theorem, Finite Automata with output.
Variants of Finite Automata: Two way finite automata, Multi head Finite Automata.
UNIT III

Pushdown Automata: The Pushdown Automation, Equivalence between acceptance by empty store and acceptance by Final State, Equivalence of CFG and PDA

CFG-Properties and Parsing: Pumping Lemma for CFL, Closure Properties for CFL, Decidability results for CFL, Sub families of CFL.
UNIT IV

Turing Machines: Turing Machine as a acceptor, Turing Machine as a computing device, Techniques for Turing Machine Construction.
Variations of Turing Machine: Generalized Versions, Restricted Turing Machines, Turing Machines as Enumerated, Equivalence between Turing Machines and Type Zero Languages, Linear Bounded Automata.

UNIT V

Universal Turing Machine and Decidability: Encoding and Enumeration of Turing Machines,

Recursive and Recursively Enumerable Sets, Universal Turing Machines, Problems, Instances and Languages, Rice's Theorem, Reduction of Problems to show undecidability, Post's correspondence problem, Computable functions.
Time and Space Complexity: The RAM model, Time and Tape Complexity of Turing Machines.
New Models of Computations: DNA Computing, Membrane Computing

Text Books:

1. "Introduction to Formal Languages, Automata Theory and Computation", Kamala Krithivasan, Rama R, PEARSON.

References Books:

1. "Introduction to Automata Theory, Languages, and Computation", Third Edition, John E.Hopcroft, Rajeev Motwani, Jeffery D. Ullman, PEARSON.
2. "Introduction To Languages And The Theory of Computation", John C Martin, The McGraw-Hill Companies, Third Edition. (TATA McGRAW HILL)
3. "Introduction to Automata Theory, Formal Languages and Computation", Shyamalendu kandar, PEARSON.
4. Theory of Computation", Vivek Kulkarni, OXFORD.
5. "Theory of computer Science Automata, Languages and Computation", K.L.P. Mishra, N. Chandrasekaran, PHI, Third Edition.
6. Formal Languages and Automata Theory", C.K. Nagpal, OXFORD.
7. "Fundamentals of the Theory of Computation, Principles and Practice", Raymond Greenlaw, H. James Hoover, MK(MORGAN KAUFMANN)

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Principles of Programming Languages

Course Objective

- To provide an exposure to core concepts and principles in contemporary programming languages
- to explore various important programming methodologies, such as functional programming, logic programming, programming with abstract data types, and object-oriented programming
- to learn the fundamental concepts that underlies in most programming Languages
- To provide conceptual understanding of High level language design and implementation.
- To introduce the power of scripting languages

Unit - I :
Preliminary Concepts: Reasons for studying, concepts of programming languages, Programming domains, Language Evaluation Criteria, influences on Language design, Language categories, Programming Paradigms – Imperative, Object Oriented, functional Programming , Logic Programming. Programming Language Implementation – Compilation and Virtual Machines, programming environments. Syntax and Semantics: general Problem of describing Syntax and Semantics, formal methods of describing syntax - BNF, EBNF for common programming languages features, parse trees, ambiguous grammars, attribute grammars, denotational semantics and axiomatic semantics for common programming language features

Unit – II:
Data types: Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization. Expressions and Statements: Arithmetic relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements, Control Structures – Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements, guarded commands

Unit – III :
Subprograms and Blocks: Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions user defined overloaded operators, co routines.

Unit – IV :
Abstract Data types: Abstractions and encapsulation, introductions to data abstraction, design issues, language examples, C++ parameterized ADT, object oriented programming in small talk, C++, Java, C#, Ada 95
Concurrency: Subprogram level concurrency, semaphores, monitors, massage passing, Java threads, C# threads.
Exception handling : Exceptions, exception Propagation, Exception handler in Ada, C++ and Java.
Logic Programming Language : Introduction and overview of logic programming, basic elements of

prolog, application of logic programming

Unit – V :

Functional Programming Languages: Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages.

Scripting Language: Pragmatics, Key Concepts, Case Study : Python – Values and Types, Variables , Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library

Text Books :

1. "Concepts of Programming Languages", Robert .W. Sebesta 10/e, Pearson Education,2008.
2. "Programming Language Design Concepts", D. A. Watt, Wiley dreamtech,rp-2007.

Reference Books :

1. "Programming Languages", 2nd Edition, A.B. Tucker, R.E. Noonan, TMH.
2. "Programming Languages", K. C.Louden, 2nd Edition, Thomson, 2003.
3. "LISP", Patric Henry Winston and Paul Horn, Pearson Education.
4. "Programming in Prolog", W.F. Clocksin,& C.S.Mellish, 5th Edition, Springer.
5. "Programming Python", M.Lutz, 3rd Edition, O'reilly, SPD, rp-2007.
6. "Core Python Programming", Chun, II Edition, Pearson Education, 2007.
7. "Guide to Programming with Python", Michael Dawson, Thomson, 2008

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Design and Analysis Of Algorithms

Course Objective

- To know the importance of the complexity of a given algorithm.
- To study various algorithmic design techniques.
- To utilize data structures and/or algorithmic design techniques in solving new problems.
- To know and understand basic computability concepts and the complexity classes P, NP, and NP-Complete.
- To study some techniques for solving hard problems
- Analyze the complexity of the algorithms
- Use techniques divide and conquer, greedy, dynamic programming, backtracking, branch and bound to solve the problems.
- Identify and analyze criteria and specifications appropriate to new problems, and choose the appropriate algorithmic design technique for their solution.

Unit - I :

Algorithms, Pseudo code for expressing algorithms, performance analysis:- space complexity and time complexity, Asymptotic notations:- Big Oh notation, Omega Notation, Theta notation, amortized complexity

Unit – II:

Divide and Conquer: General method, applications: Defective Chessboard, Binary Search, Quick Sort and its time complexity, Merge Sort and Stressen's matrix multiplication.
Greedy Method: General method, applications: job sequencing with deadlines, knapsack problem, single source shortest path, Minimum cost Spanning Trees

Unit – III :

Dynamic programming: General Method, applications: Single Source Shortest path, 0/1 knapsack, All Pairs shortest path, travelling sales person problem and reliability design

Unit – IV :

Back tracking: General Method, applications: 8 – queens problem, sum of subsets problem, graph coloring and hamiltonian cycles, Knapsack Problem.
Branch and Bound: General method, applications: travelling sales person, 0/1 knapsack problem, LC Branch and Bound and FIFO Branch and Bound

Unit – V :

NP – Hard and NP – Complete Problems: NP Hardness, NP Completeness, Consequences of being in P, Cook's Theorem, Reduction Source Problems, Reductions: Reductions for some known problems

Text Books :

1. "Fundamentals of Computer Algorithms", Ellis Horowitz, S. Satraj Sahani and Rajasekhran, University Press.
2. "Design and Analysis of Algorithms", Parag Himanshu Dave, Himanshu Bhalchandra Dave,

Second Edition, Pearson Education

Reference Books :

1. "Introduction to Algorithms", secondedition,T.H.Cormen,C.E.Leiserson, R.L.Rivest,and C.Stein,PHI Pvt. Ltd./ Pearson Education
2. "Introduction to Design and Analysis of Algorithms A strategic approach", R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc Graw Hill.
3. "Data structures and Algorithm Analysis in C++", Allen Weiss, Second edition, Pearson education.
4. "Design and Analysis of algorithms", Aho, Ullman and Hopcroft,Pearson education.
5. "Algorithms" – Richard Johnson baugh and Marcus Schaefer, Pearson Education

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HUMAN VALUES AND PROFESSIONAL ETHICS

OBJECTIVE

• To create an awareness on Engineering Ethics and Human Values.
• To instill Moral and Social Values and Loyalty
• To appreciate the rights of Others

Students will be able to:

- identify and analyze an ethical issue in the subject matter under investigation or in a relevant field
- identify the multiple ethical interests at stake in a real-world situation or practice
- articulate what makes a particular course of action ethically defensible
- assess their own ethical values and the social context of problems
- identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects
- demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work
- integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research

Unit I: HUMAN VALUES

Morals, Values and Ethics-Integrity-Work Ethic-Service learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty - Courage- Co Operation – Commitment – Empathy –Self Confidence Character – Spirituality.

Unit II: ENGINEERING ETHICS

Senses of 'Engineering Ethics- Variety of moral issued – Types of inquiry – Moral dilemmas – Moral autonomy –Kohlberg's theory- Gilligan's theory- Consensus and controversy – Models of professional roles- Theories about right action- Self interest - Customs and religion –Uses of Ethical theories – Valuing time –Co operation – Commitment.

Unit III :ENGINEERING AS SOCIAL EXPERIMENTATION

Engineering As Social Experimentation – Framing the problem – Determining the facts – Codes of

Ethics – Clarifying Concepts – Application issues – Common Ground - General Principles – Utilitarian thinking respect for persons.

UNIT IV: ENGINEERS RESPONSIBILITY FOR SAFETY AND RISK

Safety and risk – Assessment of safety and risk – Risk benefit analysis and reducing risk- Safety and the Engineer- Designing for the safety- Intellectual Property rights(IPR).

UINIT V: GLOBAL ISSUES

Globalization – Cross culture issues- Environmental Ethics – Computer Ethics – Computers as the instrument of Unethical behavior – Computers as the object of Unethical acts – Autonomous Computers- Computer codes of Ethics – Weapons Development - Ethics and Research – Analyzing Ethical Problems in research – Intellectual property Rights(IPR)

Text Books

1. Engineering ethics includes human values by M.Govindarajan, s. nataraja and vssenthilkumar PHI.2009.

2. "Engineering Ethics" by Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009.

3. "Ethics in Engineering" by Mike W. Martin and Roland Schinzinger – Tata McGraw-Hill– 2003.

4. "Professional Ethics and Morals" by Prof.A.R.Aryasri, DharanikotaSuyodhana-Maruthi Publications.

5. "Professional Ethics and Human Values" by A.Alavudeen, R.KalilRahman and M.Jayakumaran-Laxmi Publications.

7. "Professional Ethics and Human Values" by Prof.D.R.Kiran-

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Database Management Systems Lab

Course Objective

- To create database and query it using SQL queries, design forms and generate reports.
- Learn to use integrity constraints, referential integrity constraints, triggers, assertions
- Design databases
- Retrieve information from data bases
- Use procedures to program the data access and manipulation
- Create user interfaces and generate reports

List of Experiments:

1. Practice session: Students should be allowed to choose appropriate DBMS, install it, configure it and start working on it: Create sample tables, execute some queries, use SQLPLUS features, use PL/SQL features like cursors.

2. A college consists of number of employees working in different departments. In this context, create two tables **employee** and **department**. Employee consists of columns empno, empname, basic, hra, da, deductions, gross, net, date-of-birth. The calculation of hra,da are as per the rules of the college. Initially only empno, empname, basic have valid values. Other values are to be computed or updated later. Another table department is maintained containing deptno, deptname, description columns. Deptno is the primary key in department table and referential integrity constraint exists between employee and department tables. Perform the following operations on the above database:

    - Create tables department and employee with required constraints.
    - Initially only the few columns (essential) are added. Add the remaining columns separately by using appropriate SQL command
    - Basic column should not be null
    - Add constraint that basic cannot be less than 5000.
    - Calculate hra,da,gross and net by using PL/SQL program.
    - Whenever salary is updated and its value becomes less than 5000 a trigger has to be raised preventing the operation
    - The assertions are: hra should not be less than 10% of basic and da should not be less than 50% of basic.
    - The percentage of hra and da are to be stored separately
    - When the da becomes more than 100% of the basic a message has to be generated and with user permission da has to be merged with basic
    - Empno should be unique and has to be generated automatically
    - If the employee is going to retire in a particular month, automatically a message has to be generated
    - The default value for date-of-birth is 1 jan, 1970
    - When the employees called daily-wagers are to be added the constraint that salary should be greater than or equal to 5000 should be dropped
    - Display the information of the employees and departments with description of the fields

- Display the average salary of all the departments
- Display the average salary department wise
- Display the maximum salary of each department and also all departments put together
- Commit the changes whenever required and rollback if necessary
- Use substitution variables to insert values repeatedly
- Assume some of the employees have given wrong information about date-of-birth. Update the corresponding tables to change the value
- Find the employees whose salary is between 5000 and 10000 but not exactly 7500
- Find the employees whose name contains ‘en’
- Try to delete a particular deptno. What happens if there are employees in it and if there are no employees
- Create alias for columns and use them in queries
- List the employees according to ascending order of salary
- List the employees according to ascending order of salary in each department
- Use && wherever necessary
- Amount 6000 has to be deducted as CM relief fund in a particular month which has to be accepted as input from the user. Whenever the salary becomes negative it has to be maintained as 1000 and the deduction amount for those employees is reduced appropriately
- The retirement age is 60 years. Display the retirement day of all the employees
- If salary of all the employees is increased by 10% every year, what is the salary of all the employees at the retirement
- Find the employees who are born in leap year
- Find the employees who are born on feb 29
- Find the departments where the salary of atleast one employee is more than 20000
- Find the departments where the salary of all the employees is less than 20000
- On first January of every year a bonus of 10% has to be given to all the employees. The amount has to be deducted equally in the next 5 months
- As a designer identify the views that may have to be supported and create views
- As a designer identify the PL/SQL procedures necessary and create them using cursors
- Use appropriate Visual programming tools like oracle forms and reports, visual basic etc to create user interface screens and generate reports

Note: as a designer identify other operations required and add to the above list. The above operations are not in order. Order them appropriately. Use SQL or PL/SQL depending on the requirement.

3. Students may be divided into batches and the following experiments may be given to them to better understand the DBMS concepts. Students should gather the required information, draw ER diagrams, map them to tables, create tables, triggers, procedures, execute queries, create user interfaces, and generate reports.

- Student information system
- APSRTC reservation system
- Hostel management
- Library management
- Indian Railways reservation
- Super market management
- Postal system
- Banking system

- Courier system
- Publishing house system

Reference Books :

1. “Learning Oracle SQL and PL/SQL”, Rajeeb C. Chatterjee, PHI.
2. “Oracle Database 11g PL/SQL Programming”, M.Mc Laughlin,TMH.
3. “Introduction to SQL”, Rick F.Vander Lans, Pearson education.
4. “Oracle PL/SQL”, B.Rosenzweig and E.Silvestrova, Pearson education

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Java Programming Lab

Course Objective/Outcomes
- To introduce java compiler and eclipse platform
- To impart hand on experience with java programming

Note:
1. **IDEs are not mandatory, encourage the use of Eclipse or Netbean platform**
2. **The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed**

Week-1:
1. Use Eclipse or Netbean platform and acquaint with the various menus. Create a test project, add a test class and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with java program to find prime numbers between 1 to n.

Week-2:
1. Write a Java program that prints all real and imaginary solutions to the quadratic equation ax2 + bx + c = 0. Read in a, b, c and use the quadratic formula.
2. Write a Java program for sorting a given list of names in ascending order
3. Write a java program to accept a string from user and display number of vowels, consonants, digits and special characters present in each of the words of the given text.

Week -3:
1. Write a java program to make rolling a pair of dice 10,000 times and counts the number of times doubles of are rolled for each different pair of doubles.
   Hint: Math.random()
2. Write java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it's not a duplicate of any number already read display the complete set of unique values input after the user enters each new value.
3. Write a java program to read the time intervals (HH:MM) and to compare system time if the system time between your time intervals print correct time and exit else try again to repute the same thing. By using StringToknizer class

Week-4:
1. Write a java program to split a given text file into n parts. Name each part as the name of the original file followed by .part<n> where n is the sequence number of the part file.
2. Write java program to create a super class called Figure that receives the dimensions of two dimensional objects. It also defines a method called area that computes the area of an object. The program derives two subclasses from Figure. The first is Rectangle and second is Triangle. Each of the sub class overridden area() so that it returns the area of a rectangle and a triangle respectively.
3. Write a Java program that creates three threads. First thread displays "Good Morning" every one second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds

Week-5:
1. Write a Java program that correctly implements producer consumer problem using the

concept of inter thread communication

2. Write a java program to find and replace pattern in given file,
3. Use inheritance to create an exception super class called EexceptionA and exception sub class ExceptionB and ExceptionC, where ExceptionB inherits from ExceptionA and ExceptionC inherits from ExceptionB. Write a java program to demonstrate that the catch block for type ExceptionA catches exception of type ExceptionB and ExceptionC

Week-6:

1. Write a java program to convert an ArrayList to an Array.
2. Write a Java Program for waving a Flag using Applets and Threads
3. Write a Java Program for Bouncing Ball (The ball while moving down has to increase the size and decrease the size while moving up)

Week-7:

1. Write a Java Program for stack operation using Buttons and JOptionPane input and Message dialog box.
2. Write a Java Program to Addition, Division, Multiplication and substraction using JOptionPane dialog Box and Textfields.

Week-8:

1. Write a Java Program for the blinking eyes and mouth should open while blinking.
2. Implement a Java Program to add a new ball each time the user clicks the mouse. Provided a maximum of 20 balls randomly choose a color for each ball.

Week-9:

1. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are eparated by commas. Write a java program to display the table using Jtable component
2. Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the textfields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an ArithmeticException Display the exception in a message dialog box.

Week-10:

1. Write a Java Program to implement the opening of a door while opening man should present before hut and closing man should disappear.
2. Write a Java code by using JtextField to read decimal value and converting a decimal number into binary number then print the binary value in another JtextField

Week-11:

1. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result.
2. Write a Java program for handling mouse events.

Week-12:

1. Write a java program establish a JDBC connection, create a table student with properties name, register number, mark1,mark2, mark3. Insert the values into the table by using the java and display the information of the students at front end.

Text Books :

1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI
2. Java The Complete Reference" by Herbert Schildt, TMH, 8th Edition

Reference Books :

1. Introduction to Java programming, Sixth edition, Y.Daniel Liang, Pearson Education
2. Programming in java Sachine

3. Big Java, 2nd edition, Cay Horstmann, Wiley Student Edition, Wiley India Private Limited.
4. Introduction to Programming with Java, J.Dean & R.Dean, McGraw Hill education.
5. Java Programming, D S Malik, cengage learning, India Edition

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Operating Systems

Course Objective

- To make the students understand the basic operating system concepts such as processes, threads, scheduling, synchronization, deadlocks, memory management, file systems, protection and security.
- To get acquaintance with the class of abstractions afford by general purpose operating systems that aid the development of user applications

Course Outcomes

- Understand what makes a computer system function and the primary PC components.
- Understand past and current trends in computer technology.
- Use basic software applications.
- Add functionality to the exiting operating systems
- Design new operating systems

Unit - I :

Introduction: Operating System Services, User and Operating System Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, Operating System Structure.
Process Management: Process Concept, Process Scheduling, Operations on Process, Inter process Communications, Examples of IPC Systems, Communication in Client Server Systems.

Unit – II:

Threads: Multi core programming, multithread models, Thread Libraries, Implicit Threading, Threading Issues, Operating System Examples.
Process Synchronization: The Critical Section Problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization Examples.
CPU Scheduling: Scheduling-Criteria, Scheduling Algorithms, Thread Scheduling, Multiple-Processor Scheduling.

Unit – III :

Memory Management: Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of the page table.
Virtual memory: Demand Paging, Copy-on-Write, Page-Replacement, Allocation of Frames, Thrashing, Memory Mapped Files.

Deadlocks: System Model, Deadlock Characterization, Methods of Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Unit – IV :

Mass-storage structure: Overview of Mass-Storage Structure, RAID Structure, Stable-Storage Implementation.
File system Interface: Access Methods, File System Mounting, File Sharing, Protection.
File system Implementation: File-system Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management, Recovery.

Unit – V :

Protection: Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix.
Security: The Security Problem, Program Threats, Implementing Security Defenses, Firewalling to Protect Systems and Networks, Computer–Security Classifications
Case Studies: The Linux System, Windows 7

Text Books :

1. "Operating System Concepts", Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Ninth edition, John Wiley.

Reference Books :

1. "Operating Systems: Internals and Design Principles", Stallings, Sixth Edition–2009,
2. PearsonEducation
3. "Modern Operating Systems", Andrew S Tanenbaum, Second Edition, PHI.
4. "Operating Systems", S.Haldar, A.A.Aravind, Pearson Education.
5. "Principles of Operating Systems", B.L.Stuart, Cengage learning, India Edition.
6. "Operating Systems", A.S.Godbole, Second Edition, TMH.
7. "An Introduction to Operating Systems", P.C.P. Bhatt, PHI.
8. "Operating Systems", G.Nutt, N.Chaki and S.Neogy, Third Edition, Pearson Education.
9. "Operating Systems", R.Elmasri, A,G.Carrick and D.Levine, McGraw Hill

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Compiler Design

Course Objective

This course is a *de facto* capstone course in Computer Science, as it combines skills in software design, programming, data structures and algorithms, theory of computing, documentation, and machine architecture to produce a functional compiler.

- Realize that computing science theory can be used as the basis for real applications
- Introduce the major concept areas of language translation and compiler design.
- Learn how a compiler works
- Know about the powerful compiler generation tools and techniques, which are useful to the other non-compiler applications
- Know the importance of optimization and learn how to write programs that execute faster

Course Outcomes

- Able to design a compiler for a simple programming language
- Able to use the tools related to compiler design effectively and efficiently
- Can write an optimized code

Unit - I :

Introduction: Language processors, Phases of a compiler, Pass and phase, Bootstrapping, Compiler construction tools, Applications of compiler technology, Programming language basics

Lexical Analysis: Role and Responsibility, Input buffering, Specification of tokens, Recognition of tokens, LEX tool, Design of a Lexical Analyzer generator

Unit – II:

Syntax Analysis: Role of the parser, Context Free Grammars- Definition, Derivations, Parse trees, Ambiguity, Eliminating ambiguity, Left recursion, Left faltering.

TOP Down Parsing: Recursive descent parsing, Non-recursive predictive parsing, LL(1) grammars, Error recovery in predictive parsing.

Bottom Up Parsing: Handle pruning, Shift-Reduce parsing, Conflicts during shifts- reduce parsing, SLR Parsing, Canonical LR(1) parsers, LALR parsers, Using ambiguous grammars, YACC tool.

Unit – III :

Syntax Directed Translation: Syntax Directed Definitions, Evaluation orders for SDD's, Application of SDT, SDT schemes, Implementing L-attribute SDD's.

Intermediate Code Generation: Need for intermediate code, Types of intermediate code, Three address code, Quadruples, Triples,Type expressions, Type equivalence, Type checking, Translation of expressions, control flow statements, switch statement, procedures, back patching

Unit – IV :

Run Time Storage Organization: Scope and Life time of variable, Information associated with symbols in symbol table, Data Structures for symbol Table, Static vs dynamic storage allocation, Stack allocation of space, Access to non-local data on stack, Heap management, Introduction to garbage collection

Optimization: Need and objective of optimization, Places of optimization, Optimization at user level, Construction of Basic blocks and Processing, Data Flow analysis using flow graph, Data flow equations for blocks with back ward flow control, Principles source of optimization and transformations, Alias, Loops in flow graphs, Procedural optimization, Loop optimization

Unit – V :

Code Generation: Issues in code Generation, Target machine architecture, Subsequent Use information, Simple code generator, Register allocation, DAG representation of basic blocks, Code generation from intermediate code, Peephole optimization, Code scheduling

Text Books :

1. "Compilers Principles, Techniques and Tools", Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman., Pearson.
2. "Compiler Design", K. Muneeswaran., Oxford University Press, 2012

Reference Books :

8. "Compiler Construction", K.V.N Sunitha, Pearson, 2013
9. "Engineering A Compiler", Second Edition, Keith D. Cooper & Linda Torczon., MK(Morgan

Kaufmann) (ELSEVIER)

10. “Compilers Principles and Practice”, Parag H. Dave, Himanshu B. Dave.,PEARSON
11. “Compiler Design”, SandeepSaxena, Rajkumar Singh Rathore., S.Chand publications
12. “Compiler Design”, SantanuChattopadhyay., PHI
13. “Principals of Compiler Design”, Nadhni Prasad, Elsevier

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Unix and Shell Programming

Course Objectives:

1. Discuss the development of Unix system over time.
2. State how the shell functions at the user interface and command line interpreter.
3. Modify built-in shell variables and create and use user-defined shell variables.
4. Use I/O redirection, pipes, quoting, and filename expansion mechanisms.
5. Create structured shell programming which accept and use positional parameters and exported variables.
6. Use shell flow control and conditional branching constructs (while, for, case, if, etc.)
7. Create shell programs which process interrupts, pass signals, invoke sub-shells and functions, and trap signals.

Course Outcomes:

1. The course delegates will have the fundamental skills required to write simple and complex Shell scripts to automate jobs and processes in the Unix environment.
2. Identify and use UNIX/Linux utilities to create and manage simple file processing operations, organize directory structures with appropriate security, and develop shell scripts to perform more complex tasks.
3. Effectively use the UNIX/Linux system to accomplish typical personal, office, technical, and software development tasks.
4. Monitor system performance and network activities.

Unit I

Introduction: Operating System, History of UNIX, Overview and Features of Unix System, Structure of Unix System, Unix Environment. **Unix File System**: Introduction of Files, Organization of File Systems, Accessing File Systems, Structure of File Systems. **Unix Commands**: Basic Commands, Advanced Unix Commands: File Access Permissions, Pipe Operator, cut, paste, wc, sort, head, tail, diff, cmp, uniq, comm, time, Conversions between DOS and Unix, man.

Unit II

File management and Compression Techniques: Managing and Compressing Files, Computer Devices, Disk related Commands, Compression and Uncompressing Files, Important Unix System Files, Shell Variables, Export of Local and Global Shell Variables. **Manipulating Processes and Signals**: Process Basics, Processes States and Transitions, Zombie Process, Context switching, Threads, ps-status of Process.

Unit III

System calls: Introduction, File-related System calls (open, create, read, write, lseek, close, mknod, link and unlink, access, and chown, chmod), Directory Handling System calls (mkdir, rmdir, chdir, opendir, readdir, telldir, closedir). Porcess related System calls (exec, fork, wait,exit).
Editors in Unix: introduction, Stream editor, Emacs Editor.

Unit IV

AWK Script: AWK Command, print, printf, Displaying Content of Specified Patterns, Comparison Operators, Compound Expressions, Arithmetic Operators, Begin and end Sections, User-defined Variables, if else Statement, Built-in Variables, Changing Input Filed Separator, Functions, Loops, Getting Input from User, Search and Substitute Functins, Copying results into Another file. **Bourne Shell**: Introduction, beginning Bourne Shell Scripting, Writing Shell Scripts, Command Line Parameters, read, for Loop, While Loop, if Statement, Bourne Shell Commands.

Unit V

Interprocess Communications: Interprocess Communication, Synchronization, Filters.
Unix System Administration and Networking: Unix Booting Procedure, Mounting Unix File System, Unmounting Unix File System, Managing User Accounts, Networking Tools, mail Command, Distributed File System, Firewalls, Backup and Restore.

Text Books:

1. "UNIX and SHELL Programming", B.M. HARWANI, OXFORD UNIVERSITY PRESS.

References:

1. "UNIX and Linux System Administration Handbook", Evi Nemeth, Garth Snyder, Trent R. Hein and Ben Whaley, PHI
2. "Essential Linux Administration: A Comprehensive Guide for Beginners", Chuck Easttom, Cengage Learning
3. "The Linux Programming Interface: A Linux and UNIX System Programming Handbook", Michael Kerrisk, No Starch Press
4. "A Practical Guide to Linux Commands, Editors, and Shell Programming", 3rd Edition, Mark G. Sobell, PHI
5. "Advanced Programming in the UNIX Environment", 3rd Edition, W. Richard Stevens and Stephen A. Rago, Addison-Wesley professional
6. "UNIX Network Programming", W. Richard Stevens, PHI
7. "Unix: *The Ultimate Guide",* Sumitabha Das, Tat Mcgraw-Hill Edition, Indian reprint 2012

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Software Engineering

Course Objectives

- To understand the software life cycle models.
- To understand the software requirements and SRS document.
- To understand the importance of modeling and modeling languages.
- To design and develop correct and robust software products.
- To understand the quality control and how to ensure good quality software.
- To understand the planning and estimation of software projects.
- To understand the implementation issues, validation and verification procedures.
- To understand the maintenance of software

Course Outcomes

- Define and develop a software project from requirement gathering to implementation.
- Obtain knowledge about principles and practices of software engineering.
- Focus on the fundamentals of modeling a software project.
- Obtain knowledge about estimation and maintenance of software systems

Unit - I :

Software and Software Engineering: The Nature of Software, The Unique Nature of WebApps, Software Engineering, Software Process, Software Engineering Practice, Software Myths.

Process Models: A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Terminology, Product and Process.

Unit – II:

Requirements Analysis And Specification: Requirements Gathering and Analysis, Software Requirement Specification (SRS), Formal System Specification.

Software Design: Overview of the Design Process, How to Characterise of a Design?, Cohesion and Coupling, Layered Arrangement of Modules, Approaches to Software Design.

Unit – III :

Function-Oriented Software Design: Overview of SA/SD Methodology, Structured Analysis, Developing the DFD Model of a System, Structured Design, Detailed Design, Design Review, Over view of Object Oriented design.

User Interface Design: Characteristics of Good User Interface, Basic Concepts, Types of User Interfaces, Fundamentals of Component-based GUI Development, A User Interface Design Methodology.

Unit – IV :

Coding And Testing: Coding, Code Review, Software Documentation, Testing, Unit Testing, Black-Box Testing, White-Box Testing, Debugging, Program Analysis Tool, Integration Testing, Testing Object-Oriented Programs, System Testing, Some General Issues Associated with Testing.

Unit – V :

Software Reliability And Quality Management: Software Reliability, Statistical Testing, Software Quality, Software Quality Management System, ISO 9000, SEI Capability Maturity Model.

Computer Aided Software Engineering: Case and its Scope, Case Environment, Case Support in Software Life Cycle, Other Characteristics of Case Tools, Towards Second Generation CASE Tool, Architecture of a Case Environment.

Software Maintenance: Characteristics of Software Maintenance.

Software Reuse: what can be Reused? Why almost No Reuse So Far?, Basic Issues in Reuse Approach, Reuse at Organisation Level.

Text Books :

1. Software Engineering A practitioner's Approach, Roger S. Pressman, Seventh Edition McGrawHill International Edition.
2. Fundamentals of Software Engineering, Rajib Mall, Third Edition, PHI.

Reference Books :

1. Software Engineering, Ian Sommerville, Ninth edition, Pearson education.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Software Engineering, A Precise Approach, PankajJalote, Wiley India,2010.
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.

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Microprocessors & Interfacing

Course Objective
- Study the instruction set of 8086 microprocessor and its architecture
- Learn assembling language programming using 8086 microprocessor
- Interfacing 8051, 8255, 8237, and 8259

Course Outcomes
- Program the 8086 microprocessor
- Interface the 8086 microprocessor with various devices and program them

Unit - I :
Microprocessors-Evolution and Introduction: Microprocessors and Micro Controllers, Microprocessor based system, Origin of Microprocessor, Classification of Microprocessors, Types of Memory, I/O Devices, Technology Improvements Adapted to Microprocessors and Computers, Introduction to 8085 processor, Architecture of 8085, Microprocessor instructions, classification of instructions, Instruction set of 8085. Intel 8086 Microprocessor architecture, Features, and Signals: Architecture of 8086, Accessing memory locations, PIN details of 8086

Unit – II:
Addressing Modes, Instruction Set and Programming of 8086: Addressing modes in 8086, Instruction set of 8086, 8086 Assembly Language Programming, Modular Programming

Unit – III :
8086 Interrupts: Interrupt types in 8086, Processing of Interrupts by 8086, Dedicated interrupt types in 8086, Software interrupts-types 00H-FFH, Priority among 8086 interrupts, Interrupt service routines, BIOS interrupts or functional calls, Interrupt handlers, DOS services-INT 21H, System calls-BIOS services.
Memory and I/O Interfacing: Physical memory organization in 8086, Formation of system bus, Interfacing RAM and EPROM chips using only logic gates, Interfacing RAM/ EPROM chips using decoder IC and logic gates, I/O interfacing, Interfacing 8-bit input device with 8086, Interfacing output device using 8086, Interfacing printer with 8086, Interfacing 8-bit and 16-bit I/O devices or ports with 8086, Interfacing CRT terminal with 8086.

Unit – IV :
Features and Interfacing of programmable devices for 8086 systems: Intel 8255 p[programmable peripheral interface, Interfacing switches and LEDS, Interfacing seven segment displays, Traffic light control, Interfacing analog to digital converters, Intel Timer IC 8253, Introduction to serial communication, 8259 programmable controller, 8237 DMA controller

Unit – V :
Introduction to 8051 Micro controllers: Intel's MCS-51 series micro controllers, Intel 8051 architecture, Memory organization, Internal RAM structure, Power control in 8051, Stack operation.
8051 Instruction Set and Programming: Introduction, Addressing modes of 8051, Instruction set of 8051**,**
Hardware features of 8051: Introduction, Parallel ports in 8051, External memory interfacing in 8051, Timers, Interrupts, Serial ports.
Interfacing Examples: Interfacing 8255 with 8051, Interfacing of push button switches and LEDS,

Interfacing of seven segment displays

Text Books :

1. "Microprocessor and Interfacing 8086,8051, 8096 and advanced processors", Senthil Kumar, Saravanan, Jeevanathan, Shah, Oxford Publishers, 2012.
2. "The X86 Microprocessors", Lyla B. Das. Pearson, 2012.

Reference Books :

1. "Microprocessor and Interfacing: Programming and Hardware", Douglas V.Hall, McGrawHill
2. "8086 microprocessor: Programming and Interfacing the PC", Kenneth Ayala, Cengage Learning
3. "ARM system-on-chip architecture", Steve Furber, Addison-Wesley Professional
4. "The Intel Microprocessors", Barry B. Brey, Prentice Hall

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Advanced Computer Architecture

Course Objective

- Discuss the concept of parallel processing and the relationship between parallelism and performance
- Understand the organization of computer structures that can be electronically configured and reconfigured
- Discuss the performance advantages that multithreading can offer along with the factors that make it difficult to derive maximum benefits from this approach

Course Outcomes

- Realize Parallelism and Parallel architectures
- Ability to use Instruction Level Parallelism
- Ability to use Thread level parallelism

Unit - I :

Evolution of Computer Architecture, System Attributes to performance; Shared Memory Multiprocessors, Distributed Memory Multiprocessors, A Taxonomy of MIMD Computers; architecture of Vector Super computers, operational model of SIMD computer, PRAM models and PRAM variants

Conditions of Parallelism- data and resource dependencies, hardware and software parallelism, Program partitioning and Scheduling- grain sizes and latency, grain packing and scheduling, static multi processor scheduling, Program flow mechanisms- control flow vs data flow, demand driven mechanisms, comparison of flow mechanisms, System interconnect architectures- network properties and routing, static and dynamic connection networks

Unit – II:

Principles of scalable performances- performance metrics and measures- parallelism profile in programs, mean performance, efficiency, utilization and quality, benchmarks and performance measures, characteristics of parallel processing applications, Speed up performance laws- Amdahl's law, Gustafson's law, memory bounded speed up model, Scalability metrics and goals,

Bus systems- back plane bus specification, Addressing and Timing protocols, Arbitration, transaction and interrupt, IEEE future bus standard requirement set, Shared memory organizations- Interleaved memory organization, band width and fault tolerance, memory allocation schemes, Atomicity and event ordering

Unit – III :

Linear Pipeline Processors- asynchronous and synchronous models, clocking and timing control, speedup, efficiency, and throughput, Non linear pipeline processors- reservation and latency analysis, collision free scheduling, pipeline schedule optimization, Instruction pipe line design- instruction execution phases, mechanisms for instruction pipelining, dynamic instruction scheduling, branch handling techniques, static arithmetic pipelines.

Hierarchical bus system, cross bar switch and multiport memory, multistage and combining networks, multistage and combining networks, The cache coherence problem, message passing mechanism- message routing schemes, deadlock virtual channels, flow control strategies, multicast routing algorithms

Unit – IV :

Vector processing principles- vector instruction types, vector access memory schemes, early super computers, Multi vector multiprocessors- performance directed design rules, architecture of Cray and MPP, Compound vector operations, vector loops and chaining, SIMD computer organizations

Unit – V :

Latency-hiding techniques- shared virtual memory, prefetching techniques, distributed coherent caches, scalable coherence interface, relaxed memory consistency, principles of multithreading and context switching policies,

MPD architecture, The Tera multiprocessor system, Data flow computer architecture

Text Books :

1. KAI Hwang & Naresh Jotwani, “Advanced Computer Architecture- Parallelism, Scalability, Programmability” Second Edition, Mc Graw Hill Publishing

Reference Books :

1. Hennessy Patterson, “Computer Architecture- A Quantitative Approach” Fifth Edition, Elsevier
2. Kai Hwang, “Advanced Computer Architecture- Parallelism, Scalability, Programmability”, TMH.
3. Computer Architecture, Concepts and Evolutions, Garrit A Blaauw, PEA

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Operating Systems and Shell Programming Lab

Course Objective

- To learn shell programming
- To use UNIX operating system for study of operating system concepts.
- To write the code to implement and modify various concepts in operating systems using Unix
- To learn implement CPU scheduling algorithms in Unix
- To practice basic administration skills

Course Outcomes

- Understand the role and responsibilities of a Unix system administrator
- Master CPU scheduling algorithms
- Be familiar with device interrupts and how they are used in an operating system implementation
- Students will gain knowledge in writing software routines, modules for implementing various concepts of operating systems

PART-A

1. Simulate the following CPU scheduling algorithms

a) Round Robin b) SJF c) FCFS d) Priority

2. Simulate all file allocation strategies

a) Sequential b) Indexed c) Linked

3. Simulate MVT and MFT

4. Simulate all File Organization Techniques

a) Single level directory b) Two level c) Hierarchical d) DAG

5. Simulate Bankers Algorithm for Dead Lock Avoidance

6. Simulate Bankers Algorithm for Dead Lock Prevention

7. Simulate all page replacement algorithms

a) FIFO b) LRU c) LFU Etc. …

8. Simulate Paging Technique of memory management

Reference Books :

1. “Operating System Concepts”, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth edition, John Wiley.
2. “Operating Systems: Internals and Design Principles”, Stallings, Sixth Edition–2009, PearsonEducation
3. “Modern Operating Systems”, Andrew S Tanenbaum, Second Edition, PHI.
4. “Operating Systems”, S.Haldar, A.A.Aravind, Pearson Education.
5. “Principles of Operating Systems”, B.L.Stuart, Cengage learning, India Edition.

6. "Operating Systems", A.S.Godbole, Second Edition, TMH.
7. "An Introduction to Operating Systems", P.C.P. Bhatt, PHI.

PART-B

1. Practice session: practice use of some basic Linux commands. Document the syntax and semantics of those commands. Practice programs on shell variables, control statements etc.
2. Practice session: Study the features of Linux environment and submit a report on it.
3. Write a shell script that accepts a name from the user and displays whether it is a file, directory or something else.
4. Write a shell script that creates users
5. Write a shell script that searches for a given string in a file
6. Write a shell script that compiles all C files in your home directory and creates executable files
7. Write a shell script that given a filename as argument, deletes all even lines in a file
8. Implement the grep command in C language
9. Write a shell script that removes duplicate lines from a file
10. Write a shell script that enhances find command by adding error messages that explain why the command failed.
11. Write a shell script to backup files in a specified directory
12. Write a shell script that finds all links to a file
13. Write an awk script to count the number of lines in a file that do not contain vowels.
14. Write an awk script to find the number of characters, words and lines in a file.
15. Write C programs that illustrate communication between two unrelated processes using named pipe(FIFO File).
16. Write a C program in which a parent writes a message to a pipe and the child reads the message.
17. Write a C program (sender.c) to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.
18. Write a C program (receiver.c) that receives the messages (from the above message queue and displays them.
19. Configure mail server and file server.
20. Write Client and Server programs in C for connection oriented communication between Server and Client processes using Unix Domain sockets to perform the following:Client process sends a message to the Server Process. The Server receives the message, reverses it and sends it back to the Client.The Client will then display the message to the standard output device.

Reference Books

1. "Unix and Shell programming", B.A.Forouzan and R.F.Gilberg, Cengage Learning.

2. "Beginning Linux Programming", 4th Edition, N.Matthew, R.Stones,Wrox, Wiley
3. "Advanced Unix Programming", N.B.Venkateswarulu, BS Publications.
4. "Unix and Shell Programming", M.G. Venkatesh Murthy, Pearson Education.
5. "Unix Shells by Example", 4th Edition, Elllie Quigley, Pearson Education.
6. "Sed and Awk", O.Dougherty&A.Robbins,2nd edition,SPD.
7. "Unix shell Programming", S.G.Kochan and P.Wood,3rd edition, Pearson Education.
8. "Shell Scripting, S.Parker, Wiley India Pvt. Ltd.
9. "Advanced Programming in the Unix Environment",2nd edition, W.R.Stevens and S.A.Rago, Pearson Education.
10. "Linux System Programming", Robert Love, O'Reilly, SPD

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Compiler Design and Assembly Language Programming Lab

Course Objective

- To implement some of the functionality of the compiler
- To do programming using compiler related tools

Course Outcomes

- Develop compiler tools
- Design simple compiler

Complier Design Lab

1. Write a program to search for a given pattern in a set of files. It should support regular expressions. It should work similar to grep and fgrep of Linux environment.
2. Write programs for DFA, NFA.
3. Consider the following regular expressions:

   a) $(0 + 1)^* 1(0+1)(0+1)$

   b) $(ab^*c + (def)^+ + a^*d^+e)^+$

   c) $((a + b)^*(c + d)^*)^+ + ab^*c^*d$

   Write separate programs for recognizing the strings generated by each of the regular expressions mentioned above (Using FA).
4. Given a text-file which contains some regular expressions, with only one RE in each line of the file. Write a program which accepts a string from the user and reports which regular expression accepts that string. If no RE from the file accepts the string, then report that no RE is matched.
5. Design a PDA for any given CNF. Simulate the processing of a string using the PDA and show the parse tree.

6. Design a Lexical analyzer for identifying different types of tokens used in C language.

   Note: The reserved keywords such as if, else, class, structetc must be reported as invalid identifiers. C allows identifier names to begin with underscore character too.
7. Simulate a simple desktop calculator using any lexical analyzer generator tool (LEX or FLEX).
8. Program to recognize the identifiers, if and switch statements of C using a lexical analyzer generator tool.
9. Consider the following grammar:

   S --> ABC

   A-->abA | ab

   B--> b | BC

   C--> c | cC

   Design any shift reduced parser which accepts a string and tells whether the string is accepted by above grammar or not.
10. Design a YACC program that reads a C program from input file and identify all valid C identifiers and for loop statements.
11. Program to eliminate left recursion and left factoring from a given CFG.
12. YACC program that reads the input expression and convert it to post fix expression.
13. YACC program that finds C variable declarations in C source file and save them into the symbol table, which is organized using binary search tree.
14. YACC program that reads the C statements from an input file and converts them into quadruple three address intermediate code

Reference Books :

1. "Compiler Design using FLEX and YACC", Das, PHI.
2. "Compiler Design in C", Holub, PHI.

Assembly Language Programming Lab

1. Write an ALP to find factorial of number.
2. The 8 data bytes are stored from memory location E000H to E007H. Write 8086 ALP to transfer the block of data to new location B001H to B008H.
3. Write a program to display string Computer Science & Engineering for 8086.

4. Write a program to reverse the given string for 8086.
5. Write a program to multiply 2 numbers (16-bit data) for 8086.
6. Sum of series of 10 numbers and store result in memory location total.
7. Write a program to find Largest No. in a block of data. Length of block is 0A. Store the maximum in location result.
8. Find number of times letter “e” exist in the string exercise, Store the count at memory
9. Write an assembly language program to count number of vowels in a given string.
10. Write an 8086 ALP which will input the user name from the keyboard. If the user is “Ramu-janu” it will output “The username is valid” else it will output “Invalid user name”.

Reference Books :

1. “Microprocessor and Interfacing 8086,8051, 8096 and advanced processors”, Senthil Kumar, Saravanan, Jeevanathan, Shah, Oxford Publishers, 2012.
2. “8086 microprocessor: Programming and Interfacing the PC”, Kenneth Ayala, Cengage Learning
3. “The X86 Microprocessors”, Lyla B. Das. Pearson, 2012.

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Computer Networks

Course Objective

- To provide students with a theoretical and practical base in computer networks issues.
- Students will be able purse their study in advanced networking courses.
- Students will able to Design, Implement, and Analyze simple Computer Networks.
- Students will able to identify, formulate, and solve network engineering problems.

Course Outcome:

- Open for research in Computer Networks.
- Use appropriate transmission media to connect to a computer network and Internet.
- Work on the open issues for their project.
- Start using the Internet effectively
- Able to design new protocols for computer network.

UNIT I

Introduction: Networks, Network Types, Internet History, Network Models: Protocol Layering, TCP/IP Protocol Suite, The ISO Model.

Introduction to physical layer: Data and Signals, Transmission impairment, Transmission media: Guided Media, Unguided Media, Switching: Introduction, Circuit Switched Networks, Packet switching.

UNIT II

Introduction to Data Link Layer: Introduction, Data link Layer Design Issues, Elementary Data Link Protocols, Sliding Window Protocols. Data link control: DLC Services, Data link layer protocols, HDLC, Point to Point Protocol, Media Access control: Random Access, Controlled Access, Channelization, Ethernet, Connecting devices and virtual LANs: Connecting Devices.

UNIT III

The Network Layer: Network layer design issues, Routing algorithms, Congestion control algorithms, Internetworking, The network layer in the Internet: IPV4 Addresses, IPV6, Internet Control protocol, OSPF, BGP, IP, ICMPv4, IGMP.

UNIT IV

The Transport Layer: The Transport Service, Elements of Transport Protocols, The internet transport protocols: UDP, TCP.

UNIT V

Introduction to Application Layer: Introduction, Client Server Programming, WWW and HTTP, FTP, e-mail, TELNET, Domain Name System.

Text Books:

1. “Computer Networks”, 5th edition, 2010, Andrew S. Tanenbaum, Wetherall, Pearson.
2 “Data communications and networking” 5th edition, 2012, Behrouz A. Forouzan, TMH.

Reference Books:

1. "Internetworking with TCP/IP – Principles, protocols, and architecture- Volume 1, Douglas E. Comer, 5th edition, PHI
2. "Computer Networks", 5E, Peterson, Davie, Elsevier.
3. "Introduction to Computer Networks and Cyber Security", Chawan- Hwa Wu, Irwin, CRC Publications.
4. "Computer Networks and Internets with Internet Applications", Comer.

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Object oriented Analysis and Design Using UML

Course Objective:

- To understand how to solve complex problems
- Analyze and design solutions to problems using object oriented approach
- Study the notations of Unified Modeling Language

Learning Outcome:

- Ability to find solutions to the complex problems using object oriented approach
- Represent classes, responsibilities and states using UML notation
- Identify classes and responsibilities of the problem domain

UNIT I

Introduction: The Structure of Complex systems, The Inherent Complexity of Software, Attributes of Complex System, Organized and Disorganized Complexity, Bringing Order to Chaos, Designing Complex Systems, Evolution of Object Model, Foundation of Object Model, Elements of Object Model, Applying the Object Model.

UNIT II

Classes and Objects: Nature of object, Relationships among objects, Nature of a Class, Relationship among Classes, Interplay of Classes and Objects, Identifying Classes and Objects, Importance of Proper Classification, Identifying Classes and Objects, Key abstractions and Mechanisms.

UNIT III

Introduction to UML: Why we model, Conceptual model of UML, Architecture, Classes, Relationships, Common Mechanisms, Class diagrams, Object diagrams.

UNIT IV

Structural and Behavioral Modeling: Advance Classes, Advance Relationships, Interfaces, Types &Roles, Packages, Interactions, Use cases, Use case diagrams.

UNIT V

Advanced Behavioral and Architectural modeling: Activity diagrams, Events and Signals, State chart diagrams, Components and Component diagrams, Deployment & Deployment diagrams, Collaborations.

Text Books:

1. "Object- Oriented Analysis And Design with Applications", Grady BOOCH, Robert A. Maksimchuk, Michael W. ENGLE, Bobbi J. Young, Jim Conallen, Kellia Houston, 3rd edition, 2013, PEARSON
2. "The Unified Modeling Language User Guide", Grady Booch, James Rumbaugh, Ivar Jacobson, 12th Impression, 2012, PEARSON.

Reference Books:

1. “Object-oriented analysis and design using UML”, Mahesh P. Matha, PHI
2. “Head first object-oriented analysis and design”, Brett D. McLaughlin, Gary Pollice, Dave West, O“Reilly
3. “Object-oriented analysis and design with the Unified process”, John W. Satzinger, Robert B. Jackson, Stephen D. Burd, Cengage Learning
4. “The Unified modeling language Reference manual”, James Rumbaugh, Ivar Jacobson, Grady Booch, Addison-Wesley

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DATA MINING

Course Objective

- Understand data mining principles and techniques: Introduce DM as a cutting edge business intelligence method and acquaint the students with the DM techniques for building competitive advantage through proactive analysis, predictive modeling, and identifying new trends and behaviors.
- Building basic terminology.
- Learn how to gather and analyze large sets of data to gain useful business understanding.
- Learn how to produce a quantitative analysis report/memo with the necessary information to make decisions.
- Describing and demonstrating basic data mining algorithms, methods, and tools
- Identifying business applications. Other applications of data mining
- Develop and apply critical thinking, problem-solving, and decision-making skills.

Course Outcomes

- Apply preprocessing statistical methods for any given raw data.
- Select and apply proper Data mining algorithms to build analytical applications.
- Develop practical work of Data Mining techniques and design hypothesis based on the analysis to conceptualize a Data Mining Solution to practical problem.

UNIT I

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Issues in Data Mining.

Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT II

Basic Concepts, Decision Trees, and Model Evaluation: Preliminaries, General Approach to Solving a Classification Problem, Decision Tree Induction, Model Over fitting, Evaluating the Performance of a Classifier, Methods for Comparing Classifiers.

UNIT III

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, The Apriori algorithm for finding frequent item sets using candidate generation, Generating association rules from frequent item sets, Mining frequent item sets without candidate generation, Mining various kinds of Association Rules, Correlation Analysis

UNIT IV

Classification and Prediction: Description and comparison of classification and prediction, preparing data for Classification and Prediction

Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation Prediction, linear and non-linear regression, evaluating accuracy of a Classifier or a Predictor

UNIT V

Cluster Analysis: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, k-means and k-mediods methods, CLARANS, Agglomerative and divisive hierarchical clustering, chameleon dynamic modeling, clustering based on density distribution function, wavelet transformation based clustering, conceptual Clustering, Constraint-Based Cluster Analysis, Outlier Analysis.

TEXT BOOKS:

1. Data Mining – Concepts and Techniques - Jiawei Han , Micheline Kamber, and Jian Pei, Morgan Kaufmann Publishers, 3rd Edition, ELSEVIER.

REFERENCE BOOKS:

1. Data Warehousing in the Real World – Sam Aanhory & Dennis Murray Pearson Edn Asia.
2. Insight into Data Mining, K.P.Soman ,S.Diwakar, V.Ajay,PHI,2008.
3. Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley student Edition
4. The Data Warehouse Life cycle Tool kit – Ralph Kimball Wiley student edition
5. Building the Data Warehouse By William H Inmon, John Wiley & Sons Inc, 2005.
6. Data Mining Introductory and advanced topics –Margaret H Dunham, Pearson education
7. Data Mining Techniques – Arun K Pujari,2nd edition, Universities Press.
8. Data Mining, V. Pudi and P. RadhaKrishna, Oxford University Press.
9. Data Mining: Methods and Techniques, A.B.MShawkat Ali and S.A. Wasimi,Cengage Learning.
10. Data Warehouse 2.0,The Architecture for the next generation of Data Warehousing, W.H.Inmon, D.Strauss, G.Neushloss, Elsevier, Distributed by SPD.

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Internet Technologies

Course Objective:
- Learn to build and access databases using java.
- Learn to communicate over a network using java.
- Learn to design server side programs and access them from client side.

Learning Outcome:
Upon completion of this course, students will receive:

- **Familiarity with WWW technical concepts:** IP addressing, routing, client-server interaction, and basic HTTP server functionality.
- **Exposure to basic web programming:** including Html programming (manual and tool assisted), JavaScript programming of reactive web pages elements.
- **Exposure to** database programming using java
- The necessary skills to write server side programs
- A solid foundation for further exploration of more advanced web programming technologies.

UNIT I
Fundamentals: Introduction to the web, Web servers and clients, Resources, URL and its anatomy, message format, persistent and non persistent connections, Web caching, proxy, java and the net, java network classes and interfaces, looking up internet address, client/server programs, socket programming, e-mail client, POP3 programs, remote method invocation, example
Selectors

UNIT II
HTML: HTML and its flavors, HTML basics, Elements, Attributes and tags, Basic tags, Advanced Tags, Frames, Images, Meta tag, Planning of webpage, Model and structure for a website, designing web pages, Multimedia content.
Cascading Style Sheets: Advantages, Adding CSS, Browser, compatibility, CSS and Page layout, Selectors

UNIT III
Java Script: Introduction, Variables, Literals, Operators, Control structure, Conditional statements, Arrays, Functions, Objects, Predefined objects, Object hierarchy, Accessing objects, Events, Event handlers, Multiple windows and Frames, Form object and Element, Advanced JavaScript and HTML, Data entry and Validation, Tables and Forms, DHTML with JavaScript

UNIT IV
Server side programming: Internet programming paradigm, Server-side programming, Languages for CGI, Applications, Server environment, Environment variables, CGI building blocks, CGI scripting using C, Shell script, Writing CGI program, CGI security, Alternatives and Enhancement to CGI, Server-side Java, Advantages over applets, Servlet alternatives, Servlet strengths, Servlet Architecture, Servlet Life cycle, Generic and HTTP Servlet, First servlet, passing parameters to servlets, retrieving parameters, Server-side include, cookies, filters, Problems with servlet, Security issues, JSP and HTTP, JSP Engines, How JSP works, JSP and Servlet, Anatomy of a JSP Page, JSP syntax, JSP components.

UNIT V
Sever side programming continued: Beans, Session tracking, Users passing control and data between pages, Sharing session and Application data, Database connectivity, JDBC drivers, Basic steps, Loading

a driver, Making a connection, Execute and SQL statement, SQL statements, Retrieving the result, Getting database information, Scrollable and updatable result set, Result set metadata, Introduction to JavaBeans, Bean builder, Advantages of Java Beans, BDK introspection, Properties, Bean Info interface, Persistence, Customizer, JavaBeans API, EJB, Introduction to Struts Framework.

Text Books:

1. Web Technologies: HTML, JavaScript, PHP, Java, JSP, XML, And AJAX, Black Book, KOGENT LEARNING SOLUTIONS INC.
2. Web Technologies, Uttam K. Roy, 1st edition 7th impression, 2012, Oxford Higher Education

Reference Books:

1. Java How to program, Paul deitel, Harvey deital, PHI
   Introduction to Java Programming, Y.Daniel Liang, 6th Edition, Pearson Education,
2. 2007
3. The J2EE Tutorial, Stephanie Bodoff et al, 2nd Edition, Pearson Education, 2004.
4. Web Technologies, Roy, Oxford University Press
5. Web Technologies, Srinivasan, Pearson Education, 2012
6. Java EE 5 for Beginners, Ivan Bayross, Sharanam Shah, Cynthia Bayrossand Vaishali Shai, SPD.
   Programming the Worldwide Web, Robert W.Sebesta, 7th edition, 2009, Pearson Education

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Software Testing

Course Objective:

- Fundamentals for various testing methodologies.
- Describe the principles and procedures for designing test cases.
- Provide supports to debugging methods.
- Acts as the reference for software testing techniques and strategies.

Learning Outcome:

- Understand the basic testing procedures.
- Able to support in generating test cases and test suites.
- Able to test the applications manually by applying different testing methods and automation tools.
- Apply tools to resolve the problems in Real time environment.

UNIT I

Introduction: Purpose of Testing, Dichotomies, Model for Testing, Consequences of Bugs, Taxonomy of Bugs.

Flow graphs and Path testing: Basics Concepts of Path Testing, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Application of Path Testing.

UNIT II

Transaction Flow Testing: Transaction Flows, Transaction Flow Testing Techniques.

Dataflow testing: Basics of Dataflow Testing, Strategies in Dataflow Testing, Application of Dataflow Testing.

UNIT III

Domain Testing: Domains and Paths, Nice & Ugly Domains, Domain testing, Domains and Interfaces Testing, Domain and Interface Testing, Domains and Testability.

Paths, Path products and Regular expressions: Path Products & Path Expression, Reduction Procedure, Applications, Regular Expressions & Flow Anomaly Detection.

UNIT IV

Logic Based Testing: Overview, Decision Tables, Path Expressions, KV Charts, Specifications.

State, State Graphs and Transition Testing: State Graphs, Good & Bad State Graphs, State Testing, Testability Tips.

UNIT V:

Software Testing Tools: Introduction to Testing, Automated Testing, Concepts of Test Automation, Introduction to list of tools like Win runner, Load Runner, Jmeter, About Win Runner ,Using Win runner, Mapping the GUI, Recording Test, Working with Test, Enhancing Test, Checkpoints, Test Script Language, Putting it all together, Running and Debugging Tests, Analyzing Results, Batch Tests, Rapid Test Script Wizard.

Text Books :

1. Software testing techniques – Boris Beizer, Dreamtech, second edition.
2. Software Testing- Yogesh Singh, Camebridge

Reference Books :

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing, 3rd edition, P.C. Jorgensen, Aurbach Publications (Dist.by SPD).
3. Software Testing, N.Chauhan, Oxford University Press.
4. Introduction to Software Testing, P.Ammann & J.Offutt, Cambridge Univ.Press.
5. Effective methods of Software Testing, Perry, John Wiley, 2nd Edition, 1999.
6. Software Testing Concepts and Tools, P.Nageswara Rao, dreamtech Press
7. Win Runner in simple steps by Hakeem Shittu,2007 Genixpress.
8. Foundations of Software Testing, D.Graham & Others, Cengage Learning.

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Data Analytics - I

Objectives:

- To introduce the terminology, technology and its applications
- To introduce the concept of Analytics for Business
- To introduce the tools, technologies & programming languages which is used in day to day analytics cycle

Unit I

Introduction to Analytics and R programming (NOS 2101)

Introduction to R, RStudio (GUI): R Windows Environment, introduction to various data types, Numeric, Character, date, data frame, array, matrix etc., Reading Datasets, Working with different file types .txt,.csv etc. Outliers, Combining Datasets, R Functions and loops.

Summary Statistics - Summarizing data with R, Probability, Expected, Random, Bivariate Random variables, Probability distribution. Central Limit Theorem etc.

Unit II

SQL using R & Correlation and Regression Analysis (NOS 2101)

Introduction to NoSQL, Connecting R to NoSQL databases. Excel and R integration with R connector.

Regression Analysis, Assumptions of OLS Regression, Regression Modelling. Correlation, ANOVA, Forecasting, Heteroscedasticity, Autocorrelation, Introduction to Multiple Regression etc.

Unit III

Understand the Verticals - Engineering, Financial and others (NOS 2101)

Understanding systems viz. Engineering Design, Manufacturing, Smart Utilities, Production lines, Automotive, Technology etc.

Understanding Business problems related to various businesses

Unit IV

Manage your work to meet requirements (NOS 9001)

Understanding Learning objectives, Introduction to work & meeting requirements, Time Management, Work management & prioritization, Quality & Standards Adherence,

Unit V

Work effectively with Colleagues (NOS 9002)

Introduction to work effectively, Team Work, Professionalism, Effective Communication skills, etc.

NOS * National Occupational Standards

Text Books:

1. **Student's Handbook for Associate Analytics.**
2. Introduction to Scientific Programming and Simulation Using R, Owen Jones, Robert Maillardet and Andrew Robinson, Second Edition, CRC Press, 2014
3. A First Course in Statistical Programming with R, Braun W. J., Murdoch D. J.. — Cambridge University Press, 2007
4. Data Manipulation with R, Jaynal Abedin and Kishor Kumar Das, Second Edition, Packt publishing, BIRMINGHAM – MUMBAI.
5. Beginning R The Statistical Programming language- Mark Gardener, John Wiley & Sons, Inc, 2012

Reference Books:

6. Introduction to Probability and Statistics Using R, ISBN: 978-0-557-24979-4, is a textbook written for an undergraduate course in probability and statistics.
7. An Introduction to R, by Venables and Smith and the R Development Core Team. This may be downloaded for free from the R Project website (http://www.r-project.org/, see Manuals). There are plenty of other free references available from the R Project website.
8. Time Series Analysis and Mining with R**,** Yanchang Zhao
9. Graphics for Statistics and Data Analysis with R – Kevin J. Keen, CRC Press, 2010
10. Data Analysis and Graphics Using R, Third Edition, John Maindonald, W. John Braun, Cambridge University Press, 2010
11. Exploratory Data Analysis with R – Roger D. Peng, Leanpub publications, 2015
12. Introduction to Probability and Statistics Using R, G. jay Kerns, First Edition, 2011
13. The Art of Data Science- A Guide for anyone Who Works with Data – Roger D. Peng and Elizabeth Matsui, Leanpub Publications, 2014
14. Montgomery, Douglas C., and George C. Runger, Applied statistics and probability for engineers. John Wiley & Sons, 2010.The Basic Concepts of Time Series Analysis. http://anson.ucdavis.edu/~azari/sta137/AuNotes.pdf

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ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

1. Introduction:

In the past engineering education has focused only on imparting “hard” or technical skills. With the entry of multinational companies in India there is a revolutionary change in the employment opportunities and recruitment process as well. Globalization demands universities to produce engineers who are equipped with effective interpersonal skills to meet global demands.

In this scenario the **Advanced English Language Communication skills lab** introduced at the 3rd B. Tech. level plays a key role to learn the foreign language in a happy atmosphere and in a successful way. Breaking through the traditional method of teaching, this course motivates student’s learning attitude by providing an interactive learning environment.

This course is developed on the methodology of LSRW skills along with soft skills. This course focuses on the practical aspects of listening, speaking, reading and writing that enable the students to expose to various activities like group discussions, Oral Presentations, Mock interview sessions etc., Personality development, etiquettes and to provide corporate knowledge to help the students in facing interviews in a formal organizational set up.

2. Objectives:

This lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To expose the students to a variety of self instructional, learner-friendly modes of language learning.
- To enable the students to learn better pronunciation and accent through listening and reading exercises.
- To train students to use language appropriately for interviews, group discussion and public speaking.

- To initiate them to greater use of the computer in resume preparation, format-making etc.

- To help the students to cultivate the habit of reading passages from the computer monitor, thus providing them with the required facility to face computer based competitive exams such as GRE, TOFEL, and GMAT etc.

- To enable the students to acquire good communication skills as well as soft skills to meet global demands.

3 Syllabus:

The following course content is prescribed for the Advanced Communication Skills Lab:

Unit I:

Reading &Listening Comprehension: Skimming –scanning- Extensive and Intensive reading. Reading for making inferences. Active VS passive listening. Listening and Note taking, - Listening for making inferences.

. **Unit II:**

Writing Skills: Formal and informal writing- Resume Writing-E-Correspondence.

. **Unit III:**

Technical Presentations (Oral) : Planning-Preparation-Presentation . Art of Persuasion- Audience analysis- Handling questions. .

Unit IV:

Interview Skills: Types of Interviews - pre-interview planning- answering strategies. Analysis of One to one –interviews – group interviews - Mock interviews.

Unit V:

Soft Skills: Inter Personal Skills- Goal setting – Etiquettes and good manners – Team Working – Work Ethics--Time management – Problem Solving. .

Minimum Requirements

The English Language Lab shall have two parts:

The Computer Aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.

The Communication Skills Lab with movable chairs and audio-visual aids with a PA System, a TV, a digital stereo-audio and video system, a Camcorder, etc

System Requirement (Hardware Component):

Computer network with LAN with a minimum of 60 multimedia systems with the following specifications:

P-IV Processor

Speed-2.8 GHZ

RAM_512 MB minimum

Hard Disk-80 GB

Headphones

Prescribed Software:

9. **K-Van Advanced Communication Skills**
10. **Walden Infotech Advanced Communication Skills.**

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. **Technical Writing and Professional Communication, Huckin and Olsen** Tata Mc Graw-Hil 2009.

2. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.

3. **Cambridge English for Job-Hunting** by Colm Downes, Cambridge University Press, 2008

4. **Resume's and Interviews** by M.Ashraf Rizvi, Tata Mc Graw-Hill, 2008

5.. **English Language Communication : A Reader cum Lab Manual** Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.

6. **Managing Soft Skills** by K R Lakshminarayan and T.Muruguvel, Sci-Tech Publications, 2010

7. **The ACE of Soft Skills** by Gopal Ramesh and Mahadevan Ramesh, Pearson Education, 2010

8. **Soft Skills** by Dr. K. Alex, S.Chand

9. **Study Skills for Professional Students in Higher Education** by Dr. M. Adithan, S.Chand.

10. **Personality Development and Soft Skills by Barun** K. Mitra, Oxford Higher Education.

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Object oriented Analysis and Design Using UML

and Software Testing Lab

Course Objective

- Practice the notation for representing various UML diagrams
- Analyze and design the problem by representing using UML diagrams
- Become familiar with all phases of OOAD

Course Outcomes

- Find solutions to the problems using object oriented approach
- Represent using UML notation and interact with the customer to refine the UML diagrams

Part A: UML Programs

UML diagrams to be developed are:

1. Use Case Diagram.
2. Class Diagram.
3. Sequence Diagram.
4. Collaboration Diagram.
5. State Diagram
6. Activity Diagram.
7. Component Diagram
8. Deployment Diagram.
9. Test Design.

Problems that may be considered are

1. College information system
2. Hostel management
3. ATM system

Part B : Software Testing Lab

1 Write programs in 'C' Language to demonstrate the working of the following constructs:

i) do...while

ii) while….do

iii) if…else

iv) switch

v) for

2 "A program written in 'C' language for Matrix Multiplication fails" Introspect the causes for its failure and write down the possible reasons for its failure.

3 Take any system (e.g. ATM system) and study its system specifications and report the various bugs.

4 Write the test cases for any known application (e.g. Banking application)

5 Create a test plan document for any application (e.g. Library Management System)

6 Study of Win Runner Testing Tool and its implementation

a) Win runner Testing Process and Win runner User Interface.

b) How Win Runner identifies GUI (Graphical User Interface) objects in an application and describes the two modes for organizing GUI map files.

c) How to record a test script and explains the basics of Test Script Language (TSL).

d) How to synchronize a test when the application responds slowly.

e) How to create a test that checks GUI objects and compare the behaviour of GUI objects in different versions of the sample application.

f) How to create and run a test that checks bitmaps in your application and run the test on different versions of the sample application and examine any differences, pixel by pixel.

g) How to Create Data-Driven Tests which supports to run a single test on several sets of data from a data table.

h) How to read and check text found in GUI objects and bitmaps.

i) How to create a batch test that automatically runs the tests.

j) How to update the GUI object descriptions which in turn supports test scripts as the application changes.

Apply Win Runner testing tool implementation in any real time applications.

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Internet Technologies and Data Mining Lab

Part A: Internet Technologies Lab

Course Outcomes:

- To create a fully functional website with MVC architecture. To develop an online Book store using we can sell books (Ex: amazon .com).
- To obtain practical experience using data mining techniques on real world data sets.
- Emphasize hands-on experience working with all real data sets.

Course Outcomes:

- Ability to apply object oriented concepts for programming and its use.
- Practical WEB Development using java by using JDBC and ODBC connectivity.
- Implementation of servlets and PHP connectivity by using MYSQL applications.
- Learning how to use PHP in different operating systems with different editors like eclipse and net beans.
- Acquire skills to develop final project by acquired knowledge during curriculum.
- Design data mining algorithms.

Hardware and Software required:

1. A working computer system with either Windows or Linux
2. A web browser either IE or Firefox
3. Apache web server or IIS Webserver
4. XML editor like Altova Xml-spy [www.Altova.com/**XML**Spy – free], Stylus studio, etc.,
5. A database either MySQL or Oracle
6. JVM (Java virtual machine) must be installed on your system
7. BDK (Bean development kit) must be also be installed

Week-1:

Design the following static web pages required for an online book store web site.

1) **HOME PAGE:**

The static home page must contain three **frames**.

Top frame : Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).

Left frame : At least four links for navigation, which will display the catalogue of respective links.

For e.g.: When you click the link **"CSE"** the catalogue for **CSE** Books should be displayed in the Right frame.

Right frame: The *pages to the links in the left frame must be loaded here*. Initially this page contains description of the web site.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Description ofthe Web Site			

Fig 1.1

2) LOGIN PAGE:

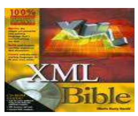
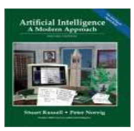
This page looks like below:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Login : Passwor Submit Reset			

3) CATOLOGUE PAGE:

The catalogue page should contain the details ofall the books available in the web site in a table.
The details should contain the following:

2013-2014
Snap shot ofCover Page.
Author Name.
Publisher.
Price.
Add to cart button.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	   	Book : XML Bible Author : Winston Publication : Wiely Book : AI Author : S.Russel Publication : Princeton hall Book : Java 2 Author : Watson Publication : BPB publications Book : HTML in 24 hours Author : Sam Peter Publication : Sam publication	$ 40.5 $ 63 $ 35.5 $ 50	Add to cart Add to cart Add to cart Add to cart

Note: Week 2 contains the remaining pages and their description.

Week-2:

4) CART PAGE:
The cart page contains the details about the books which are added to the cart.

The cart page should look like this:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart

ECE				
EEE	Java 2	$35.5	2	$70
CIVIL	XML bible	$40.5	1	$40.5
			Total amount -	$130.5

5) REGISTRATION PAGE:

Create a "*registration form* "with the following fields
1) Name (Text field)
2) Password (password field)
3) E-mail id (text field)
4) Phone number (text field)
5) Sex (radio button)
6) Date ofbirth (3 select boxes)
7) Languages known (check boxes – English, Telugu, Hindi, Tamil)
8) Address (text area)

WEEK 3:

VALIDATION:
Write *JavaScript* to validate the following fields ofthe above registration page.

Name (Name should contains alphabets and the length should not be less than 6 characters).
Password (Password should not be less than 6 characters length).
E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)
4. Phone number (Phone number should contain 10 digits only).

Note : You can also validate the login page with these parameters.

Week-4:

Design a web page using **CSS (C**ascading **S**tyle **S**heets**)** which includes the following:
1) Use different font, styles:
In the style definition you define how each selector should work (font, color etc.). Then, in the body ofyour pages, you refer to these selectors to activate the styles.
For example:

```
<HTML>
<HEAD>
<style type="text/css">
B.headline {color:red, font-size:22px, font-family:arial, text-
decoration:underline}
</style>

</HEAD>

<BODY>
<b>This is normal bold</b><br>
Selector {cursor:value}

For example:

<html>
<head>
<style type="text/css">
```

```
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>

<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a>
<br>
<a href="mypage.htm" class="hlink">HELP LINK</a>
</b>
</body>
</html>

<b class="headline">This is headline style bold</b>
</BODY>

</HTML>
```

2) Set a background image for both the page and single elements on the page. You can define the background image for the page like this:

```
BODY {background-image:url(myimage.gif),}
```

3) Control the repetition ofthe image with the background-repeat property. As background-repeat: repeat Tiles the image until the entire page is filled, just like an ordinary background image in plain HTML.

4) Define styles for links as

A:link
A:visited
A:active
A:hover

Example:

```
<style type="text/css">
A:link {text-decoration: none}
A:visited {text-decoration: none}
A:active {text-decoration: none}
A:hover {text-decoration: underline, color: red,}
</style>
```

5) Work with layers:

For example:

LAYER 1 ON TOP:

```
<div style="position:relative, font-size:50px, z-index:2,">LAYER 1</div><div style="position:relative, top:-50, left:5, color:red, font-size:80px, z-
index:1">LAYER 2</div>
```

LAYER 2 ON TOP:

```
<div style="position:relative, font-size:50px, z-index:3,">LAYER 1</div><div style="position:relative, top:-50, left:5, color:red, font-size:80px, z-
index:4">LAYER 2</div>
```

6) Add a customized cursor:

Selector {cursor:value}

For example:

```
<html>
<head>
<style type="text/css">
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>

<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a>
<br>
<a href="mypage.htm" class="hlink">HELP LINK</a>
</b>
</body>
</html>
```

Week-5:

Write an XML file which will display the Book information which includes the following:

1) Title ofthe book
2) Author Name
3) ISBN number
4) Publisher name
5) Edition
6) Price

Write a Document Type Definition (DTD) to validate the above XML file.
Display the XML file as follows.
The contents should be displayed in a table. The header ofthe table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns.
Use XML schemas XSL and CSS for the above purpose.
Note: Give at least for 4 books. It should be valid syntactically.
Hint: You can use some xml editors like XML-spy

Week-6:
VISUAL BEANS:
Create a simple visual bean with a area filled with a color.
The shape ofthe area depends on the property shape. If it is set to true then the shape ofthe area is Square and it is Circle, if it is false.
The color ofthe area should be changed dynamically for every mouse click. The color should also be changed if we change the color in the "property window ".

Week-7:

1) Install IIS web server and APACHE.

While installation assign port number 4040 to IIS and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port.

2) Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root.

Access the pages by using the urls : http://localhost:4040/rama/books.html (for tomcat) http://localhost:8080/books.html (for Apache)

Week-8:

User Authentication :

Assume four users user1,user2,user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a PHP for doing the following.

1. Create a Cookie and add these four user id's and passwords to this Cookie.
2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.

If he is a valid user(i.e., user-name and password match) you should welcome him by name(user-name) else you should display " You are not an authenticated user ''.

Use init-parameters to do this.

Week-9:

Install a database(Mysql or Oracle).

Create a table which should contain at least the following fields: name, password, email-id, phone number(these should hold the data from the registration form).

Write a PHP program to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.

Insert the details ofthe users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).

Week-10:

Write a PHP which does the following job:

Insert the details ofthe 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).

Week-11:

Create tables in the database which contain the details of items (books in our case like Book name , Price, Quantity, Amount) ofeach category. Modify your catalogue page (week 2)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using PHP

Week-12:

HTTP is a stateless protocol. Session is required to maintain the state.

The user may add some items to cart from the catalog page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time(i.e., from different systems in the LAN using the ip-address instead oflocalhost). This can be achieved through the use ofsessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated (by using the method session.invalidate()). Modify your catalogue and cart PHP pages to achieve the above mentioned functionality using sessions.

Part B: Data Mining Lab

Task 1: Credit Risk Assessment

Description:

The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient.

To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.
1. Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.
2. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.
3. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

The German Credit Data:
Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data.
In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer !)

A few notes on the German dataset
• DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).
• owns_telephone. German phone rates are much higher than in Canada so fewer people own telephones.
• foreign_worker. There are millions of these in Germany (many from Turrkey). It is very hard to get German citizenship if you were not born of German parents.
• There are 20 attributes used in judging a loan applicant. The goal is the classify the applicant into one of two categories, good or bad.

Subtasks: (Turn in your answers to the following tasks)

1. List all the categorical (or nominal) attributes and the real-valued attributes seperately. (5 marks)

2. What attributes do you think might be crucial in making the credit assessment ? Come up with some simple rules in plain English using your selected attributes. (5 marks)

3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training. (10 marks)

4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy? (10 marks)

5. Is testing on the training set as you did above a good idea? Why or Why not ? (10 marks)

6. One approach for solving the problem encountered in the previous question is using cross-validation? Describe what is cross-validation briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why? (10 marks)

7. Check to see if the data shows a bias against "foreign workers" (attribute 20), or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss. (10 marks)

8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.) (10 marks)

9. Sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifcations equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)? (10 marks)

10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model? (10 marks)

11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase? (10 marks)

12.(Extra Credit): How can you convert a Decision Trees into "if-then-else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules. PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one ! Can you predict what attribute that might be in this dataset ? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR. (10 marks)

Task Resources:

- Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)
- Decision Trees (Source: Tan, MSU)
- Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)
- Weka resources:
    - Introduction to Weka (html version) (download ppt version)
    - Download Weka
    - Weka Tutorial

- ARFF format
- Using Weka from command line

Task 2: Hospital Management System

Data Warehouse consists Dimension Table and Fact Table.

REMEMBER The following

Dimension

The dimension object (Dimension):

_ Name

_ Attributes (Levels) , with one primary key

_ Hierarchies

One time dimension is must.

About Levels and Hierarchies

Dimension objects (dimension) consist of a set of levels and a set of hierarchies defined over those levels. The levels represent levels of aggregation. Hierarchies describe parent-child relationships among a set of levels.

For example, a typical calendar dimension could contain five levels. Two hierarchies can be defined on these levels:

H1: YearL > QuarterL > MonthL > WeekL > DayL

H2: YearL > WeekL > DayL

The hierarchies are described from parent to child, so that Year is the parent of Quarter, Quarter the parent of Month, and so forth.

About Unique Key Constraints

When you create a definition for a hierarchy, Warehouse Builder creates an identifier key for each level of the hierarchy and a unique key constraint on the lowest level (Base Level)

Design a Hospital Management system data warehouse (TARGET) consists of Dimensions Patient, Medicine, Supplier, Time. Where measures are ‘ NO UNITS’, UNIT PRICE.

Assume the Relational database (SOURCE) table schemas as follows

TIME (day, month, year),

PATIENT (patient_name, Age, Address, etc.,)

MEDICINE (Medicine_Brand_name, Drug_name, Supplier, no_units, Uinit_Price, etc.,)

SUPPLIER :(Supplier_name, Medicine_Brand_name, Address, etc.,)

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If each Dimension has 6 levels,   decide the levels and hierarchies, Assume the level names suitably.

Design the Hospital Management system data warehouse using all schemas. Give the example 4-D cube with assumption names.

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Software Architecture

COURSE OBJECTIVES:

- Introduction to the fundamentals of software architecture.
- Software architecture and quality requirements of a software system
- Fundamental principles and guidelines for software architecture design, architectural styles, patterns, and frameworks.
- Methods, techniques, and tools for describing software architecture and documenting design rationale.
- Software architecture design and evaluation processes.

COURSE OUTCOMES:

The student will be able to:

- Design and motivate software architecture for large scale software systems
- Recognize major software architectural styles, design patterns, and frameworks
- Describe a software architecture using various documentation approaches and architectural description languages
- Generate architectural alternatives for a problem and select among them
- Use well-understood paradigms for designing new systems

UNIT I: ENVISIONING ARCHITECTURE

What is software Architecture-What is Software Architecture, Other Points of View, Architectural Patterns, Reference Models, and Reference Architectures, Importance of Software Architecture, Architectural Structures and views.

ENVISIONING ARCHITECTURE:

Architecture Business Cycle- Architectures influences, Software Processes and the Architecture Business Cycle, Making of "Good" Architecture.

UNIT II: DESIGNING THE ARCHITECTURE WITH STYLES

Designing the Architecture: Architecture in the Life Cycle, Designing the Architecture, Formatting the Team Structure, Creating a Skeletal System.

Architecture Styles: Architectural Styles, Pipes and Filters, Data Abstraction and Object-Oriented Organization, Event-Based, Implicit Invocation, Layered Systems, Repositories, Interpreters.

UNIT III: CREATING AN ARCHITECTURE-I

Creating an Architecture: Understanding Quality Attributes – Functionality and Architecture, Architecture and Quality Attributes, System Quality Attributes, Quality Attribute. Scenarios in Practice, Other System Quality Attributes, Business Qualities, Architecture Qualities.

Achieving Qualities: Introducing Tactics, Availability Tactics, Modifiability Tactics, Performance Tactics, Security Tactics, Testability Tactics, Usability Tactics.

UNIT IV: CREATING AN ARCHITECTURE-II

Documenting Software Architectures: Use of Architectural Documentation, Views, Choosing the Relevant Views, Documenting a view, Documentation across Views. Reconstructing Software Architecture: Introduction, Information Extraction, Database Construction, View Fusion, and Reconstruction.

UNIT V: ANALYZING ARCHITECTURES

The ATAM: Participants in the ATAM, Outputs of The ATAM, Phases Of the ATAM. The CBAM: Decision-Making Context, The Basis for the CBAM, Implementing the CBAM. The World Wide Web:A Case study in Interoperability- Relationship to the Architecture Business Cycle, Requirements and Qualities, Architecture Solution, Achieving Quality Goals.

TEXT BOOKS:

1. Software Architectures in Practice , Len Bass, Paul Clements, Rick Kazman, 2nd Edition, Pearson Publication.
2. Software Architecture , Mary Shaw and David Garlan, First Edition, PHI Publication, 1996.\

REFERENCES BOOKS:

1. **Software Design: From Programming to Architecture**, Eric Braude**,** Wiley, 2004.
2. N. Domains of Concern in Software Architectures and Architecture Description Languages. Medvidovic and D. S. Rosenblum. USENIX.

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CRYPTOGRAPHY & NETWORK SECURITY

Course Objective:

1) To provide students with a theoretical base in networks security issues.
2) Students will be able purse their study in advanced networking courses.
3) Students will able to Design, Implement, and Analyze simple Network Security Concepts.
4) Students will able to identify, formulate, and solve network engineering issues.
5) Understanding the various cryptographic algorithms and implementation of the same.
6) Understanding the various attacks, security mechanisms and services

Course Outcome:

1) Protect the network from both internal and external attacks (PO 8)
2) Understand and implement various public and private key cryptographic algorithms (PO 2)
3) Design of new security approaches (PO 3)

UNIT I

Computer Security Concepts, The OSI Security Architecture, Security Attacks, Security Services And Security Mechanisms, Classical Encryption Techniques- Symmetric Cipher Model, Substitution Ciphers, Transposition Ciphers, Steganography, Modern Block Ciphers, Modern Stream Ciphers.

Modern Block Ciphers: Block Ciphers Principles, Data Encryption Standard (DES), Linear And Differential Cryptanalysis, Block Cipher Modes Of Operations, AES.

UNIT II

Public-Key Cryptography : Principles Of Public-Key Cryptography, RSA Algorithm, Diffie-Hellman Key Exchange, Elgamal Cryptographic System, Elliptic Curve Arithmetic, Elliptic Curve Cryptography
Cryptographic Hash Functions: Applications Of Cryptographic Hash Functions, Requirements And Security, Hash Functions Based On Cipher Block Chaining, Secure Hash Algorithm (SHA).

UNIT III

Message Authentication Codes: Message Authentication Requirements, Message Authentication Functions, Requirements For Message Authentication Codes, Security Of Macs, HMAC, Macs Based On Block Ciphers, Authenticated Encryption.
Digital Signatures and Authentication Protocols: Digital Signatures, Authentication Protocols.

UNIT IV

Key Management And Distribution: Symmetric Key Distribution Using Symmetric Encryption, Symmetric Key Distribution Using Asymmetric, Distribution Of Public Keys, X.509 Certificates, Public Key Infrastructure.
Electronic Mail Security: Pretty Good Privacy (PGP), S/MIME

UNIT V

Security At The Transport Layer(SSL And TLS) : SSL Architecture, Four Protocols, SSL Message Formats, Transport Layer Security, HTTPS, SSH

Security At The Network Layer (Ipsec): Two Modes, Two Security Protocols, Security Association, Security Policy, Internet Key Exchange.

Intruders: Intruders, Intrusion Detection, Password Management, Firewalls, Viruses and Worms.

Text Books :

1. Cryptography and Network Security: Principals and Practice, William Stallings, Fifth Edition, Pearson Education.
2. Cryptography and Network Security, Behrouz A. Frouzan and Debdeep Mukhopadhyay, 2nd edition, Mc Graw Hill Education

Reference Books :

1. Network Security and Cryptography, Bernard Menezes , Cengage Learning.
2. Cryptography and Security, C.K. Shymala, N. Harini and Dr. T.R. Padmanabhan, Wiley-India.
3. Applied Cryptography, Bruce Schiener, 2nd edition, John Wiley & Sons.
4. Cryptography and Network Security, Atul Kahate, TMH.
5. Introduction to Cryptography, Buchmann, Springer.
6. Number Theory in the Spirit of Ramanujan, Bruce C.Berndt, University Press
7. Introduction to Analytic Number Theory, Tom M.Apostol, University Press

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MOBILE APPLICATION DEVELOPMENT

Course Objective:

- *Introducing the J2ME and how to write the code for small computing device.*
- *Design & program real working education based mobile application projects.*
- *To introduce the Android technology and its application.*
- *Become familiar with common mobile application technologies and platforms.*

Learning Outcome:

At the end of the course students will be assessed to determine whether they are able to

- *Design, implement and evaluate a User Interface for a mobile application using J2ME.*
- *Be exposed to technology and business trends impacting mobile applications.*
- *Create a small but realistic working mobile application for small computing devices.*
- *Categorize the challenges posed by developing mobile applications and be able to propose and evaluate and select appropriate solutions*
- *Describe and work within the capabilities and limitations of a range of mobile computing devices.*
- *Be competent with designing and developing mobile applications using one application development framework.*

UNIT I

J2ME Overview: Java 2 Micro Edition and the World of Java, Inside J2ME, J2ME and Wireless Devices. Small computing Technology: Wireless Technology, Radio Data Networks, Microwave Technology, Mobile Radio Networks, Messaging, Personal Digital Assistants.

J2ME Architecture and Development Environment: J2ME Architecture, Small Computing Device Requirements, Run – Time Environment, MIDlet programming, Java Language for J2ME, J2ME Software Development Kits, Hello World J2ME Style, Multiple MIDlets in a MIDlet Suite, J2ME wireless Toolkit.

UNIT II

J2ME Best Practices and Patterns: The Reality of Working in a J2ME World, Best Practices. **Commands, Items, and Event Processing:** J2ME User Interfaces, Display Class, The Palm OS Emulator, Command Class, Item Class, Exception Handling.

High – Level Display: Screens, Screen Class, Alert Class, Form Class, Item Class, List Class, Text Box Class, Ticker Class.

UNIT III

Low Level Display: The Canvas, User Interactions, Graphics, Clipping Regions, Animation.
Record Management System: Record Storage, Writing and Reading Records, Record Enumeration, Sorting Records, Searching Records, Record Listener.

UNIT IV

JDBC Objects: The Concept of JDBC, JDBC Driver Types, JDBC Packages. Overview of the JDBC process, Database Connection, Statement Objects, Result Set, Transaction Processing, Metadata, Data Types, Exceptions.

JDBC and Embedded SQL: Model programs, Tables, Indexing, Inserting Data into Tables, Selecting Data from a Table, Updating Tables, Deleting Data from a table. Joining Tables, Calculating Data, Grouping and Ordering Data

UNIT V

Getting started with Android Programming: What is Android, Obtaining the required tools, Creating your First Android Application. Anatomy of an Android Application.
Activities, Fragments and Intents: Understanding Activities, Linking Activities Using Intents, Fragments, Calling Built – in Applications using Intents, Displaying Notifications
Android User Interface: Understanding the Components of a Screen, Adapting to Display Orientation, Managing Changes to Screen Orientation, Utilizing the Action Bar, Listening for UI Notifications.

Text Books :

1. J2ME: The Complete Reference, James Keogh, TMH.
2. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India

Reference Books :

1. Enterprise J2ME: Developing Mobile Java Applications, Michael Juntao Yuan, Pearson Education, 2004.
2. Android Application Development for Java programming by James C. Sheusi, Cengage.
3. Learning Android A Programmers Guide by Jerome DiMargio, TMH.

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Cloud Computing

Course Objective

- To introduce the various levels of services that can be achieved by cloud computing.
- To describe the security aspects in cloud computing.
- Provide an idea on the underlying infrastructure and architecture of clouds, techniques for enabling services and the quality of such services, as well as issues in designing clouds.
- Address the research issues in performance, security, and management.

Course Outcomes

- Students can able to program enterprise clouds and to analyze data on clouds using Aneka.
- Students learn and understand tools and techniques for using, designing, and implementing clouds as well as services.
- Ability to design applications for cloud environment.
- Ability to create cloud computing environments.

UnitI: Systems Modeling, Clustering and Virtualization

Distributed System Models and Enabling Technologies,Computer Clusters for Scalable Parallel Computing, Virtual Machines, and Virtualization of Clusters and Data centers.

Unit - II

Introduction to Cloud Computing

Roots of Cloud Computing, Layers and Types of Clouds, Features of a Cloud, Cloud Infrastructure Management, Software as a service providers, Infrastructure as a Service Providers, Platform as a Service Providers, Challenges and Opportunities.

Unit - III

Programming Enterprise Clouds using Aneka

Introduction, Aneka Architecture, Thread Programming using Aneka, Task Programming: using Aneka, Map Reduce Programming using Aneka.

Unit IV: Monitoring, Management and Applications

An Architecture for Federated Cloud Computing, SLA Management in Cloud Computing, Performance Prediction for HPC on Clouds, Best Practices in Architecting Cloud Applications in the AWS cloud, Building

Content Delivery networks using Clouds, Resource Cloud Mashups.

Unit V: Governance and Case Studies
Organizational Readiness and Change management in the Cloud age, Data Security in the Cloud, Legal Issues in Cloud computing, Achieving Production Readiness for Cloud Services.

TEXT BOOKS:

1. Cloud Computing: Principles and Paradigms by RajkumarBuyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing , Kai Hwang, GeofferyC.Fox, Jack J.Dongarra, Elsevier, 2012.

REFERENCE BOOKS:

1. Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw Hill, rp2011.
2. Enterprise Cloud Computing, GautamShroff, Cambridge University Press, 2010.
3. Cloud Computing: Implementation, Management and Security, John W. Rittinghouse, James F.Ransome, CRC Press, rp2012.
4. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O’Reilly, SPD, rp2011.
5. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, SubraKumaraswamy, ShahedLatif, O’Reilly, SPD, rp2011.
6. cloud computing - principles,systems and applications by Springer publications.

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Data Analytics – II

(Open Elective/CBCS)

Unit I

Data Management & Introduction to Big Data Tools (NOS 2101)

Design Data Architecture and manage the data for analysis, understand various sources of Data like Sensors/signal/GPS etc.

Export all the data onto Cloud ex. AWS/Rackspace etc.

Introduction to Big Data tools like Hadoop, Spark, Impala etc., Data ETL process, Identify gaps in the data and follow-up for decision making.

Unit II

Big Data Analytics & Machine Learning Algorithms (NOS 2101)

Run descriptives to understand the nature of the available data, collate all the data sources to suffice business requirement, Run descriptive statistics for all the variables and observer the data ranges, Outlier detection and elimination.

Hypothesis testing and determining the multiple analytical methodologies, Train Model on 2/3 sample data using various Statistical/Machine learning algorithms, Test model on 1/3 sample for prediction etc.

Unit III

Data Visualization (NOS 2101)

Prepare the data for Visualization, Use tools like Tableau, QlickView and D3, Draw insights out of Visualization tool.

Unit IV

Maintain Healthy, Safe & Secure Working Environment (NOS 9003)

Introduction, workplace safety, Report Accidents & Emergencies, Protect health & safety as your work**,** course conclusion, assessment

Unit V

Provide Data/Information in Standard Formats (NOS 9004)

Introduction, Knowledge Management, Standardized reporting & compliances, Decision Models, course conclusion. Assessment

Text Books:

1. **Student's Handbook for Associate Analytics.**

Reference Books:

1. Introduction to Data Mining, Tan, Steinbach and Kumar, Addison Wesley, 2006
2. Data Mining Analysis and Concepts, M. Zaki and W. Meira (the authors have kindly made an online version available): http://www.dataminingbook.info/uploads/book.pdf
3. Mining of Massive Datasets Jure Leskovec Stanford Univ. Anand Rajaraman Milliway Labs Jeffrey D. Ullman Stanford Univ.
   (http://www.vistrails.org/index.php/Course:_Big_Data_Analysis)

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ARTIFICIAL INTELLIGENCE
(Open Elective/CBCS)

Objectives:
To learn the basics of designing intelligent agents that can solve general purpose problems, represent and process knowledge, plan and act, reason under uncertainty and can learn from experiences.

UNIT I

PROBLEM SOLVING
Introduction – Agents – Problem formulation – uninformed search strategies – heuristics – informed search strategies – constraint satisfaction

UNIT II

LOGICAL REASONING
Logical agents – propositional logic – inferences – first-order logic – inferences in firstorder logic – forward chaining – backward chaining – unification – resolution

UNIT III

PLANNING
Planning with state-space search – partial-order planning – planning graphs – planning and acting in the real world

UNIT IV

UNCERTAIN KNOWLEDGE AND REASONING
Uncertainty – review of probability - probabilistic Reasoning – Bayesian networks – inferences in Bayesian networks – Temporal models – Hidden Markov models.

UNIT V

LEARNING
Learning from observation - Inductive learning – Decision trees – Explanation based learning –Statistical Learning methods - Reinforcement Learning

TEXT BOOK:
1. S. Russel and P. Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education, 2003.

REFERENCES:
1. David Poole, Alan Mackworth, Randy Goebel, "Computational Intelligence : a logical approach", Oxford University Press, 2004.
2. G. Luger, "Artificial Intelligence: Structures and Strategies for complex problem solving", Fourth Edition, Pearson Education, 2002.
3. J. Nilsson, "Artificial Intelligence: A new Synthesis", Elsevier Publishers, 1998.

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Introduction to Machine Learning
(Open Elective/CBCS)

Objectives:

- To understand the basic theory underlying machine learning.
- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To be able to apply machine learning algorithms to solve problems of moderate complexity.

Course Outcomes:

- Ability to understand what is learning and why it is essential to the design of intelligent machines.
- Ability to design and implement various machine learning algorithms in a wide range of real-world applications.
- Acquire knowledge deep learning and be able to implement deep learning models for language, vision, speech, decision making, and more

UNIT I   INTRODUCTION

Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

UNIT II NEURAL NETWORKS AND GENETIC ALGORITHMS

Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evalution and Learning.

UNIT III BAYESIAN AND COMPUTATIONAL LEARNING

Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

UNIT IV INSTANT BASED LEARNING

K- Nearest Neighbour Learning – Locally weighted Regression – Radial Bases Functions – Case Based Learning.

UNIT V ADVANCED LEARNING

Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning

TEXT BOOKS:

1. Machine Learning – Tom M. Mitchell, - MGH

REFERENCE BOOKS

1. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis

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Software Process Management
(Open Elective/CBCS)

Objectives:

- To make predictions and commitments relative to the products it produces.
- To understand Effective measurement processes
- To develop achievable plans for producing and delivering products and services
- To identify important events and trends and that effectively separate signals from noise are invaluable in guiding software organizations to informed decisions.

UNIT-I

SOFTWARE PROCESS MATURITY:

A SOFTWARE MATURITY FRAMEWORK: Software Process Improvement, Process Maturity Levels, People in the Optimizing Process, The Need for the Optimizing Process

THE PRINCIPLES OF SOFTWARE PROCESS CHANGE: Process in Perspective, The Six Basic Principles, Some Common Misconceptions about the Software Process, A Strategy for Implementing Software Process Change

SOFTWARE PROCESS ASSESSMENT: Assessment Overview, Assessment Phases, Five Assessment Principles, The Assessment Process, Assessment Conduct, implementation Considerations

THE INITIAL PROCESS: The Nature of the Initial Process, A Case Study of a Chaotic Project, why Software Organizations are Chaotic, Software Process Entropy, The Way Out.

UNIT-II

THE REPEATABLE PROCESS:

MANAGING SOFTWARE ORGANIZATIONS: Commitment Discipline, The Management System, Establishing a Project management System

THE PROJECT PLAN: Project Planning Principles, Project Plan Contents, Size Measures, Estimating, Productivity Factors, Scheduling, Project Tracking, The Development Plan, Planning Models, Final Considerations.

SOFTWARE CONFIGURATION MANAGEMENT – PART 1: The Need for Configuration

Management, Software Product Nomenclature, Basic configuration Management Functions, Baselines, Configuration Management Responsibilities, The need for Automated Tools.

UNIT-III

THE DEFINED PROCESS:

SOFTWARE STANDARDS: Definitions, The Reasons for Software Standards, Benefits of Standards, Examples of Some Major Standards, Establishing Software Standards, Standards Versus Guidelines

SOFTWARE INSPECTIONS: Types of Reviews, Inspection Objectives, Basic Inspection Principles, The Conduct of Inspections, Inspection Training, Reports and Tracking, Other Considerations, Initiating an Inspection Program, Future Directions

SOFTWARE TESTING: Software Testing Principles, Types of Software Tests, Test Planning, Test Development, Test Execution and Reporting, Test Tools and Methods, Real-Time Testing, The Test Organization.

UNIT-IV

SOFTWARE CONFIGURATION MANAGEMENT (CONTINUED): The Software Configuration Management Plan, Software Configuration, Management Questions, SCM Support Functions, The Requirements Phase, Design Control, The Implementation Phase, Operational Data, The Test Phase, SCM for Tools, Configuration Accounting, The Software Configuration Audit

DEFINING THE SOFTWARE PROCESS: Process Standards, Definitions, Levels of Software Process Models, Prescriptive and Descriptive Uses of Models, A Software Process Architecture, Critical Software Process Issues, A Preliminary Process Architecture, Larger Process Models, Detailed Process Models, Entity Process Models, Process Model Views, Establishing and Using a Process Definition, Basic Process Guidelines

THE SOFTWARE ENGINEERING PROCESS GROUP: Changing the Software Process, The Role of the SEPG, Establishing Standards, The Process Database, Technology Insertion Focal Point, Education and Training, Process Consultation, Process Status and Assessment, Establishing the SEPG

THE MANAGED PROCESS:

DATA GATHERING AND ANALYSIS: The Principles of Data Gathering, The Data Gathering Process, Software Measures, Data Analysis.

UNIT- V

MANAGING SOFTWARE QUALITY: The Quality Management Paradigm, Quality Examples, Quality Motivation, Measurement Criteria, Establishing a Software Quality Program, Estimating Software Quality, Removal Efficiency, Quality Goals, Quality Plans, Tracking and Controlling Software Quality

THE OPTIMIZING PROCESS:

DEFECT PREVENTION: Defect Prevention Not a New Idea, The Principles of Software Defect Prevention, Process Changes for Defect Prevention, Defect Prevention Considerations, Management’s Role.

Textbooks:

1. Watts S. Humphrey, "**Managing the Software Process", Pearson Edocation.**

Reference Books:

1. Watts S. Humphrey, "An Introduction to the Team Software Process", Pearson Education,2000
2. James R. Persse, "Process Improvement essentials", O'Reilly,2006

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Artificial Neural Networks
(Open Elective/CBCS)

Objectives:

To Survey of attractive applications of Artificial Neural Networks.

- To practical approach for using Artificial Neural Networks in various technical, organizational and economic applications

UNIT I: INTRODUCTION: History Of Neural Networks, Structure And Functions Of Biological And Artificial Neuron, Neural Network Architectures, Characteristics Of ANN, Basic Learning Laws and Methods.

UNIT II: SUPERVISED LEARNING: Single Layer Neural Network and architecture, McCulloch-Pitts Neuron Model, Learning Rules, Perceptron Model, Perceptron Convergence Theorem, Delta learning rule, ADALINE, Multi-Layer Neural Network and architecture, MADALINE, Back Propagation learning, Back Propagation Algorithm.

UNIT III: UNSUPERVISED LEARNING-1: Outstar Learning, Kohenen Self Organization Networks, Hamming Network And MAXNET, Learning Vector Quantization, Mexican hat.

UNIT IV: UNSUPERVISED LEARNING-2: Counter Propagation Network -Full Counter Propagation network, Forward Only Counter Propagation Network, Adaptive Resonance Theory (ART) -Architecture, Algorithms.

UNIT V : ASSOCIATIVE MEMORY NETWORKS : Introduction, Auto Associative Memory ,Hetero Associative Memory, Bidirectional Associative Memory(BAM) -Theory And Architecture, BAM Training Algorithm, Hopfield Network: Introduction, Architecture Of Hopfield Network.

TEXT BOOKS:

1. B.Yegnanarayana" Artificial neural networks" PHI ,NewDelhi.
2. S.N.Sivanandam ,S.N.Deepa, "Introduction to Neural Networks using MATLAB 6.0", TATA MCGraw- Hill publications.
3. J .M. Zurada ,"Introduction to Artificial neural systems" –Jaico publishing.

REFERENCE BOOKS:

1. S.Rajasekaran and G.A.Vijayalakshmi pai "Neural Networks.Fuzzy Logic and genetic Algorithms".
3. James A Freeman and Davis Skapura" Neural Networks Algorithm, applications and programming Techniques ", Pearson Education, 2002.
4. Simon Hakins "Neural Networks " Pearson Education.

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SERVICE ORIENTED ARCHITECTURE
(Open Elective/CBCS)

Objectives:

The course should enable the student

- Understand SOA and evolution of SOA.
- Understand web services and primitive, contemporary SOA.
- Understand various service layers.
- Understand service-oriented analysis and design based on guidelines.

UNIT I

Introducing SOA: Fundamental SOA, Common Characteristics of Contemporary SOA, Common Tangible Benefits of SOA, Common Pitfalls of Adopting SOA.

The Evolution of SOA: An SOA Timeline, The Continuing Evolution of SOA, The Roots of SOA.

UNIT II

Web Services and Primitive SOA: The Web Services Frame Work, Services, Service Descriptions, Messaging.

Web Services and Contemporary SOA (Part I-Activity management and Composition): Message Exchange Patterns, Service Activity, Coordination, Atomic Transactions, Orchestration, Choreography.

Web Services and Contemporary SOA (Part-II-Advanced Messaging, Metadata and Security): Addressing, Reliable Messaging, Correlation, Policies, Metadata exchange, Security.

UNIT III

Principles of Service-Orientation: Service–Orientation and the Enterprise, Anatomy of SOA, Common Principles of Service–Orientation, Interrelation between Principles of Service-Orientation, Service Orientation and Object Orientation, Native Web Services Support for Principles of Service-Orientation.

Service Layers: Service-Orientation and Contemporary SOA, Service Layer abstraction, Application Service Layer, Business Service Layer, Orchestration Service Layer, Agnostic Services, Service Layer Configuration Scenarios.

UNIT IV

SOA Delivery Strategies: SOA Delivery Lifecycle Phases, The Top-Down Strategy, The Bottom-up Strategy, The Agile Strategy.

Service Oriented Analysis (Part I-Introduction): Introduction to Service Oriented Analysis, Benefits of a Business Centric SOA, Deriving Business Services.

Service Oriented Analysis (Part-II-Service Modelling): Service Modeling, Service Modelling Guidelines, Classifying Service Model Logic, Contrasting Service Modeling Approaches.

Service Oriented Design (Part I-Introduction): Introduction to Service-Oriented Design, WSDL Related XML Schema Language Basics, WSDL Language Basics, Service Interface Design Tools.

Service Oriented Design (Part II-SOA Composition Guidelines): SOA Composing Steps, Considerations for Choosing Service Layers, Considerations for Positioning Core SOA Standards, Considerations for Choosing SOA Extensions.

UNIT V

Service Oriented Design (Part III- Service Design): Service Design Overview, Entity-Centric Business Service Design, Application Service Design, Task-Centric Business Service Design, Service Design Guidelines.

Service Oriented Design (Part IV-Business Process Design): WS-BPEL Language Basics, WS-Coordination Overview, Service Oriented Business Process Design.

TEXT BOOKS:

1. Service-Oriented Architecture-Concepts, Technology, and Design, Thomas Erl, Pearson Education.
2. Understanding SOA with Web Services, Eric Newcomer, Greg Lomow, Pearson Education.

REFERENCE BOOKS:

1. The Definitive guide to SOA, Jeff Davies & others, Apress, Dreamtech.
2. Java SOA Cook book, E.Hewitt, SPD.
3. SOA in Practice, N.M.Josuttis, SPD.
4. Applied SOA, M.Rosen and others, Wiley India pvt. Ltd.
5. Java Web Services Architecture, J.Mc Govern, and others, Morgan Kaufmann Publishers, Elsevier.
6. SOA for Enterprise Applications, Shankar.K, Wiley India Edition.
7. SOA-Based Enterprise Integration, W.Roshen, TMH.
8. SOA Security, K.Rama Rao, C.Prasad, dreamtech press.

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Security and Cloud Computing Lab

Course Objective/Outcomes

- Understand the basic functions of each layer in the reference models
- Students will be able to simulate the algorithms for flow control, error control and routing protocols
- Understand the basics of the cryptographic algorithms
- Students can able to program enterprise clouds and to analyze data on clouds using Aneka.
- Students learn and understand tools and techniques for using, designing, and implementing clouds as well as services.

Part - A

1. Implement the data link layer framing methods such as character, character stuffing and bit stuffing.
2. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP.
3. Implement Dijkstra‘s algorithm to compute the Shortest path thru a graph.
4. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table at each node using distance vector routing algorithm.
5. Take an example subnet of hosts. Obtain broadcast tree for it.
6. Implement one bit sliding window protocol
7. Implement sliding window protocol with Go-back n
8. Implement sliding window protocol using Selective repeat.
9. Take a 64 bit playing text and encrypt the same using DES algorithm.
10. Write a program to break the above DES coding.
11. Using RSA algorithm encrypt a text data and Decrypt the same.

Part –B

3. Write a program to print “Hello World” using Aneka Thread Programming model use Single Thread.
4. Write a program to print “Hello World” based in thread model and use exactly five threads also print the executor node information along with the submission time and completion time.
5. Write a program to print “Hello World” using Aneka Thread Programming model and

conventional thread and understand the differences.

6. Write a program to compute the following mathematical equation using Aneka Threads (Note: Consider each trigonometric function in independent thread)?

$$P= \sin(x) + \cos(y) + \tan(z).$$

7. Write a program to print “Hello World” using Aneka Task Programming model.
8. Write a program to sum the two numbers using Aneka Task Programming model.
9. Write a program to print “Hello World” using Aneka Thread Programming model use Five Threads , also print the Node Ids on which the threads are executed and submission time and Completion Time of the Threads.

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MOBILE APPLICATION DEVELOPMENT LAB

Course Objectives:
In this lab, a student is expected to design, implement, document and present a mobile client/server system using standard Java and Java 2 Micro Edition (J2ME) platform. Specifically it is required to design and implement a system that consists mainly of a mobile client (MC) and a Proxy Server (PS). MC will be written in J2ME, MIDP 2.0, while PS will be written in standard Java. It is necessary to use a mobile phone emulator to develop and demonstrate the experiments.
It may be necessary to use other components or existing resources (servers) as needed. For instance a database local to PS or a web service available on the Internet that can be invoked by the PS.

Week - 1: Installation of Java Wireless Toolkit (J2ME)

1) If the Java Development Kit (JDK) is not there or only having the Java Runtime Environment (JRE) installed, install the latest JDK from http://java.sun.com/javase/downloads/index.jsp. Current stable release of Java is JDK 6 Update 7 but check the web page in case there are newer non-beta releases available.
2) Next, download the Java Wireless Toolkit (formerly called J2ME Wireless Toolkit) from: http://java.sun.com/products/sjwtoolkit/download.html.
3) Run the installer (for example, for Windows it is: sun_java_wireless_toolkit- 2_5_2-windows.exe). The installer checks whether a compatible Java environment has been pre-installed. If not, it is necessary to uninstall old versions of Java and perform Step 1 again.
Once after successful installation of Java and the tool kit compile this program and run the following program in the toolkit.
Steps to run this program in toolkit:

1. Start -> All Programs -> Sun Java Tool Kit -> Wireless Tool Kit
2. Click New Project – Enter Project Name -> Enter Class Name -> Click on Create Project.
3. Choose appropriate API Selection and Configurations.
4. Place Java Source file in WTK2.1 / WTK2.2\apps\projectname\src
5. Build the Project.
6. Run the Project.

```
import javax.microedition.lcdui.*;
import javax.microedition.midlet.*;

public class HelloWorld extends MIDlet{
  private Form form;
```

```
  private Display display;

  public HelloWorld(){
    super();
  }

  public void startApp(){
    form = new Form("Hello World");
    String msg = "Hello World!!!!!!!";
    form.append(msg);
    display = Display.getDisplay(this);
    display.setCurrent(form);
  }

  public void pauseApp(){}

  public void destroyApp(boolean unconditional){
    notifyDestroyed();
  }
}
```

Week - 2 Working with J2ME Features:

Working with J2ME Features: Say, creating a Hello World program Experiment with the most basic features and mobile application interaction concepts (lists, text boxes, buttons, radio boxes, soft buttons, graphics, etc)
2.1 Create a program which creates to following kind of menu.
* cut
* copy
* past
* delete
* select all
* unselect all

2.2 Event Handling.
Create a menu which has the following options:
* cut - can be on/off
* copy - can be on/off
* paste - can be on/off
* delete - can be on/off
* select all - put all 4 options on
* unselect all - put all 4 options off

2.3. Input checking
Create an MIDP application which examine, that a phone number, which a user has entered is in the given format.
* Area code should be one of the following: 040, 041, 050, 0400, 044
* There should 6-8 numbers in telephone number (+ area code)

Week - 3 Threads & High Level UI:

3.1. Create a slide show which has three slides, which includes only text. Program should change to the new slide after 5 seconds. After the third slide program returns to the first slide.

3.2 High-level UI
Create a MIDP application, which show to the user 5-10 quiz questions. All questions have 4 possible options and one right option exactly. Application counts and shows to the user how many right answers were right and shows them to user.

3.3 Create a MIDP application, where the user can enter player name and points. The program saves the information to the record using RMS at MIDP device. Program should also print out the top 10 player list to the end user. You can use this class in your game if you made own class for saving and reading record sets.

Week - 4 Working on Drawing and Images

4.1 Create a slide show which has three slides, which includes pictures at PNG format. Program should change to the new slide other 5 seconds.

4.2 Create a MIDP application, which draws a bar graph to the display. Data values can be given at int[] array.

4.3 Create a MIDP application, which draws a bar graph to the display. Data values can be given at int[] array. You can enter four data (integer) values to the input text field.

Week - 5 Developing Networked Applications using the Wireless Toolkit

Creating a Simple Client-Server Application
Create, compile and run a basic UDP-based client-server application.
Creating the Datagram Server project
1) Click on Wireless Toolkit 2.5.2 under the group: All Programs→Sun Java (TM) Wireless Toolkit 2.5.2.
2) Click on 'New Project...' button.
3) Enter project name as 'DatagramServer'. Enter MIDlet name as 'DatagramServer'. Note that the Midlet name is the same as the name of the class in the source code, which extends the MIDlet class, otherwise the application won’t run.
4) Another window pops up where it is required to select a target platform. Select 'MIDP 1.0' from the drop down list.
5) After clicking OK, the project is created; and the Wireless Toolkit tells that the name of the folder where source code files are created. The path of the source code folder is displayed in the debug output window.

Creating and Compiling the DatagramServer source files

The Wireless Toolkit does not come with an IDE by default so Use any IDE or a text editor like Notepad.
1) Create a new text file called DatagramServer.java in the source folder of the project. The exact path of this folder is displayed in the Wireless Toolkit window.
2) Paste contents DatagramServer.java from into the source file.

Running your Server application on the Phone simulator

1) After compiling the project successfully, click on the Run button in the Wireless Toolkit window.
2) A graphical window depicting a phone handset will appear with the name of your application highlighted on its screen as shown below.

3) To start the application, click on the right soft-key (marked with a dot) below the ‘Launch’ command.
4) The phone simulator might ask if it is OK to run the network application. Select ‘Yes’ by clicking on the appropriate soft-key. The server is now up and running.
5) Keep the server running during the creation, compilation and running of the Datagram Client application.

Creating the DatagramClient project

1) Use the same instance of the Wireless Toolkit that is used for creating and compiling the Datagram Server project.
2) Click on 'New Project...' button.
3) A new window pops up. Enter project name as 'DatagramClient'. Enter MIDlet name as 'DatagramClient'. Note that the Midlet name is the same as the name of the class in the source code, which extends the MIDlet class.
4) Another window pops up where one has to select a target platform. Select 'MIDP 1.0' from the drop down list.
5) After clicking OK, the project is created and the Wireless Toolkit tells where to place the source code files. The path of the source code folder is displayed in the debug output window as explained before.

Creating and Compiling the DatagramClient source files

1) Create a new text file called DatagramClient.java in the source folder of the project.
2) Paste contents DatagramClient.java into the source file.
3) Then click on the Build button in the Wireless Toolkit window. If the compilation is OK, it will say Build Complete in the window's debug output window, otherwise it will show the errors. Note: In the source code, use the System.out.println() statement to output debug information to this window.

Running your Client application on the Phone simulator

1) After compiling the project successfully, click on the Run button in the Wireless Toolkit window.
2) A graphical window depicting a phone handset will appear with the name of the application highlighted on its screen.
3) To start the application, click on the right soft-key (marked with a dot) below the ‘Launch’ command.
4) The phone simulator might ask if it is OK to run the network application. Select ‘Yes’ by clicking on the appropriate soft-key. The client is now up and running.
5) When the client executes on the phone simulator, one should see a text box with the caption 'Message'. Enter any message and press the right soft-key (corresponding to Send). If the client-server application is working properly, the screen of the server phone will display the message sent by the client and the client screen will now display a message sent by the server in response. The response message from the server is the original client message in reverse.
6) Try various features of the phone simulator including the different look-and feel options.

Week - 6 Authentication with a Web Server

6.1 Write a sample program to show how to make a SOCKET Connection from j2me phone.
This J2ME sample program shows how to how to make a SOCKET Connection from a J2ME Phone. Many a times there is a need to connect backend HTTP server from the J2ME application. shows how to make a SOCKET connection from the phone to port 80.
6.2 Login to HTTP Server from a J2ME Program
This J2ME sample program shows how to display a simple LOGIN SCREEN on the J2ME phone and how to authenticate to a HTTP server.
Many J2ME applications for security reasons require the authentication of the user. This free J2ME sample program, shows how a J2ME application can do authentication to the backend server.
Note: Use Apache Tomcat Server as Web Server and Mysql as Database Server.

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Week - 7 & 8 Web Application using J2ME

The following should be carried out with respect to the given set of application domains: (Assume that the Server is connected to the well-maintained database of the given domain. Mobile Client is to be connected to the Server and fetch the required data value/information)

- Students Marks Enquiry
- Town/City Movie Enquiry
- Railway/Road/Air (For example PNR) Enquiry/Status
- Sports (say, Cricket) Update
- Town/City Weather Update
- Public Exams (say Intermediate or SSC)/ Entrance (Say EAMCET) Results Enquiry

Divide Students into Batches and suggest them to design database according to their domains and render information according to their requests.

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MANAGEMENT SCIENCE

***Course Objective**: The objective of the course, is to equip the student the fundamental knowledge of management science and its application for effective management of human resource, materials and operation of an organization. It also aims to expose the students about the latest and contemporary developments in the field of management.*

UNIT I

INTRODUCTION TO MANAGEMENT:
Management-Concept and meaning-Nature-Functions-Management as a science and art and both. Schools of management thought-Taylor's scientific theory-Henry Fayol's principles-Weber's Ideal Bureaucracy-Eltan Mayo's Human relations-Systems theory- Situational or Contingency theory-Social responsibilities of management.**Organizational structure and design**: Features of organizational structure-work specialization-Departmentation-Span of control-Centralization and Decentralization. **Organisational designs**-Line organization-Line & Staff Organization-Functional Organization-Matrix Organization-Project Organization-Committee form of organization.

UNIT II
OPERATIONS MANAGEMENT:
Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study-Statistical Quality Control**:** *C* chart, *P* chart, (simple Problems) Deming's contribution to quality. **Material Management:** Objectives-Inventory-Functions,types, inventory classification techniques-EOQ-ABC Analysis-Purchase Procedure and Stores Management. **Marketing Management:** Concept- Meaning - Nature-Functions of Marketing- Marketing Mix- Channels of distribution -Advertisement and sales promotion- Marketing Strategies based on Product Life Cycle.

UNIT III
HUMAN RESOURCES MANAGEMENT (HRM):
HRM- Definition and meaning – nature-Managerial and Operative functions-Evolution of HRM-Human Resource Planning(HRP)-Employee Recruitment-sources of recruitment-employee selection- process and tests in employee selection- Employee training and development-On- the- job and Off- the- job training methods-Performance Appraisal systems-Concept-Methods of Performance Appraisal-Placement-Employee Induction-Wage and Salary Administration-Objectives-Essentials of Wage and Salary Administration-Job Analysis-Process -Job Evaluation-Employee Grievances-techniques of handling Grievances.

UNIT IV
STRATEGIC MANAGEMENT:
Definition& meaning-Setting of Vision- Mission- Goals- Corporate Planning Process- Environmental Scanning-Steps in Strategy Formulation and Implementation-SWOT Analysis. **Project Management (PERT/CPM):**Network Analysis- Programme Evaluation and Review Technique (PERT), Critical Path

Method (CPM), Identifying Critical Path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing. (Simple problems).

UNIT V

CONTEMPORARY ISSUES IN MANAGEMENT:
The concept of MIS- Materials Requirement Planning (MRP)- Just-In-Time (JIT) System- Total Quality Management (TQM)- Six Sigma Concept- Supply Chain Management- Enterprise Resource Planning (ERP)- Performance Management- Business Process Outsourcing (BPO), Business Process Re-engineering and Bench Marking -Balanced Score Card-Knowledge Management.

The students are required to submit any one of the following- two assignments/ a mini project/submission of any two case studies in the subject.

Learning Outcome: After completion of this course, the prospective engineering technocrats will be able to understand various fundamentals of functional areas such general management, plant and materials management, marketing management, human resource management, statistical quality control techniques, strategic management and also aware of the latest and contemporary issues of management science.

TEXT BOOKS:
1. A.R Aryasri: Management Science, TMH, 2013
2. Stoner, Freeman, Gilbert, Management, Pearson Education,New Delhi, 2012.

REFERENCE BOOKS:
1. Kotler Philip & Keller Kevin Lane: Marketing Mangement , PHI,2013.
2. Koontz & Weihrich: Essentials of Management, 6/e, TMH, 2005.
3. Thomas N.Duening & John M.Ivancevich ManagementPrinciples and Guidelines,Biztantra.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2004.
5. Memoria & S.V.Gauker, Personnel Management, Himalaya, 25/e, 2005
6. Samuel C.Certo: Modern Management, 9/e, PHI, 2005
7. Schermerhorn, Capling, Poole & Wiesner: Management, Wiley, 2002.
8. Parnell: Strategic Management, Biztantra, 2003.
9. Lawrence R Jauch, R.Gupta &William F.Glueck: Business Policy and Strategic Management, Frank Bros., 2005.
10. L.S.Srinath: PERT/CPM,Affiliated East-West Press, 2005.

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Design Patterns

Course Objective

- To understand design patterns and their underlying object oriented concepts.
- To understand implementation of design patterns and providing solutions to real world software design problems.
- To understand patterns with each other and understanding the consequences of combining patterns on the overall quality of a system.

Course Outcomes

- Know the underlying object oriented principles of design patterns.
- Understand the context in which the pattern can be applied.
- Understand how the application of a pattern affects the system quality and its tradeoffs.

UNIT-I

Introduction: What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

UNIT-II

A Case Study: Designing a Document Editor : Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary .

Creational Patterns : Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

UNIT-III

Structural Pattern Part-I : Adapter, Bridge, Composite.

Structural Pattern Part-II : Decorator, açade, Flyweight, Proxy.

UNIT-IV

Behavioral Patterns Part-I : Chain of Responsibility, Command, Interpreter, Iterator.
Behavioral Patterns Part-II : Mediator, Memento, Observer.

UNIT-V

Behavioral Patterns Part-II (cont'd):State, Strategy, Template Method ,Visitor, Discussion of Behavioral Patterns.
What to Expect from Design Patterns, A Brief History, The Pattern Community An Invitation, A Parting Thought.

TEXT BOOK :

1. Design Patterns By Erich Gamma, Pearson Education

REFERENCE BOOKS:

1. Pattern's in JAVA Vol-I By Mark Grand, Wiley DreamTech.
2. Pattern's in JAVA Vol-II By Mark Grand, Wiley DreamTech.
3. JAVA Enterprise Design Patterns Vol-III By Mark Grand, Wiley DreamTech.
4. Head First Design Patterns By Eric Freeman-Oreilly-spd
5. Design Patterns Explained By Alan Shalloway,Pearson Education.
6. Pattern Oriented Software Architecture, F.Buschmann &others, John Wiley & Sons.

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MOBILE COMPUTING
(Elective II)

Course Objective:

- To make the students understand the basic information about mobile computing and its concepts such as Applications, Impediments, Architecture, New Data Services like GPRS, CSHSD, DECT, Mobile IP Networks, MANET's and Linux for Mobile devices.
- To get acquaintance with the class of abstractions offered by the mobile computing system that develops the User App applications

Learning Outcome:

- Students able to use mobile computing more effectively
- Developing mobile application programs to exploit the mobile operating system

UNIT I

Introduction: MobileCommunications,Mobile Computing–Paradigm,Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices.
GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS, CSHSD, DECT.

UNIT –II
Medium Access Controlin Wireless(MAC): Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA. MAC protocols for GSM, Wireless LAN (IEEE802.11), Collision Avoidance (MACA, MACAW) Protocols.

Mobile IP Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT –III
Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

Database Issues: Database Hoarding & Caching Techniques, C–S Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

UNIT –IV
Data Dissemination and Synchronization: Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination Broadcast Models, Selective Tuning and Indexing Methods, Digital Audio and Video Broadcasting (DAB & DVB). Data Synchronization – Introduction, Software, and Protocols

UNIT V

Mobile Ad hoc Networks (MANETs): Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc., Mobile Agents, Service Discovery.

Protocols and Platforms for Mobile Computing: WAP, Bluetooth, XML, J2ME, Java Card, PalmOS, Windows CE, SymbianOS, Linux for Mobile Devices.

TEXT BOOKS:

1. Raj Kamal, "Mobile Computing", Oxford University Press, 2007, ISBN: 0195686772

REFERENCE BOOKS:

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2004.
2. Stojmenovic and Cacute, "Handbook ofWireless Networks and Mobile Computing", Wiley, 2002, ISBN 0471419028.
3. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press,Oct 2004,

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Software Project Management

(ELECTIVE-II)

Course Objective

- Understanding the specific roles within a software organization as related to project and process management.
- Understanding the basic infrastructures competences (e.g., process modeling and measurements.)
- Describe the principles, techniques, methods & tools for model based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experienced based creation and improvements of models (process management) .
- Understanding the basic steps of project planning, project management, quality assurance, and process management and their relationships.
- To provide basic project management skills with a strong emphasis on issues and problems associated with delivering successful IT projects.

Course Outcomes

- To describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- To compare and differentiate organization structures and project structures.
- To implement a project to manage project schedule, expenses and resources with the application of suitable project management tools.
- Understand and practice the process of project management and its application in delivering successful IT projects.

UNIT I

Conventional Software Management: The waterfall model, conventional software Management performance. Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

UNIT II

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

The old way and the new : The principles of conventional software engineering, principles of modern software management, transitioning to an iterative process.

UNIT III

Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts. Model based software architectures: A Management perspective and technical perspective.

UNIT IV

Work Flows of the process: Software process workflows, Inter Trans workflows.Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic status assessments. Iterative Process **Planning:** Work breakdown structures, planning guidelines, cost and schedule estimating, Interaction planning process, Pragmatic planning.

ProjectOrganizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.

Process Automation: Automation Building Blocks, The Project Environment.

UNIT V

Project Control and Process instrumentation: The server care Metrics, Management indicators, quality indicators, life cycle expectations pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminates, Example.

Future Software Project Management: Modern Project Profiles, Next generationSoftware economics, modern Process transitions.

Case Study: The Command Center Processing and Display System-Replacement (CCPDS-R)

TEXT BOOKS:

1. Software Project Management, Walker Royce, Pearson Education, 2012
2. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition,TataMc-Graw Hill,2006

REFERENCE BOOKS:

1. Applied Software Project Management, Andrew Stellman& Jennifer Greene,O'Reilly, 2006
2. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly,2007
3. Software Engineering Project Managent, Richard H. Thayer & Edward Yourdon, second edition, Wiley India, 2004.
4. Agile Project Management, Jim Highsmith, Pearson education, 2004
5. The art of Project management, Scott Berkun, O'Reilly, 2005.
6. Software Project Management in Practice, PankajJalote, Pearson Education,2002.

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Pattern Recognition

Elective- II

Course Objective

The objective of this course is to enable the students to understand thefundamentals of

- Pattern recognition. The students should learn to choose an appropriate feature
- Pattern classification algorithm for a pattern recognition problem,properly implement the algorithm using modern computing tools such as Matlab, OpenCV, C, C++ and correctly.
- Analyze, and report the results using proper technical terminology

Course Outcomes

- Student understands the fundamental pattern recognition and machine learning theories
- Student has the ability to design and implement certain important pattern recognition techniques
- Student has the capability of applying the pattern recognition theories to applications of interest.

Unit - I :

Introduction to Pattern Recognition: Data Sets for Pattern Recognition, Different Paradigms for Pattern Recognition,

Pattern Representation: Data Structures for Pattern Representation, Representation of Clusters, Proximity Measures, Size of Patterns, Abstractions of the Data Set, Feature, Feature Selection, Evaluation of Classifiers, Evaluation of Clustering

Unit – II:

Nearest Neighbour Based Classifiers: Nearest Neighbour Algorithm, Variants of the NN Algorithm , Use of the Nearest Neighbour Algorithm for Transaction Databases, Efficient Algorithms, Data Reduction, Prototype Selection,

Bayes Classifier: Bayes Theorem, Minimum error rate classifier, Estimation of Probabilities, Comparison with the NNC, Naive Bayes Classifier, Bayesian Belief Network.

Unit – III :

Hidden Markov Models: Markov Models for Classification, Hidden Markov Models, Classification Using HMMs, Classification of Test Patterns.

Decision Trees: Introduction, Decision Trees for Pattern Classification, Construction of Decision Trees, Splitting at the Nodes, Over fitting and Pruning, Example of Decision Tree Induction.

Unit – IV :

Support Vector Machines: Introduction, Linear Discriminant Functions, Learning the Linear Discriminant Function, Neural Networks, SVM for Classification, Linearly Separable Case, Non-linearly Separable Case.

Combination of Classifiers: Introduction, Methods for Constructing Ensembles of Classifiers, Methods for Combining Classifiers, Evaluation of Classifiers, Evaluation of Clustering

Unit – V :

Clustering: Clustering and its Importance, Hierarchical Algorithms, Partitional Clustering, Clustering Large Data Sets, An Application to Handwritten Digit Recognition: Description of the Digit Data, Pre-processing of Data, Classification Algorithms, Selection of Representative Patterns.

Text Books :

7. Pattern Recognition an Introduction, V. Susheela Devi M. NarasimhaMurty, University Press.
8. Pattern Recognition, SegriosTheodoridis,KonstantinosKoutroumbas, Fourth Edition, Elsevier

Reference Books :

1. Pattern Recognition and Image Analysis, Earl Gose, Richard John Baugh, Steve Jost, PHI 2004.
2. C. M. Bishop, ‘Neural Networks for Pattern Recognition’, Oxford University Press, Indian Edition, 2003.
3. Pattern Classification, R.O.Duda, P.E.Hart and D.G.Stork, Johy Wiley, 2002

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Computer Graphics and Multimedia

(Elective - II)

Course Objective

- To know about different graphics hardware
- To study different techniques and algorithms related to Computer Graphics.
- To make the students understand the creation, storage, and manipulation of models and images of objects.
- Understand the basic concepts of multimedia and gain the skills required to work with them

Course Outcomes

- Ability to develop programs to control the content, structure and appearance of objects.

Ability to design, organize and produce multimedia projects of all kinds

UNIT I

Introduction: Computer-Aided design, Presentation graphics, Computer Art, Entertainment, Education and Training, Visualization, Image processing, Graphics user interfaces.

Graphics Systems: Video display devices, Raster scan systems, Random scan systems, Graphics monitors and workstations, Input devices, Hard-copy devices, Graphics software

UNIT II

Basic Graphic algorithms: Overview, Scan converting lines, Scan converting Circles, Scan converting Ellipse, Filling rectangles, Filling polygons, Filling ellipse Arcs, Pattern filling, Clipping lines, Clipping circles and ellipse, Clipping polygons, Generating characters.

Geometrical Transformations: 2D Transformation, Homogeneous co-ordinates and matrix representation of 2D transformations, Composition of 2D transformations, The window-to-view port transformation, Efficiency.

3D Transformations: Matrix representation of 3D transformations, Composition of 3D transformations, Transformations as a change in coordinate system.

UNIT III

Viewing in 3D: Projections, Specifying an arbitrary 3D view, Examples of 3D viewing.

Curves and surfaces: Polygon meshes, Parametric cubic curves: Hermite curves, Bezier curves, Uniform non rational B-splines, Non uniform Non rational B-splines

Parametric Bicubic surfaces: Hermite surfaces, Bezier surfaces, B-spline surfaces

Visual realism: Why realism, Fundamental difficulties,Rendering techniques for line drawings, Rendering techniques for shaded images, Dynamics.

UNIT IV

Visible surface determination: Functions of two variables, Techniques for efficient visible surface algorithms, Algorithms for visible-line determination, The z-buffer algorithm, List priority algorithms, Scan line algorithms

Illumination and Shading: Illumination models, Shading models for polygons, Surface detail, Shadows, Transparency

UNIT V

Multimedia: Where to use multimedia, Text: The power of meaning, About fonts and faces, Images: Before you start to create, Making still images, colour, Sound: The power of sound, Digital audio, MIDI Audio, MIDI Vs Digital audio, Multimedia system sounds, Audio File formats, Animation, Video: Using video, How video works and is displayed, Digital video containers

Text Books

1. Computer Graphics C version", Donald Hearn and M. Pauline Baker, 2nd edition, 2011, Pearson.
2. "Computer Graphics Principles and Practice in C", Foley, Dam, Feiner, John, 2nd Edition, 2013, Pearson.

"Multimedia: Making It Work", , Tay Vaughan, 8th Edition, 2011, Tata McGrawHill Edition

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Optimization Techniques

Course Objective

- To understand the theory of optimization methods and algorithms developed for solving various types of optimization problems.
- To develop and promote research interest in applying optimization techniques in problems of Engineering and Technology.
- To apply the mathematical results and numerical techniques of optimization theory to concrete Engineering problems.

Course Outcomes

At the end of the course students will be able to:

- Use various optimization techniques such as Quadratic programming, Dynamic Programming and select the ones most suitable to the problem at hand.
- Subdivide a complex system in to smaller disciplinary models, manage their interfaces and reintegrate them in to an overall system model.
- Rationalize and quantify a system architecture or product design problem by selecting appropriate objective function, design variables, parameters and constraints.
- Interpret the mathematical conditions for optimality and give physical explanation.
- Make recommendations based on solutions, analysis and limitations of models.

UNIT I

Introduction to optimization: Requirements for the Application of Optimization Methods, Applications of Optimization in Engineering, Structure of Optimization Problems, Functions of a Single Variable: Properties of Single-Variable Functions, Optimality Criteria, Region Elimination Methods, Polynomial Approximation or Point Estimation Methods.

UNIT II

Functions of a Several Variables: Optimality Criteria, Direct-Search Methods, Gradient Based Methods, Comparison of Methods and Numerical Results.

UNIT III

Linear Programming: Formulation of Linear Programming Models, Graphical Solution of Linear Programming in Two Variables, Linear Programming in Standard Form, Principles of the Simplex Method, Applications.

UNIT IV

Constrained Optimality Criteria: Equality-Constrained Problems, Lagrange Multipliers, Economic Interpretation of Lagrange Multipliers, Kuhn-Tucker Conditions, Kuhn-Tucker Theorems, Saddle point Conditions, Second-Order Optimality Conditions, Generalized Lagrange Multiplier Method, and Generalization of Convex Functions.

UNIT V

Transformation Methods: Penalty Concept, Algorithms, Codes, and Other Contributions, Method of Multipliers, Constrained Direct Search: Problem Preparation, Adaptations of Unconstrained Search Methods, Random-Search Methods.

TEXT BOOKS:

1. Engineering Optimization- Methods and Applications, A.Ravindran, K. M. Ragsdell, G.V. Reklaitis, Second Edition, Wiley India Edition.

2. Introductory Operation Research- Theory and Applications, H.S. Kasana, K.D. Kumar, Springer International Edition.

REFERENCES:

1. Optimization Methods in Operations Research and Systems Analysis, K.V. Mital and C. Mohan, New Age International (P)Limited, Publishers, Third Edition, 1996.

2. Operations Research, Dr. J.K.Sharma, Mc Millan.

3. Operations Research: An Introduction, H.A. Taha, PHI Pvt. Ltd.,

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Embedded Systems

(Elective-III)

Course Objective

- Study embedded computer system hardware
- Study Design, implement, and debug multi-threaded application software that operates under real-time constraints on embedded computer systems
- Use and describe the implementation of a real-time operating system on an embedded computer system
- Formulate an embedded computer system design problem including multiple constraints, create a design that satisfies the constraints.
- Create computer software and hardware implementations that operate according to well-known standards

Course Outcomes

- Design embedded computer system hardware
- Design embedded computer software
- Design realtime operating systems

Unit - I :

Embedded Computing: Introduction, Complex Systems and Microprocessor, The Embedded System Design Process, Formalisms for System Design, Design Examples

The 8051 Architecture : Introduction, 8051 Micro controller Hardware, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, Interrupts

Unit – II:

Basic Assembly Language Programming Concepts: The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051, Data Transfer and Logical Instructions. Arithmetic Operations, Decimal Arithmetic, Jump and Call Instructions, Further Details on Interrupts.

Unit – III :

Applications: Interfacing with Keyboards, Displays, D/A and A/D Conversions, Multiple Interrupts, Serial Data Communication.

Introduction to Real – Time Operating Systems : Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment.

Unit – IV :

Basic Design Using a Real-Time Operating System: Principles, Semaphores and Queues, HardReal-Time Scheduling Considerations, Saving Memory and Power, An example RTOS like uC-OS (Open Source); Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System.

Unit – V :

Introduction to advanced architectures: ARM and SHARC, Processor and memory organization and Instruction level parallelism; Networked embedded systems: Bus protocols, I2C bus and CAN bus; Internet-Enabled Systems, Design Example-Elevator Controller.

Text Books :

1. "Computers and Components", Wayne Wolf, Elseveir.
2. "The 8051 Microcontroller", Kenneth J.Ayala, Thomson.
3. "An Embedded Software Primer", David E. Simon, Pearson Education

Reference Books :

1. "Embedding system building blocks", Labrosse, via CMP publishers.
2. "Embedded Systems", Raj Kamal, TMH.
3. "Micro Controllers", Ajay V Deshmukhi, TMH.
4. "Embedded System Design", Frank Vahid, Tony Givargis, John Wiley.
5. "Microcontrollers", Raj kamal, Pearson Education
6. "Embedded Systems", Lyla B. Das, Pearson

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NATURAL LANGUAGE PROCESSING

(Elective III)

Objectives

Upon completion, students will be able to explain and apply fundamental algorithms and techniques in the area natural language processing (NLP). In particular, students will:

- Understand approaches to syntax and semantics in NLP.
- Understand current methods for statistical approaches to machine translation.
- Understand language modeling.
- Understand machine learning techniques used in NLP.

UNIT – I

Introduction to Natural Language Understanding, Syntactic Processing: Grammars and Parsing

UNIT-II:

Features and Augmented Grammars, Toward Efficient Parsing, Ambiguity Resolution

UNIT –III

Statistical Methods: Probabilistic Context-Free Grammars, Best-First Parsing.

UNIT-IV

Semantic Interpretation: Linking Syntax and Semantics, Ambiguity Resolution, other Strategies for Semantic Interpretation.

UNIT-V

Context and World Knowledge: Using World Knowledge, Discourse Structure, Defining a Conversational Agent.

TEXT BOOK:

1. Natural Language Understanding – James Allen, Second Edition, Pearson Education.

REFERENCE BOOKS:

1. Speech and Language Processing – Daniel Jurafsky, James H.Martin.

2. Foundations of Statistical Natural Language Processing – Christopher Manning, Hinrich Schutze, MIT Press.

3. Charniack, Eugene, Statistical Language Learning, MIT Press, 1993.
4. Jurafsky, Dan and Martin, James, Speech and Language Processing, 2nd Edition, Prentice Hall,

2008.
5. Manning, Christopher and Henrich, Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999.

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Data Analytics – III

(Elective-III)

Unit I

Introduction to Predictive Analytics & Linear Regression (NOS 2101)

What and Why Analytics, Introduction to Tools and Environment, Application of Modelling in Business, Databases & Types of data and variables, Data Modelling Techniques, Missing imputations etc.

Need for Business Modelling, Regression – Concepts, Blue property-assumptions-Least Square Estimation, Variable Rationalization, and Model Building etc.

Unit II

Logistic Regression Objective Segmentation (NOS 2101)

Model Theory, Model fit Statistics, Model Conclusion, Analytics applications to various Business Domains etc.

Regression Vs Segmentation – Supervised and Unsupervised Learning, Tree Building – Regression, Classification, Overfitting, Pruning and complexity, Multiple Decision Trees etc.

Unit III

Time Series Mothods/Forecasting, Feature Extraction (NOS 2101)

Arima, Measures of Forecast Accuracy, STL approach, Extract features from generated model as Height, Average, Energy etc and Analyze for prediction.

Unit IV

Working with Documents (NOS 0703)

Standard Operating Procedures for documentation and knowledge sharing, Defining purpose and scope documents, Understanding structure of documents – case studies, articles, white papers, technical reports, minutes of meeting etc., Style and format, Intectual Property and Copyright, Document preparation tools – Visio, PowerPoint, Word, Excel etc., Version Control, Accessing and updating corporate knowledge base, Peer review and feedback.

Unit V

Develop Knowledge, Skill and Competences (NOS 9005)

Introduction to Knowledge skills & competences, Training & Development, Learning & Development, Policies and Record keeping, etc.

Text Books:

1. **Student's Handbook for Associate Analytics-III.**

Reference Books and websites:

1. Gareth James • Daniela Witten • Trevor Hastie Robert Tibshirani. An Introduction to Statistical Learning with Applications in R

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
ANANTAPUR COLLEGE OF ENGINEERING ANANTAPUR
(Autonomous)

Course Structure for B.Tech (Computer Science and Engineering)(2015-16)

I B.Tech (CSE) – I Sem

Sl.No.	Course Code	Subject	L	P	Credits
1	**15A55101**	English	4	-	4
2	**15A51101**	Mathematics- I	4	-	4
3	**15A52101**	Applied Physics	4	-	4
4	**15A01101**	Environment studies	4	-	4
5	**15A03102**	Engineering Graphics	4	–	4
6	**15A52102**	Applied Physics Lab	-	4	2
7	**15A35101**	Engineering workshop & IT Workshop	-	4	2
8	**15A55102**	English Language Communication Skills la	-	4	2
		Total	**20**	**12**	**26**

I B.Tech (CSE) – II Sem

Sl.No.	Course Code	Subject	L	P	Credits
1	**15A55201**	Technical Communications and presentation Skills	**4**	**-**	**4**
2	**15A51201**	Mathematics – II	4	-	4
3	**15A53201**	Applied Chemistry	4	-	4
4	**15A05201**	Problem Solving and Computer Programmi	4	-	4
5	**15A02204**	Basic Electrical Engineering	4	-	4
6	**15A51202**	Mathematical Methods	4	-	4
7	**15A05202**	Computer Programming Lab	-	4	2
8	**15A53202**	Applied Chemistry Lab	-	4	2
		Total	**24**	**8**	**28**

IIB.Tech (CSE) – I Sem

Sl.No	Course Code	Subject	L	P	Credits
1	**15A54301**	Managerial Economics and Financial Analysis	4	0	4
2	**15A51303**	Probability and Statistics	4	0	4
3	**15A05301**	Data Structures	4	0	4
4	**15A04302**	Electronic Devices & Circuits	4	0	4
5	**15A04307**	Digital Logic Design	4	0	4
6	**15A05302**	Discrete Mathematics	4	0	4
7	**15A05303**	Data Structures using C++Lab	0	4	2
8	**15A24302**	Electrical &ElectronicsEngineering Lab	0	4	2
		Total	**24**	**8**	**28**

IIB.Tech (CSE) – II Sem

Sl.No	Course Code	Subject	L	P	Credits
1	**15A05401**	Computer Organization	4	0	4
2	**15A05402**	Database Management Systems	4	0	4
3	**15A05403**	Programming With JAVA	4	0	4
4	**15A05404**	Formal Languages and Automata Theory	4	0	4
5	**15A05405**	Principles of Programming Languages	4	0	4
6	**15A05406**	Design and Analysis of Algorithms	4	0	4
7	**15A54402**	Human Values & Professional Ethics(Audit)	2	0	0
8	**15A05407**	Database ManagementSystems Lab	0	4	2
9	**15A05408**	Programming With JAVA Lab	0	4	2
		Total	**26**	**8**	**28**

IIIB.Tech (CSE) – I Sem

Sl.No	Course Code	Subject	L	P	Credits
1	**15A05501**	Operating Systems	4	0	4
2	**15A05502**	Compiler Design	4	0	4
3	**15A05503**	Data Mining	4	0	4
4	**15A05504**	Software Engineering	4	0	4
5	**15A05505**	Microprocessors & Interfacing	4	0	4
6	**15A54501**	Management Science	4	0	4
7	**15A05506**	Operating Systems and Data Mining Lab	0	4	2
8	**15A05507**	Compiler Design and Assembly Language Programming Lab	0	4	2
		Total	**24**	**8**	**28**

IIIB.Tech (CSE) – II Sem

Sl.No	Course Code	Subject	L	P	Credits
1	**15A05601**	Computer Networks	4	0	4
2	**15A05602**	Object Oriented Analysis and Design Using UML	4	0	4
3	**15A05603**	Unix and Shell Programming	4	0	4
4	**15A05604**	Web Technologies	4	0	4
5	**15A05605**	Software Testing Methodologies	4	0	4
6	**15A05606a**	**Open Elective/CBCS** Human Computer Interaction	4	0	4
	15A05606b	Introduction to Machine Learning			
	15A05606c	Computer Graphics			
	15A05606d	Artificial Neural Networks			
	15A05606e	Grid computing			
	15A05606f	Distributed systems			
7	**15A55601**	Advanced Communications Skills Lab (Compulsory Audit Course)	0	4	0
8	**15A05607**	Unified Modeling Language & Software Testing Lab	0	4	2
9	**15A05608**	Web Technologies& Shell Programming Lab	0	4	2
		Total	**24**	**12**	**28**

IVB.Tech(CSE) – I Sem

Sl.No	Course Code	Subject	L	P	Credits
1	**15A05701**	Service Oriented Architecture	4	0	4
2	**15A05702**	Cryptography and Network Security	4	0	4
3	**15A05703**	Advanced Computer Architecture	4	0	4
4	**15A05704**	Software Architecture	4	0	4
5	**15A05705**	Software Project Management	4	0	4
6	**15A05706**	**(MOOC)** **(Annexure- I)**	4	0	4
7	**15A05707**	Network Security Lab	0	4	2
8	**15A05708**	Service Oriented Architecture Lab	0	4	2
9	**15A05709**	Project Part-A – Seminar	2	0	0
		Total	**26**	**8**	**28**

IVB.Tech(CSE) – II Sem

Sl.No	Course Code	Subject	L	P	Credits
1	**15A05801a**	**Elective-I** Artificial Intelligence	4	0	4
	15A05801b	Pattern Recognition			
	15A05801c	Adhoc and Sensor Networks			
2	**15A05802a**	**Elective- II** Design Patterns	4	0	4
	15A05802b	Natural Language Processing			
	15A05802c	Data Analytics			
3	**15A05803a**	**Elective-III** Mobile Computing	4	0	4
	15A05803b	Cloud Computing			
	15A05803c	Computer Graphics and Multimedia			
4	**15A05804a**	**Elective-IV** Optimization Techniques	4	0	4
	15A05804b	Embedded Systems			
	15A05804c	Digital Image Processing			

5	**15A05805**	Seminar	0	4	2
6	**15A05806**	Project Part-B	-	20	10
		Total	**16**	**24**	**28**

BS** – Basic SciencesES** – Engineering Science***HS** – Humanities and Social Science
PC** – Professional Subject –CorePE** – Professional Subject –Elective***MC-** Mandatory Course
***OE**- Open Elective * **MOOC-** Massive Open Online Course.

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I B.Tech.-I Sem .	**L**	**P**	**C**
	4	**0**	**4**

15A55101:ENGLISH

1. INTRODUCTION:

English is an international language as well as a living and vibrant one. People have found that knowledge of English is a passport for better career, better pay, advanced knowledge and for communication with the entire world. As it is a language of opportunities in this global age, English is bound to expand its domain of use everywhere. The syllabus has been designed to enhance communication skills of the students of engineering and technology. The prescribed books serve the purpose of preparing them for everyday communication and to face the global competitions in future.

The first text prescribed for detailed study focuses on LSRW skills and vocabulary development. The teachers should encourage the students to use the target language. The classes should be interactive and student-centered. They should be encouraged to participate in the classroom activities keenly.

The text for non-detailed study is meant for extensive reading/reading for pleasure by the students. They may be encouraged to read some select topics on their own, which could lead into a classroom discussion. In addition to the exercises from the texts done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements, promotional material etc.

2.OBJECTIVE:

1. To enable the students to communicate in English for academic and social purpose
2. To enable the students to acquire structure and written expressions required for their profession.
3. To develop the listening skills of the students
4. To inculcate the habit of reading for pleasure.
5. To enhance the study skills of the students with emphasis on LSRW skill

COURSE OUTCOMES	
CO1	Develop facility in responding to a variety of situations and contexts calling for purposeful shifts in voice, tone, level of formality, design, medium, and/or structure
CO2	Become effective in the use of different modes of written communication in a professional environment
CO3	Develop capacity to apply different reading methods to evaluate a mass of data on the net and to glean the necessary information.
CO4	Learn and use key rhetorical concepts through analyzing and composing a variety of texts.
CO5	Well trained in LSRW skills and develop communicative competence

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1									2						
CO2									2	3					3
CO3									2	3		2			
CO4				3					2			2			
CO5									2	3		2			3

3 SYLLABUS

UNIT –I

Chapter entitled *Humour*from ―Using English‖

Chapter entitled ‗*HomiJehangirBhabha'* from ―New Horizons‖

L- Listening -Techniques - Importance of phonetics
L- Meet & Greet and Leave taking, Introducing Oneself and Others (Formal and Informal situations)
R- -Reading Strategies -Skimming and Scanning
W- Writing strategies- sentence structures
G-Parts of Speech –Noun-number, pronoun-personal pronoun, verb- analysis
V-Affixes-prefix and suffix, root words, derivatives

UNIT –II

Chapter entitled *Inspiration* from ―Using English‖

Chapter entitled ‗My Struggle for an Education' from ―New Horizons‖

L- Listening to details
S- Apologizing, Interrupting, Requesting and Making polite conversations
R-note making strategies
W- Paragraph-types- topic sentences, unity, coherence, length , linking devices
G-Auxiliary verbs and question tags
V- synonyms-antonyms, homonyms , homophones, homographs, words often confused

UNIT –III

Chapter entitled *Sustainable Development* from ―Using English‖

Chapter entitled ‗The Autobiography of Abraham Lincoln' from ―New Horizons‖

L- Listening to themes and note taking
S- Giving instructions and Directions, making suggestions, Accepting ideas, fixing a time and Advising
R- Reading for details -1
W- Resume and cover letter
G- Tenses – Present tense, Past tense and Future tense
V-Word formation and One-Word Substitutes

UNIT –IV

Chapter entitled *Relationships* from ―Using English‖
Chapter entitled ‗T*he Happy Prince* from ―New Horizons‖

L- Listening to news
S- Narrating stories, Expressing ideas and opinions and telephone skills
R- Reading for specific details and Information
W- Technical Report writing-strategies, formats-types-technical report writing
G- Voice and Subject – Verb Agreement
V- Idioms and prepositional Phrases

UNIT –V

Chapter entitled Science and Humanism from ―Using English‖
Chapter entitled ‗If' from ―New Horizons‖

L- Listening to speeches
S- Making Presentations and Group Discussions
R- Reading for Information
W- E-mail drafting
G- Conditional clauses and conjunctions
V- Collocations and Technical Vocabulary and using words appropriately
2.EXPECTED OUTCOME:
The students will get the required training in LSRW skills through the prescribed texts and develop communicative competence

Prescribed Books:

1. **Using English (for detailed study)** published by Orient Black Swan, 2013
2. **New Horizons** published by Pearson, 2013

SUGGESTED READING:

1. **Raymond Murphy's English Grammar with CD,** Murphy, Cambridge University Press, 2012.
2. **English Conversation Practice –**Grant Taylor, Tata McGraw Hill,2009.
3. **Communication Skills, Sanjay Kumar &Pushpalatha** Oxford University Press, 2012.
4. **A Course in Communication Skills**- KiranmaiDutt& co. Foundation Books, 2012.
5. **Current English grammar and usage-**S M Guptha, PHI, 2013.
6. **Modern English Grammar-**Krishna SWAMI .McMillan, 2009.
7. **Powerful Vocabulary Builder-** AnjanaAgarwal New Age International Publishers, 2011.
8. Writing with a Purpose, Tickoo and Sasi Kumar, OUP, 2011
9. **Strengthen Your Writing, Orient Blackswan**

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B.Tech. I – I Sem. (C.S.E)	L	P	C
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15A51101: MATHEMATICS-I

(COMMON TO ALL BRANCHES)

OBJECTIVES:

- To train the students thoroughly in Mathematical concepts of ordinary differential equations and their applications.
- To prepare students for lifelong learning and successful careers using mathematical concepts of differential and Integral calculus, ordinary differential equations and vector calculus.
- To develop the skill pertinent to the practice of the mathematical concepts including the students abilities to formulate and modeling the problems, to think creatively and to synthesize information.

Course Outcome:

COURSE OUTCOMES	
CO1	Acquire knowledge in Linear differential equations of order n, Optimum values of a given multivariable functions measuring the bending nature of the curve, Tracing of curves, Multiple integrals.
CO2	: Develop skills in problem solving of differential equations., stationary points for a given multivariable functions
CO3	Develop skills in designing mathematical models involving Electrical circuits such as L-R-C oscillatory circuits, Mechanical oscillations, Newton's Law of cooling
CO4	Develop analytical skills in providing solutions for complex problems involving Optimum of a multivariable function, Measuring the curve lengths
CO5	Applications of differential equations, differential calculus. Integral calculus and vector calculus to solve engineering problems

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1				1			2	1			3		
CO2	1	3				1			2	2			3		
CO3	1	3	2			1			2	2			3		
CO4	1	1	1	3		1			2	1			3		
CO5	1	1	1	1		1			2	1			2		

UNIT – I

Exact, linear and Bernoulli equations, Applications to first order equations.

Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax}, sin ax, cos ax, polynomials in x, e^{ax} V(x), xV(x), method of variation of parameters, linear equations with variable coefficients: Euler-Cauchy Equations, Legendre‘s linear equation. Applications of linear differential equations- Mechanical and Electrical oscillatory circuits and Deflection of Beams.

UNIT – II

Taylor‘s and Maclaurin‘s Series - Functions of several variables – Jacobian – Maxima and Minima of functions of two variables, Lagrange‘s method of undetermined Multipliers with three variables only. Radius of curvature, center of curvature, Involutes, evolutes and envelopes..

UNIT – III

Curve tracing – Cartesian, polar and parametric curves. Length of curves, surface area of solid of revolution (single integrals)

UNIT – IV

Multiple integral – Double and triple integrals – Change of Variables – Change of order of integration. Applications to areas and volumes in Cartesian and polar coordinates using double and triple integral.

UNIT – V

Vector Calculus: Gradient – Divergence – Curl and their properties; Vector integration – Line integral - Potential function – Area – Surface and volume integrals. Vector integral theorems: Green‘s theorem – Stoke‘s and Gauss‘s Divergence Theorem (Without proof). Application of Green‘s, Stoke‘s and Gauss‘s Theorems.

TEXT BOOKS:

1. Engineering Mathematics-I, E.Rukmangadachari & E. KeshavaReddy, Pearson Publisher
2. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers

REFERENCES:

1. Engineering Mathematics Volume-I, by T.K.V. Iyengar, B.Krishna Gandhi,S. Ranganatham and M.V.S.S.N.Prasad, S.Chand publication.
2. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.
3. Higher Engineering Mathematics, by B.V.Ramana, McGraw Hill publishers.
4. Advanced Engineering Mathematics, by Alan Jeffrey, Elsevier.

Outcomes:

- The students become familiar with the application of differential and integral calculus, ordinary differential equations and vector calculus to engineering problems.
- The students attain the abilities to use mathematical knowledge to analyze, formulate and solve problems in engineering applications.

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15A52101: APPLIED PHYSICS

(Common to EEE, ECE & CSE)

OBJECTIVES:

- To evoke interest on applications of superposition effects like interference and diffraction, the mechanisms of emission of light, achieving amplification of electromagnetic radiation through stimulated emission, study of propagation of light through transparent dielectric waveguides along with engineering applications.
- To enlighten the periodic arrangement of atoms in crystals, Bragg's law and to provide fundamentals of de'Broglie waves, quantum mechanical wave equation and itsapplications.
- To get an insight into the microscopic meaning of conductivity, classical and quantum free electron models, the effect of periodic potential on electron motion, evolution of band theory to distinguish materials, basic concepts and transport phenomenon of charge carriers in semiconductors.
- To open new avenues of knowledge in dielectric and magnetic materials which find potential in the emerging micro device applications.
- To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications. Considering the significance of micro miniaturization of electronic devices and significance of low dimensional materials, the basic concepts of nano and smart materials, their properties and applications in modern emerging technologies are to be elicited.

COURSE OUTCOMES	
CO1	The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fiber optics
CO2	The important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction are focused along with the understanding of quantum mechanical picture of subatomic world
CO3	The discrepancies between the classical estimates and laboratory observations of electron transportation phenomena are successfully explained by free electron theory and band theory. The physical properties exhibited by materials would be lifted through the understanding of properties of semiconductors
CO4	The dielectric and magnetic response of materials are focused
CO5	The importance of superconducting materials, nanomaterials and smart materials along with their engineering applications are well elucidated

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		2		2	2		2		1		2		
CO2	3	2		2		2	2		2		1		2		
CO3	3	3		2		2	2		2		1		2		
CO4	3	2		2		2	2		2		1		2		
CO5	3	2		2		2	2		2		1		2		

UNIT 1:PHYSICALOPTICS, LASERS AND FIBRE OPTICS

Physical Optics: Introduction to interference – Colours in thin films – Newton‘s Rings – Michelson interferometer – Fraunhofer diffraction due to single slit, double slit – Diffraction grating.

Lasers: Introduction – Characteristics of laser – Spontaneous and stimulated emission of radiation – Einstein‘s coefficients – Population inversion – Pumping mechanisms – Ruby laser – He **-** Ne laser – Applications of lasers.

Fiber optics: Introduction–Principle of optical fiber –Numerical aperture and acceptance angle – Types of optical fibers –Optical fiber communication system – Attenuation and losses in optical fibers – Applications of optical fibers.

UNIT 2:CRYSTALLOGRAPHYAND QUANTUM MECHANICS

Crystallography: Introduction – Space lattice –Unit cell – Lattice parameters –Bravias lattice – Crystal systems – Packing fractions of SC, BCC and FCC – Miller indices – Interplanar spacing in cubic crystals – X-ray diffraction – Bragg‘s law –Laue method.

QuantumMechanics: Introduction to matter waves – de‘Broglie hypothesis – Schrodinger‘s time independent wave equation – Significance of wave function – Particle in a one dimensional infinite potential well.

UNIT 3: FREE ELECTRON THEORY AND SEMICONDUCTORS

Freeelectrontheory: Classical free electron theory – Sources of electrical resistance – Equation for electrical conductivity – Quantum free electron theory – Fermi-Dirac distribution – Kronig-Penny model (qualitative) – Origin of bands in solids – Classification of solids into conductors, semiconductors and insulators.

Semiconductorphysics: Introduction – Intrinsic and extrinsic semiconductors – Drift & diffusioncurrents – Einstein‘s equation – Continuity equation – Hall Effect.

UNIT 4: DIELECTRICSAND MAGNETIC MATERIALS

Dielectrics: Introduction – Dielectric Polarization – Types of Polarization – Lorentz field – Clausius-Mosotti equation – Dielectric strength, loss and breakdown.

Magneticmaterials: Introduction – Basic definitions – Origin of magnetic moment – Classification of magnetic materials into dia, para, ferro, antiferro and ferri magnetic materials – Hysteresis – Soft and hard magnetic materials – Applications of magnetic materials.

UNIT 5: ADVANCED MATERIALS

Superconductors: Introduction – Properties of superconductors – Meissner effect– Type I and type II superconductors – ac and dc Josephson effects – BCS theory (qualitative) – High T_c superconductors – Applications of superconductors.

Nanomaterials: Introduction – Significance of nanoscale – Surface area and quantum confinement – Physical properties: optical, thermal, mechanical and magnetic – Carbon nanotubes & its properties – Applications of nanomateials.

SmartMaterials: Shape Memory Alloys: Definition – Two phases – One way and two way memory effect – Pseudo elasticity – Applications of shape memory alloys.

Prescribed Text books:

1. Engineering physics – M.N. Avadhanulu and P.G. KrshiSagar, Chand and Co.
2. Engineering physics – S. ManiNaidu, Pearson Education

Reference Books:

1. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley &Sons
2. Introduction to modern optics – Grant R Fowles
3. A text book on Optics – Brijlal&Subramanyam
4. Semiconductor physics and devices- Basic principle – Donald A, Neamen, McGraw Hill
5. Introduction to Nanotechnology – C P Poole and F J Owens, Wiley
6. Shape Memory Alloys-Modeling and Engg. Applications – C Lagoudas, Springer
7. Engineering Physics – V. Rajendran, K.Thyagarajan Tata MacGraw Hill Publishers
8. Engineering Physics – S.O.Pillai, New Age Publications
9. Engineering Physics - Sanjay D. Jain, D. Sahasrambudhe and Girish, University Press
10. Engineering Physics – D K Pandey, S. Chaturvedi, Cengage Learning
11. Engineering Physics – M. Arumugam, Anuradha Publications

OUTCOMES:

- The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fiber optics.
- The important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction are focused along with the understanding of quantum mechanical picture of subatomic world.
- The discrepancies between the classical estimates and laboratory observations of electron transportation phenomena are successfully explained by free electron theory and band theory. The physical properties exhibited by materials would be lifted through the understanding of properties of semiconductors.
- The dielectric and magnetic response of materials are focused.
- The importance of superconducting materials, non materials and smart materials along with their engineering applications are well elucidated.

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15A01101: ENVIRONMENTAL STUDIES

OBJECTIVE: To make the students to get awareness on environment, to understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life to save earth from the inventions by the engineers.

COURSE OUTCOMES	
CO1	Critical Thinking: demonstrate critical thinking skills in relation to environmental affairs.
CO2	Communication: demonstrate knowledge and application of communication skills and the ability to write effectively in a variety of contexts.
CO3	Interdisciplinary Synthesis: demonstrate an ability to integrate the many disciplines and fields that intersect with environmental concerns
CO4	Ecological Literacy: demonstrate an awareness, knowledge, and appreciation of the intrinsic values of ecological processes and communities
CO5	Sustainability: demonstrate an integrative approach to environmental issues with a focus on sustainability

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3					2		2			2	3			
CO2	3		3		2							3			
CO3	3		3		2		1		2	1					
CO4		1		1				2			2				
CO5	3		3			2			2			3			

UNIT – I

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES: – Definition, Scope and Importance – Need for Public Awareness.

NATURAL RESOURCES : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies

Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

UNIT – II

ECOSYSTEMS : Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological sucession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a.Forest ecosystem.

b.Grassland ecosystem

c.Desert ecosystem

d.Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

BIODIVERSITY AND ITS CONSERVATION : Introduction 0 Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-soports of biodiversity

Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – III

ENVIRONMENTAL POLLUTION : Definition, Cause, effects and control measures of :

a.Air Pollution.

b.Water pollution

c.Soil pollution

d.Marine pollution

e.Noise pollution

f.Thermal pollution

g.Nuclear hazards

SOLID WASTE MANAGEMENT :Causes, effects and control measures of urban and industrial wates – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT – IV

SOCIAL ISSUES AND THE ENVIRONMENT :From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act

Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT – V

HUMAN POPULATION AND THE ENVIRONMENT :Population growth, variation among nations. Population explosion – Family Welfare Proggramme. – Environment and human health

– Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

FIELD WORK : Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, birds – river, hill slopes, etc..

TEXT BOOKS :

1.Text book of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission, Universities Press.
2.Environmental Studies by Kaushik, New Age Pubilishers.
3.Environmental Studies by Benny Joseph, TMHPubilishers

REFERENCES :

1.Environmental Studies by Dr.S.AzeemUnnisa, Academic Publishing Company
2.Textbook of Environmental Science by Deeksha Dave and E.Sai Baba Reddy,CengagePubilications.
3.Text book of Environmental Sciences and Technology by M.Anji Reddy, BS Publication.
4.Comprehensive Environmental studies byJ.P.Sharma, Laxmi publications.
5.Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Printice hall of India Private limited.
6.Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Printice hall of India Private limited.

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15A03102: Engineering Graphics

COURSE OUTCOMES	
CO1	Student will be familiar with the BIS conventions and dimensions
CO2	Student will be familiar with the positions of points and straight lines under different cases
CO3	Student will be able to represent regular planes and solids on the drawing sheet for various cases
CO4	Student can draw the development for regular solids
CO5	Student will familiarize with the 2D and 3D projections of various figure

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2														
CO2		2								1					
CO3					1				1						
CO4															
CO5	2	2										1			

Unit-I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their significance Drawing Instruments and their Use – BIS Conventions in drawing and Lettering.

a.Curves used in practice:
b.Conic sections including the Rectangular Hyperbola
c.Cycloid, Epicycloid and Hypocycloid –Normals and Tangents
Involute of a circle –Normals and Tangents

Principles of orthographic projection, I and III angle projections –Conventions –Projections ofpoints.

Unit –II

Projection of lines inclined to both planes –traces, Projection of plane figures inclined to bothplanes.

Unit –III

Projection of simple solids inclined to both planes.

Unit –IV

Sections and Developments: Sections and Sectional views of Regularsolids – Prism,Cylinder,Pyramid, Cone – True shapes.

Unit –V

Isometric projections:Principles of pictorial representations-Isometric projection- Isometric scale-Isometric views-conventions- Isometric views of plane figures,solids-Isometric projection of objects with non isometric lines-

Isometric projection of spherical parts.

TEXT BOOKS:

1.Engineering Drawing, N.D. Bhat, Charotar Publishers
2.Engineering Drawing, K.L. Narayana& P. Kannaih, Scitech Publishers, Chennai.

REFERENCES:

1.Engineering Drawing, Johle, Tata McGraw-Hill Publishers.
2.Engineering Drawing, Shah and Rana,2/e, Pearson Education
3.Engineering Drawing and Graphics, Venugopal/New age Publishers
4.Engineering Graphics, John&john.

Suggestions:

- Student is expected to buy a book mentioned under 'Text books' for better understanding.
- Student should prepare rough sketches for all the problems given at the end of each chapter to improve his / her imaginations.
- Student should also practice Auto CAD or any other drawing software to help understanding better.

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15A52102: Applied Physics Laboratory

Subject Code	Title of the Lab	L	T	P	C
15A52102	Applied Physics Laboratory	-	1	3	2

COURSE OBJECTIVES	
1	The Objective of this course is to make the students gain practical knowledge to correlate with the theoretical studies.
2	To develop practical applications of engineering materials and use of principle in the right way to implement the modern technology.
3	To train engineering students on basis of measurements and the instruments
4	To equip the students with practical knowledge in electronic, optics, and heat experiments

COURSE OUTCOMES	
CO1	The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fiber optics.
CO2	The important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction are focused along with the understanding of quantum mechanical picture of subatomic world
CO3	The discrepancies between the classical estimates and laboratory observations of electron transportation phenomena are successfully explained by free electron theory and band theory. The physical properties exhibited by materials would be lifted through the understanding of properties of semiconductors
CO4	The dielectric and magnetic response of materials are focused
CO5	The importance of superconducting materials, nanomaterials and smart materials along with their engineering applications are well elucidated.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		2		2	2		2		1		2		
CO2	3	2		2		2	2		2		1		2		
CO3	3	3		2		2	2		2		1		2		
CO4	3	2		2		2	2		2		1		2		
CO5	3	2		2		2	2		2		1		2		

LIST OF EXPERIMENTS

Any TEN of the following experiments have to be performed during the SEMESTER

1. Determination of wavelengths of variouscolours of mercury spectrum using diffraction grating in normal incidence method.
2. Determination of dispersive power of the prism
3. Determination of thickness of thin object by wedge method.
4. Determination of radius of curvature of lens by Newton‘s rings.
5. Laser : Diffraction due to single slit
6. Laser : Diffraction due to double slit
7. Laser: Determination of wavelength using diffraction grating
8. Determination of Numerical aperture of an optical fiber.
9. Meldes experiment: Determination of the frequency of tuning fork
10. Sonometer: Verification of the three laws of stretched strings
11. Energy gap of a material using p-n junction diode
12. Electrical conductivity by four probe method
13. Hall effect : Determination of mobility of charge carriers in semiconductor
14. B-H curve
15. Magnetic field along the axis of a current carrying coil – Stewart and Gee‘s method.
16. Determination of dielectric constant and Curie temperature of a ferroelectric material.

Note: Out of 10 experiments, two experiments will be performed using virtual laboratory

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15A35101:Engineering Workshop &IT Workshop
(Common to All Branches)

Course Objectives

- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations
- To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system
- To learn about Networking of computers and use Internet facility for Browsing and Searching

COURSE OUTCOMES	
CO1	Disassemble and Assemble a Personal Computer and prepare the computer ready to use.
CO2	Prepare the Documents using Word processors and Prepare spread sheets for calculations using excel
CO3	Prepare Slide presentations using the presentation tool
CO4	Interconnect two or more computers for information sharing
CO5	Access the Internet and Browse it to obtain the required information

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3		3		3		3		3				
CO2	3		3		3		3		3		3				
CO3	3		3		3		3		3		3	2			
CO4	3				3		3				3				
CO5		1		1		1						2			

Part A: Engineering Workshop Lab

1. TRADES FOR EXERCISES :
At least 2 exercises In each :

1. Carpentry
2. Fitting
3. House-wiring
4. Black Smithy
5. Tin smithy
6. Power Tools Demonstration

TEXT BOOK:

1. Work shop Manual / P.Kannaiah/ K.L.Narayana/ Scitech Publishers.

Objective : The objective of this subject is to provide the basic concepts about different manufacturing processes and use of various workshop toolsthe exposer to the Power tools used in the inclusion

Codes / Tables : Nil

Question Paper pattern : Test in any two out of 6 trades.

PART – B (IT Workshop)

Preparing your Computer

Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2: Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and trouble shooting a computer.

Task 3: Install Operating system: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Task 4: **Operating system features**: Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

Networking and Internet

Task 5:Networking: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc should be done by the student. The entire process has to be documented.

Task 6:Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail account and send email. They should get acquaintance with applications like Facebook, skype etc.

If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, search process using different natural languages, and creating e-mail account.

Task 7: Antivirus: Students should download freely available Antivirus software, install it and use it to check for threats to the computer being used. Students should submit information about the features of the antivirus used, installation process, about virus definitions, virus engine etc.

Productivity tools

Task 8: Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

Task 9: Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement.Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet application considered.

Task 10: Presentations: creating, opening, saving and running the presentations, Selecting the style for slides, formatting the slides with different fonts, colours, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

References:

1. Introduction to Computers, Peter Norton, McGraw Hill
2. MOS study guide for word, Excel, Powerpoint& Outlook Exams‖, Joan Lambert, Joyce Cox, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Networking your computers and devices, Rusen, PHI
5. Trouble shooting, Maintaining & Repairing PCs‖, Bigelows, TMH

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15A55102:English Language Communication Skills (ELCS) Lab

The **Language Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

OBJECTIVES:

- To train students to use language effectively in everyday conversations, to participate in group discussions, to help them face interviews, and sharpen public speaking skills.
- To expose the students to a varied blend of self-instructional learner-friendlymodes of language learning through computer-aided multi-media instruction.
- To enable them to learn better pronunciation through stress on word accent,intonation, and rhythm.
- To help the second language learners to acquire fluency in spoken English andneutralize mother tongue influence.
- To train students to use language appropriately for interviews, group discussionand public speaking.

COURSE OUTCOMES	
CO1	Better Understanding of nuances of language through audio- visual experience and be independent learners
CO2	The significance of paralinguistic features will be understood by the students and they will try to be intelligible.
CO3	Become good at Inter-personal skills
CO4	Achieve neutral accent and be free from mother tongue influence
CO5	Being an active participant in debates and group discussion, showing ability to express agreement, argument to summarize ideas to elicit the views of others and present own ideas.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1												3			
CO2								2		3					3
CO3										3					
CO4										3					
CO5								2		3		2			3

SYLLABUS:

UNIT- I: Phonetics – Introduction to Sounds of Speech – Vowels – Consonants – Phonetic Transcription & Orthographic Transcription

UNIT – II: Syllabification – Word Stress – Rules of word stress – Intonation – Falling tone and Risingtone

UNIT – III: Situational Dialogues – Role-play – Expressions in various situations – Self Introduction – Introducing others – Greetings – Apologies – Requests – Social and Professional etiquettes-Telephone Etiquettes
UNIT – IV:JAM – Describing object/person/place/situation – Giving directions

UNIT – V: Debates and Group Discussions

EXPECTED OUTCOMES:

- Becoming active participants in the learning process and acquiring proficiency in spoken English of the students
- Speaking with clarity and confidence thereby enhancing employability skills of the students.

MINIMUM REQUIREMENT FOR ELCS LAB:

The English Language Lab shall have two parts:

1. Computer Assisted Language Learning (CALL) Lab:

   The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.

2. The Communication Skills Lab with movable chairs and audio-visual aids with a P.A. system, Projector, a digital stereo-audio & video system and camcorder etc.

System Requirement (Hardware component):
Computer network with LAN with minimum 60 multimedia systems with the following specifications:
i)P – IV Processor
a.Speed – 2.8 GHZ
b.RAM – 512 MB Minimum
c.Hard Disk – 80 GB
ii)Headphones of High quality

SUGGESTED SOFTWARE:

1. Walden Infotech English Language Communication Skills.
2. Clarity Pronunciation Power – Part I (Sky Pronunciation)
3. Clarity Pronunciation Power – part II
4. K-Van Advanced Communication Skills
5. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
6. DELTA's key to the Next Generation TOEFL Test: Advanced Skills Practice.
7. Lingua TOEFL CBT Insider, by Dreamtech
8. English Pronunciation in Use (Elementary, Intermediate, Advanced) CUP
9. Cambridge Advanced Learners' English Dictionary with CD.

REFERENCE BOOKS:

1. **A Textbook of English Phonetics for Indian Students** 2nd Ed T. Balasubramanian. (Macmillian), 2012.
2. **A Course in Phonetics and Spoken English**, DhamijaSethi, Prentice-Hall of India Pvt.Ltd
3. **Speaking English Effectively**, 2nd Edition Krishna Mohan & NP Singh, 2011. (Mcmillan).
4. **A Hand book for English Laboratories**, E.Sureshkumar, P.Sreehari, Foundation Books,2011
5. **English Pronunciation in Use. Intermediate & Advanced**, Hancock, M. 2009. CUP
6. **Basics of Communication in English**, Soundararaj, Francis. 2012.. New Delhi:

Macmillan

7. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.
8. **English Pronouncing Dictionary**, Daniel Jones Current Edition with CD.Cambridge, 17th edition, 2011.

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15A55201:Technical Communication & Presentation Skills

PREAMBLE:

In the increasingly globalized world, technical communication and presentation skills are assuming great importance. Industries and employers constantly complain that young engineers have adequate technical knowledge, but no communication and presentation skills. Success is defined these days in terms of possessing these skills. The syllabus has been designed to develop communicative competencies of the students.

OBJECTIVES:

1. To develop awareness in students of the relevance and importance of technicalcommunication and presentation skills.
2. To prepare the students for placements
3. To provide students with interactive practice sessions to make them internalize theseskills.

COURSE OUTCOMES	
CO1	Become effective technical communicators
CO2	Be job-ready and able to face interviews confidently
CO3	Sensitive use of non-verbal language suitable to different situations in professional life
CO4	Learn and use keys words, phrases and sentence structures making a mark in interviews and presentation skills
CO5	Effective writing skills with the ability to use different styles for different situations

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		1							2	3		2			
CO2										3					
CO3										3					
CO4										3					2
CO5										3					2

UNIT 1:

Basics of Technical Communication – Introduction – Objectives & Characteristics of Technical Communication – Importance and need for Technical communication - LSRW Skills – Barriers to effective communication

UNIT II

Informal and Formal Conversation - Verbal and Non-verbal communication –Kinesics, Proxemics, Chronemics, Haptics, Paralanguage

UNIT III

Written communication – Differences between spoken and written communication – Features of effective writing –Advantages and disadvantages of spoken and written communication

UNIT IV

Presentation Skills – Nature and importance of oral presentation – Defining the purpose – Analyzing the audience - Planning and preparing the presentation, organizing and rehearsing the presentation – Individual and group presentations - Handling stage fright

UNIT V

Interview Skills – The Interview process –Characteristics of the job interview – Pre- interview preparation techniques – Projecting the positive image – Answering Strategies

Prescribed Books:

1.Effective Technical Communication, AshrifRizvi, TataMcGrahill, 2011
2.Technical Communication by Meenakshi Raman &Sangeeta Sharma, O U Press 2009

Reference Books:

1.Communication Skills by Pushpalatha& Sanjay Kumar, Oxford Univsesity Press 2.Books on TOEFL/GRE/GMAT/CAT/IELTS by Barron's/DELTA/Cambridge UniversityPress.2012.
2. Skills for Everyone, Butterfield Jeff, Cengage Publications, 2011.
3. Management Shapers Series by Universities Press (India) Pvt Ltd., Himayatnagar,Hyderabad 2008.
4.Handbook for Technical Writing by David A McMurrey& Joanne Buckely CENGAGELearning 2008.
5.English for Technical Communication for Engineering Students, AyshaVishwamohan,Tata McGraw-Hill 2009.

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15A51201:Mathematics - II

(Common to All Branches)

Objectives: Our emphasis will be more on conceptual understanding and application of Fourier series, Fourier, Z and Laplace transforms and solution of partial differential equations.

Course Outcome:

COURSE OUTCOMES	
CO1	Acquire basic knowledge in Laplace transforms , Fourier series and Fourier transforms ,z-transforms
CO2	Develop skills in problem solving of Fourier series for a given function, transformations such as Laplace , Fourier and z .Partial differential equations through different evaluation methods, Difference equations through z – transforms and Engineering systems and processes involving wave forms and heat transfer
CO3	Develop skills in designing mathematical models involving Electrical circuits such as L-R-C oscillatory circuits, Mechanical oscillations, Newton's Law of cooling
CO4	Develop analytical skills in providing solutions for complex problems involving Laplace transforms, Fourier series , Fourier transforms. ,Z-transforms and difference equations and Heat transfer and wave motion
CO5	Applications of transformation methods and partial differential equations to solve engineering problems

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1				1			2	1			3		
CO2	1	3				1			2	2			3		
CO3	1	3	2			1			2	2			3		
CO4	1	1	1	3		1			2	1			3		
CO5	1	1	1	1		1			2	1			2		

UNIT – I

Laplace transform of standard functions – Inverse transform – First shifting Theorem, Transforms of derivatives and integrals – Unit step function – Second shifting theorem – Dirac's delta function – Convolution theorem – Laplace transform of Periodic function.

Differentiation and integration of transform – Application of Laplace transforms to ordinary differential equations of first and second order.

UNIT – II

Fourier Series: Determination of Fourier coefficients – Fourier series – Even and odd functions – Fourier series in an arbitrary interval – Even and odd periodic continuation – Half-range Fourier sine and cosine expansions-Parseval‘s formula- Complex form of Fourier series.

UNIT – III

Fourier integral theorem (only statement) – Fourier sine and cosine integrals. Fourier transform –Fourier sine and cosine transforms – Properties – Inverse transforms – Finite Fourier transforms.

UNIT – IV

Formation of partial differential equations by elimination of arbitrary constants and arbitraryfunctions – Method of separation of variables – Solutions of one dimensional wave equation,heat equation and two-dimensional Laplace‘s equation under initial and boundary conditions.s

UNIT – V

z-transform – Inverse z-transform – Properties – Damping rule – Shifting rule – Initial and final value theorems. Convolution theorem – Solution of difference equations by z-transforms.

TEXT BOOKS:

1.Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2.Engineering Mathematics, Volume - II, E. Rukmangadachari Pearson Publisher.

REFERENCES:

1.Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham andM.V.S.S.N.Prasad S. Chand publication.
2.Higher Engineering Mathematics, by B.V.Ramana, McGraw Hill publishers.
3.Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.

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15A53201:Applied Chemistry
(Common to EEE,ECE,CSE)

Knowledge in chemistry serves as basic nutrient for the understanding and thereby design of materials of importance in life. Thus the advancement in Engineering depends on the outcome of basic sciences. Many advances in engineering either produce a new chemical demand as in the case of polymers or wait upon chemical developments for their applications as in the case of implants and alloys. Currently the electronics and computer engineers are looking forward for suitable biopolymers and nano materials for use in miniature super computers, the electrical materials engineers are in search of proper conducting polymers, the mechanical engineers are on lookout for micro fluids and the civil engineers are looking for materials that are environmental friendly, economical but long lasting.

COURSE OBJECTIVES (CO):

- The Applied Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial/engineering applications.
- The main aim of the course is to impart in-depth knowledge of the subject and highlight the role of chemistry in the field of engineering.
- The lucid explanation of the topics will help students to understand the fundamental concepts and apply them to design engineering materials and solve problems related to them. An attempt has been made to logically correlate the topic with its application.
- The extension of fundamentals of electrochemistry to energy storage devices such as commercial batteries and fuel cells is one such example.
- After the completion of the course, the student would understand about the concepts of chemistry in respect of Electrochemical cells, fuel cells, mechanism of corrosion and factors to influence, polymers, nanomaterials with their applications and engineering materials.

COURSE OUTCOMES	
CO1	The students would understand about the concepts of chemistry in respect of Electrochemical cells, fuel cells, mechanism of corrosion and factors to influence, polymers with their applications, engineering materials and water chemistry.
CO2	Understand industrially based polymers, various engineering materials.
CO3	Differentiate between hard and soft water. Understand the disadvantages of using hard water domestically and industrially. The Students select and apply suitable treatments domestically and industrially.
CO4	They can able to know the chemical properties of engineering materials like ceramics, cement, glass, refractories, rocket propellants, lubricants.
CO5	Understanding the water treatment to reduce the impurities, corrosion of boiler, internal and external treatment of water.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		2		2	2		2		1		2		
CO2	3	2		2		2	2		2		1		2		
CO3	3	3		2		2	2		2		1		2		
CO4	3	2		2		2	2		2		1		2		
CO5	3	2		2		2	2		2		1		2		

UNIT.1
ELECTROCHEMISTRY

i).Review of electrochemical cells, Numerical calculations, Batteries: Rechargeable batteries (Lead acid, Ni-Cd, Lithium Ion Batteries),Fuels cells: (Hydrogen-Oxygen and Methanol-Oxygen)
ii).Electrochemical sensors: Potentiometric Sensors and voltammetric sensors. Examples : analysis of Glucose and urea
iii).Corrosion:Definition, types of corrosion, Electrochemical Theory of corrosion, Factors affecting the corrosion. Prevention: Anodic and catholic protection and electro and electroless plating. (10h)

UNIT.2
POLYMERS

i).Introduction to polymers, Polymerisation process, mechanism: cationic, anionic, free radical and coordination covalent.
Elastomers (rubbers)
Natural Rubber; Compounding of Rubber
Synthetic Rubber: Preparation, properties and engineering applications of Buna-S, buna-N, Polyurethene, Polysulfide (Thiokol) rubbers
Plastomers: Thermosetting and Thermoplatics, Preparation, properties and Engineering applications , PVC, Bakelite, nylons.
ii).Conducting polymers: Mechanism, synthesis and applications of polyacetyline, polyaniline.
iii).Liquid Crystals: Introduction, classification and applications
iii).Inorganic Polymers: Basic Introduction, Silicones, Polyphospazins (-(R)2-P=N-) applications. (12h)

UNIT.3
FUEL TECHNOLOGY

i).Classifications of Fuels – Characteristics of Fuels- Calorific Value – Units, Numerical Problems.
Solid Fuels–Coal, Coke : Manufacture of Metallurgical Coke by Otto Hoffmann‘s by product oven processes.
ii).Liquid Fuels:
Petroleum: Refining of Petroleum, Gasoline: Octane Number, Synthetic Petrol: Bergius Processes, Fischer Troph‘s synthesis
Power Alcohol: Manufacture, Advantages and Disadvantages of Power Alcohol
iii). Gaseous Fuels: Origin, Production and uses of Natural gas, Producer gas, Water gas, Coal gas and Biogas.
iv). Nuclear Fuels: Controlled and uncontrolled reactions. Breeder reactor and Power reactors. (12h)

UNIT.4
CHEMISTRY OF ENGINEERING MATERIALS

i).Electrical Insulators or Dielectric materials: Definition and classification, Characteristics of electrical insulators. Applications of electrical insulating materials (Gaseous, liquid and solid insulators)
iii).Semiconducting and Super Conducting materials-Principles and some examples
iii).Magnetic materials – Principles and some examples (9h)

UNIT.5
NANOCHEMISTRY & COMPOSITE MATERIALS

i). Nanochemistry Introduction, nanotechnology applications, nanomaterials, nanoparticles, nanostructure, supramolecular systems, future perspective.
ii). Composite Materials: Classification of Composites materials, Constituents of Composite materials. Disperse Phase composite materials Ex. a) Glass fibre reinforced polymer composite and b) Carbon fibre reinforced polymer composite materials. Advantages and applications of Composites.

Text Books:

1. Engineering Chemistry by KNJayaveera, GVSubba Reddy and C. Ramachandraiah,McGraw Hill Higher Education, Foruth Edition, New Delhi
2. A Text book of Engineering Chemistry by SS Dhara, S. Chand Publications, New Delhi

REFERENCES:

1. A Text Book of Enigneering Chemistry, Jain and Jain, DhanapathiRai Publications,New Delhi
Engineering Chemistry by K.B.ChandraSekhar, UN.Das and Sujatha Mishra, SCITECH Pubblications India Pvt Limited.
2. Concepts of Engineering Chemistry- AshimaSrivastavaf and N.N. Janhavi
3. Text Book of Engineering Chemistry – C. Parameswara Murthy, C.V.Agarwal andAndra Naidu
4. Chemistry of Engineering Materials, C.V.Agarwal, C.Parameswaramurthy andAndranaidu
5. Text Book of Engineering Chemistry, Shashichawla, Dhanapathirai Publications.

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15A05201: Problem solving and Computer Programming
(Common to All Branches)

Course Objectives:

- To understand the various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs
- To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
- To understand the notations used to analyze the Performance of algorithms.
- To understand and analyze various searching and sorting algorithms.

COURSE OUTCOMES	
CO1	Develop flowcharts, algorithms for given complex problems.
CO2	Analyze basic programming constructs.
CO3	Write C programs for real world problems.
CO4	Implement C programming by using various control structures.
CO5	Appreciate coding standards and best practices for program development.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3									2			3	
CO2	3	3	3											3	
CO3	3		3		2				2	1			1		
CO4	3	3	3	1											
CO5	3		3		2				2		2			3	

UNIT - I

Introduction: Programs and Programming, Programming Languages, Compiler, Interpreter, Loader and Linker, Program Execution, Classification of Programming, Structured Programming Concept, Algorithms, Flowcharts, System Developments.

Fundamentals Algorithms: Exchange the Values between two variables, Counting, Summation of set of numbers, Factorial Computation, Generation of the Fibonacci sequence, Reversing the digits of a integer.

Basics Of C: Introduction**,** Developing Programs in C, A Simple C program, Parts of C Program Revisited.

UNIT – II

Structure of C: Structure of a C Program, Concept of a Variable, Data Types in C, Program Statements, Declaration, Tokens, Operators and Expressions, Type conversion in C.

Input and Output: Introduction, Basic Screen and Keyboard I/O in C, Non-Formatted Input and Output, Formatted Input and Output Function.

Control Statements: Introduction, Specifying Test Condition for Selection and Iteration, Writing Test Expression, Conditional Execution and Selection, Iteration and Repetitive Execution. Nested Loops.

UNIT – III

Arrays And Strings: Introduction, One-Dimensional Array, Strings, Multidimensional Arrays, Arrays of Strings.

Function: Introduction, Concept of Functions, Using Functions, Call by Value Mechanism, Working with Functions, Passing Arrays to Functions, Scope and Extent, Inline Function, Recursion.

UNIT - IV

Factoring Methods: Finding Square root of a Number, The Smallest Deviser of an Interger, The GCD of Two Integers, Generating Prime Numbers.

Pointers – Introduction, Understanding Memory, Address Operator, Pointer, Void Pointer, Null Pointer, Use of pointer, Arrays and Pointers, Pointers and string, Pointers and string, Pointers to pointers, Array of pointers, Pointers to Function, Dynamic Memory Allocation,.

UNIT – V

User-Defined Data Types and Variables: Introduction, User-defined Data Types, Structures, Union, Enumeration Types.

Files in C: Introduction, Using Files in C, Working with text Files, Working with Binary Fields, Direct File Input and Output, Files of Records, Random Access to Files of Records.

TEXT BOOKS:

1.Programming in C, PradipDey, ManasGhosh, Second Edition, OXFORD,
2.How to Slove it by Computer by R.G. Dromey, Pearson.

REFERENCES:

1.Programming in C and Data Structures, Jeri R. Hanly, Elliot B. Koffman, Ashok Kamthane and A.AnandaRao, Pearson Education.
2.Value Range analysis of C programs by simon, Axel by New Age InternationalPublishers.
3C Programming with problem solving, J.A. Jones & K. Harrow, dreamtech Press
4Programming In C, RemmaTeraja, Second Edition OXFORD.
5 Programming in C – Stephen G. Kochan, III Edition, PearsonEductaion.
6 C for Engineers and Scientists, H.Cheng, Mc.Graw-Hill International Edition Education / PHI
7.C Programming & Data Structures,E.Balagurusamy,TMH.

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15A02204: Basic Electrical Engineering

Objective:

Basic Electrical Engineering contains basic Electrical Laws, Network theorems, AC & DC generators and motors which are widely used in industry are covered and their performance aspects will be studied.

COURSE OUTCOMES
CO1 Able to Predict the behavior of any electrical and magnetic circuits
CO2 Ability to Formulate and solve complex AC, Dc circuits
CO3 Able to Identify the type of electrical machine used for that particular application
CO4 Able to realize the requirement of transformers in transmission and distribution of electric power and other applications.
CO5 Able to perform function on multi-disciplinary teams

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2											2			
CO2			2			2							2		
CO3		3											1		
CO4													1		
CO5						2			2						

UNIT – I INTRODUCTION TO ELECTRICAL ENGINEERING

Ohm‘s Law, Basic Circuit Components, Kirchhoff‘s Laws, Types of Sources, Resistive Networks, Inductive Networks, Capacitive Networks, Series Parallel Circuits, Star Delta and Delta Star Transformation. Principle of AC Voltages, Root Mean Square and Average Values of Alternating Currents and Voltage, Form Factor and Peak Factor, Phasor Representation of Alternating Quantities, The J Operator and Phasor Algebra, Analysis of Ac Circuits With Single Basic Network Element, Single Phase Series and Parallel Circuits.

UNIT- II NETWORK THEOREMS & TWO PORT NETWORKS

Network Theorems: Thevenin‘s, Norton‘s, Maximum Power Transfer and Millman‘s Theorems for DC and Sinusoidal Excitations. Tellegen‘s, Superposition, Reciprocity and Compensation Theorems for DC And Sinusoidal Excitations.

Two Port Networks: Two Port Network Parameters – Impedance, Admittance, Transmission and Hybrid Parameters and Their Relations. Concept of Transformed Network - Two Port Network Parameters Using Transformed Variables.

UNIT-III DC MACHINES

DC Generators: Principle of Operation, Constructional details, Types of DC Generators, E.M.F Equation, DC Generator characteristics and Applications.
DC Motors:Principle of Operation of DC Motors, Types of DC Motors, Torque Equation, Losses and Efficiency Calculation in DC Motor- Swinburne's Test and Applications.

UNIT-IV AC MACHINES
Transformers: Principles of Operation, EMF equation, Losses and Efficiency, Regulation of Transformer, Testing: OC & SC Tests.
Three Phase Induction Motors: Principle of Operation, Slip and Rotor Frequency, Slip- Torque characteristics (Problems).
Alternators: Principle of operation, EMF equation, Regulation of alternator by Synchronous Impedance method.

UNIT V MEASURING INSTRUMENTS
Introduction, Classification of Instruments, Operating Principles, Essential Features of Measuring Instruments, Moving Coil Permanent Magnet (PMMC) And Moving Iron Instruments (Voltmeters And Ammeters)- Extension of Range of the Meters.

TEXT BOOKS:
1. Basic Electrical Engineering - By M.S.Naidu and S. Kamakshiah – TMH.
2. Basic Electrical Engineering –By T.K.Nagasarkar and M.S. Sukhija Oxford University Press.
3. Electrical and Electronic Technology-By Hughes – Pearson Education.
REFERENCES:
1. Theory and Problems of Basic Electrical Engineering by D.P.Kothari& I.J. Nagrath PHI.
2. Principles of Electrical Engineering by V.K Mehta, S.Chand Publications.
3. Fundamentals of Electrical Electronics Engineering by T.Thyagarajan, SCITECH Publications5th Edition-2007

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15A51202: Mathematical Methods

Objectives:

- This course aims at providing the student with the concepts of Matrices, NumericalTechniques and Curve fitting.

COURSE OUTCOMES	
CO1	Acquire basic knowledge in matrices , solving given system of equation, fitting curves to the experimental data , finding solution of the given differential equation using numerical methods
CO2	Develop skills in problem solving of interpolation, Algebraic and transcendental equations , finding solution of differentiation and integration numerically
CO3	Develop skills in designing mathematical models involving Fitting geometrical curves to the given data, Solving differential equations, Constructing polynomials to the given data and drawing inferences.
CO4	Develop analytical skills in providing solutions for complex problems involving Systems of linear equations, Derivatives and integrals, Ordinary differential equations
CO5	Applications of linear algebra and numerical methods to solve engineering problems

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1				1			2	1			3		
CO2	1	3				1			2	2			3		
CO3	1	3	2			1			2	2			3		
CO4	1	1	1	3		1			2	1			3		
CO5	1	1	1	1		1			2	1			2		

UNIT – I

Elementary row transformations-Rank – Echelon form, normal form – Consistency of System of Linear equations. Linear transformations. Hermitian, Skew-Hermitian and Unitary matrices and their properties. Eigen Values, Eigen vectors for both real and complex matrices. Cayley – Hamilton Theorem and its applications – Diagonolization of matrix. Calculation of powers of matrix and inverse of a matrix. Quadratic forms – Reduction of quadratic form to canonical formand their nature.

UNIT – II

Solution of Algebraic and Transcendental Equations: The Bisection Method – The Method of False Position– Newton-Raphson Method, Solution of linear simultaneous equation: Crout‘striangularisation method, Gauss - Seidal iteration method.

UNIT – III

Interpolation: Newton‘s forward and backward interpolation formulae – Lagrange‘s formulae. Gauss forward and backward formula, Stirling‘s formula, Bessel‘s formula.

UNIT – IV

Curve fitting: Fitting of a straight line – Second degree curve – Exponentional curve-Power curve by method of least squares. Numerical Differentiation for Newton‘s interpolation formula. Numerical Integration: Trapezoidal rule – Simpson‘s 1/3 Rule – Simpson‘s 3/8 Rule.

UNIT – V

Numerical solution of Ordinary Differential equations: Solution by Taylor‘s series Picard‘s Method of successive Approximations-Euler‘s Method-Runge-Kutta Methods. Numerical solutions of Laplace equation using finite difference approximation.

TEXT BOOKS:

1.Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2.Introductory Methods of Numerical Analysis, S.S. Sastry, PHI publisher.

REFERENCES:

1.Engineering Mathematics, Volume - II, E. Rukmangadachari Pearson Publisher.
2.Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S. Chand publication.
3.Higher Engineering Mathematics, by B.V.Ramana, McGraw Hill publishers.
4.Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.

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15A05202:Computer Programming Lab
(Common to All Branches)

Course Objective

- To work with the compound data types
- To explore dynamic memory allocation concepts
- Able to design the flowchart and algorithm for real world problems
- Able to write C programs for real world problems using simple and compound data types
- Employee good programming style, standards and practices during program development

COURSE OUTCOMES	
CO1	Translate algorithms in to programs
CO2	Code and debug programs in C program language using various constructs.
CO3	Formulate problems and implement algorithms in C.
CO4	Able to use different data types in a computer program
CO5	Implement C programming by using various control structures.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1				3				1			3		3		
CO2		3	3		2									2	
CO3		3	3	3	2		1		2	1			3		
CO4		3									3				
CO5		3	3	3		2			2		3		3	2	

Week-1

1) Write a C program to make the following exchange between the variables a-> b -> c->d - > a
2) Write a C program to carry out the arithmetic operations addition, subtraction,multiplication, and division between two variables
3) Write a C program for printing prime numbers between 1 and n.

Week-2

1) Write a C program to construct a multiplication table for a given number.
2) Write a program to reverse the digit of a given integer.
3) Write a C program to find the sum of individual digits of a positive integer.
4) Write a C program to calculate the factorial of a given number

Week-3

1) Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in thesequence. Write a C program to generate the first n terms of the sequence.
2) Write a program to calculate tax, given the following conditions:
   a) If income is less than 1,50,000 then no tax.
   b) If taxable income is in the range 1,50,001 – 300,000 then charge 10% tax
   c) If taxable income is in the range 3,00,001 – 500,000 then charge 20% tax

If taxable income is above 5,00,001 then charge 30% tax

Week-4

1) Write a program to print the calendar for a month given the first Week- day of the month.

Input the first day of the month (Sun=0,Mon=1,Tue=2,Wed=3,.....) :: 3

Total number of days in the month : 31

Expected output

Sun	Mon	Tue	Wed	Thu	Fri	Sat
-	-	-	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
25	26	27	28	29	30	31

2) Write a C program to find the roots of a quadratic equation

Week-5

1)
Write a program to print the Pascal triangle for a given number

2)
Write a C program to find the GCD (greatest common divisor) of two given integers

3)
Write a C program to construct a pyramid of numbers.

4)
Write C code to define a function cash_dispense, which takes an amount as its input, and returns the number of 1000, 500, 100, 50, 20, 10, 5, 2, 1 rupee denomination that make up the given amount

Week-6

1)
Write C code to reverse the contents of the array. For example, [1,2,3,4,5] should become [5,4,3,2,1]

2)
Write a C program that uses functions to perform the following:
i) Addition of Two Matrices
ii) Multiplication of Two Matrices

3)
Write a program that will search and find out the position where the given key element exist in a user chosen array and print it as output.

Week-7

1)
Write C code to compute the frequency table of survey responses given by 20 users. The survey responses range from 1 to 5 and are stored in an array. For example, 10 responses are stored in the array [1,1,5,2,3,3,5,5,2,2]. The frequency table will be as shown below:

a. 1 = 2
b. 2 = 3
c. 3 = 2

d. 4 = 0
e. 5 = 3

2)
Write a program to define a function to sort an array of integers in ascending order by using exchange sort.

Week-8

1)
Write a C program to check whether a given string is a palindrome or not, without using any built-in functions.

2)
Write a C program to determine if the given string is a palindrome or not by using string functions.

3)
Write a function that accepts a string and delete the first character.

4)
Write a function that accepts a string and delete all the leading spaces

Week-9 Write a program to accept a string from user and display number of vowels, consonants, digits and special characters present in each of the words of the given string.

Week-10 1) Write a C program to define a union and structure both having exactly the same numbers using the sizeof operators print the sizeof structure variables as well as union variable

3) Declare a structure time that has three fields hr, min, secs. Create two variables, start_time and end_time. Input there values from the user. Then while start_time is not equal to end_time display GOOD DAY on screen.

Week-11

1) Write a program to read in an array of names and to sort them in alphabetical order. Use sort function that receives pointers to the functions strcmp, and swap, sort in turn should call these functions via the pointers.
2) Write a program to read and display values of an integer array. Allocate space dynamically for the array using the malloc().
3) Write a program to calculate area of a triangle using function that has the input parameters as pointers as sides of the triangle.

Week-12

1) Two text files are given with the names text1 and text2. These files have several lines of text. Write a program to merge (first line of text1 followed by first line of text2 and so on until both the files reach the end of the file) the lines of text1 and text2 and writethe merged text to a new file text3.

Write a program to split a given text file into n parts. Name each part as the name of the original file followed by .part<**n**> where n is the sequence number of the part file.

Reference Books:

1. Computer Science, A Structured Programming Approach Using C by Behrouz A. Forouzan& Richard F. Gilberg, Third Edition, Cengage Learning
2. C Programming A Problem-Solving Approach, Behrouz A. Forouzan& E.V. Prasad, F. Gilberg, Third Edition, Cengage Learning
3. Programming with C RemaTheraja, Oxford
4. C Test Your Skills‖, Kamthane, Pearson Education
5. Programming in C: A Practical Approach, Ajay Mittal, Pearson
6. **Programming withc, Byron S Gottfried, Jitender Kumar Chhabra, TMH, 2011.**

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I B.Tech.-II SEM

L	P	C
0	4	2

15A53202:Applied Chemistry Lab

The experiments are designed in a manner that the students can validate their own theory understanding in chemistry by self involvement and practical execution. Thus the execution of these experiments by the student will reinforce his/her understanding of the subject and also provide opportunity to refine their understanding of conceptual aspects. As a result, the student gets an opportunity to have feel good factor at the laboratory bench about the chemical principles that he/she learned in the classroom.

Program Objective:

- Will learn practical understanding of the redox reaction
- Will able to understand the function of fuel cells, batteries and extend the knowledge to the processes of corrosion and its prevention
- Will learn the preparation and properties of synthetic polymers and other material that would provide sufficient impetus to engineer these to suit diverse applications
- Will also learn the hygiene aspects of water would be in a position to design methods to produce potable water using modern technology

COURSE OUTCOMES	
CO1	Would be confident in handling energy storage systems and would be able combat chemical corrosion
CO2	Would have acquired the practical skill to handle the analytical methods with confidence.
CO3	Would feel comfortable to think of design materials with the requisite properties
CO4	Would be in a position to technically address the water related problems.
CO5	Determine viscosity , PH, acidity,corrosion of water

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		2		2	2		2		1		2		
CO2	3	2		2		2	2		2		1		2		
CO3	3	3		2		2	2		2		1		2		
CO4	3	2		2		2	2		2		1		2		
	3	2		2		2	2		2		1		2		

LIST OF EXPERIMENTS

1. Determination of total hardness of water by EDTA method.
2. Determination of Copper by EDTA method.
3. Estimation of Dissolved Oxygen by Winkler‘s method
4. Determination of Copper by Iodometry
5. Estimation of iron (II) using diphenylamine indicator (Dichrometry – Internal indicator method).
6. Determination of Alkalinity of Water
7. Determination of acidity of Water
8. Preparation of Phenol-Formaldehyde (Bakelite)
9. Determination of Viscosity of oils using Redwood Viscometer I
10. Determination of Viscosity of oils using Redwood Viscometer II
11. Conductometric titration of strong acid Vs strong base (Neutralization titration).
12. Conductometric titration of Barium Chloride vs Sodium Sulphate (Precipitation Titration)
13. Determination of Corrosion rate and inhibition efficiency of an inhibitor for mild steel in hydrochloric acid medium.
14. Estimation of Chloride ion using potassium Chromite indicator (Mohrs method)

(Any 10 experiments from the above list)

Text Books:

1.Vogel‘s Text book of Quantitative Chemical Analysis, Sixth Edition – J. Mendham et al,Pearson Education.
2. Chemistry Practical – Lab Manual by Chandra Sekhar, GV Subba Reddy and Jayaveera.
3. Engineering Chemistry by KNJayaveera, GVSubba Reddy and C. Ramachandraiah,McGraw Hill Higher Education, Foruth Edition, New Delhi
4. A Text book of Engineering Chemistry by SS Dhara, S. Chand Publications, New Delhi

REFERENCES:

1. A Text Book of Enigneering Chemistry, Jain and Jain, DhanapathiRai Publications,New Delhi
2. Engineering Chemistry by K.B.ChandraSekhar, UN.Das and Sujatha Mishra,SCITECH Pubblications India Pvt Limited.
3. Concepts of Engineering Chemistry- AshimaSrivastavaf and N.N. Janhavi
4. Text Book of Engineering Chemistry – C. Parameswara Murthy, C.V.Agarwal andAndra Naidu
5. Chemistry of Engineering Materials, C.V.Agarwal, C.Parameswaramurthy andAndranaidu
6. Text Book of Engineering Chemistry, Shashichawla, Dhanapathirai Publications.

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B.Tech. II – I Sem. (C.S.E)

L	P	C
4	0	4

15A54301:Managerial Economics And Financial Analysis

Course Objectives: The objective of this course is to equip the student with the basic inputs of Managerial Economics and Economic Environment of business and to impart analytical skills in helping them take sound financial decisions for achieving higher organizational productivity.

COURSE OUTCOMES	
CO1	Capable of analyzing fundamentals of Economics such as Demand, Elasticity & Forecasting methods
CO2	To apply production, pricing & supply concepts for effective business administration
CO3	Students can able to identify the influence of various markets, the forms of business organization and its International Economic Environment.
CO4	Analyze how to invest adequate amount of capital in order to get maximum return from selected business activity.
CO5	Prepare and analyze accounting statements like income & expenditure statement, balance sheet apart from the fundamental knowledge, to understand financial performance of the business and to initiate the appropriate decisions to run the business profitably.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1							1								
CO2								1							
CO3										1					
CO4											2				
CO5											2				

Unit I: INTRODUCTION TO MANAGERIAL ECONOMICS

Managerial Economics – Definition- Nature- Scope - Contemporary importance of Managerial Economics - Demand Analysis: Concept of Demand-Demand Function - Law of Demand - Elasticity of Demand- Significance - Types of Elasticity - Measurement of elasticity of demand - Demand Forecasting- factors governing demand forecasting- methods of demand forecasting - Relationship of Managerial Economics with Financial Accounting and Management.

UNIT II: THEORY OF PRODUCTION AND COST ANALYSIS

Production Function- Least cost combination- Short-run and Long- run production function- Isoquants and Isocosts, MRTS- Cobb-Douglas production function - Laws of returns - Internal and External economies of scale - **Cost Analysis**: Cost concepts and cost behavior- Break-Even Analysis (BEA) - Determination of Break Even Point (Simple Problems)-Managerial significance and limitations of

Break- Even Point.

UNIT III: INTRODUCTION TO MARKETS AND NEW ECONOMIC ENVIRONMENT

Market structures: Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition- Monopoly-Monopolistic Competition-Oligopoly-Price-Output Determination - Pricing Methods and Strategies-Forms of Business Organizations- Sole Proprietorship- Partnership – Joint Stock Companies - Public Sector Enterprises – New Economic Environment- Economic Liberalization – Privatization - Globalization.

UNIT IV: CAPITAL AND CAPITAL BUDGETING

Concept of Capital - Over and Undercapitalization – Remedial Measures - Sources of Shot term and Long term Capital - Estimating Working Capital Requirements – Capital Budgeting – Features of Capital Budgeting Proposals – Methods and Evaluation of Capital Budgeting Projects – Pay Back Method – Accounting Rate of Return (ARR) – Net Present Value (NPV) – Internal Rate Return (IRR) Method (simple problems)

UNIT V: INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS

Financial Accounting – Concept - Emerging need and Importance - Double-Entry Book Keeping- Journal - Ledger – Trial Balance - Financial Statements - Trading Account – Profit & Loss Account – Balance Sheet (with simple adjustments). Financial Analysis – Ratios – Liquidity, Leverage, Profitability, and Activity Ratios (simple problems).

The students are required to submit any one of the following- two assignments/ a mini project/submission of any two case studies in the subject.

Learning Outcome: After completion of this course, the student will able to understand various aspects of Managerial Economics and analysis of financial statements and inputs therein will help them to make sound and effective decisions under different economic environment and market situations.

TEXT BOOKS:

1.Varshney&Maheswari: Managerial Economics, Sultan Chand, 2013.
2.Ahuja H.L Managerial economics.S.Chand, 3/e, 20133.

REFERENCES:

1.Aryasri: Managerial Economics and Financial Analysis, 4/e, TMH, 2013
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International,. 2013.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, NewDelhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage,2013.

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B.Tech. II – I Sem. (C.S.E)

L	P	C
4	0	4

15A51303:Probability And Statistics
(for CSE)

Objectives: To help the students in getting a thorough understanding of the fundamentals of probability and usage of statistical techniques like testing of hypothesis, Statistical Quality Control and Queuing theory

Course Outcomes	
CO1	Acquire basic knowledge in Probability distributions, correlation and regressions Statistical quality control and testing of hypotheses
CO2	Develop skills for analyzing the data with Mathematical Expectations for realistic results
CO3	Develop skills in designing Probability distributions Limitations of statistical quality control
CO4	Develop analytical skills for solving problems involving Probability distributions, means, variances and standard deviations
CO5	Use relevant probability and statistical techniques for

Mapping of COs with POs and PSOs

	PO1	PO2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	3	1				1			2	1			3		
CO2	1	3				1			2	2			3		
CO3	1	3	2			1			2	2			3		
CO4	1	1	1	3		1			2	1			3		
CO5	1	1	1	1		1			2	1			2		

UNIT – I

Basic concepts of Probability – Random variables – Expectation – Discrete and continuous Distributions – Distribution functions. Binomial and poison distributions Normal distribution – Related properties.

UNIT – II

Test of Hypothesis: Population and Sample - Confidence interval of mean from Normal distribution - Statistical hypothesis - Null and Alternative hypothesis - Level of significance. Test of significance - Test based on normal distribution - Z test for means and proportions.

UNIT – III

Small samples - t- test for one sample and two sample problem and paired t-test, F-test and Chi- square test (testing of goodness of fit and independence).

UNIT – IV

Statistical Quality Control: Concept of quality of a manufactured product -Defects and Defectives - Causes of variations - Random and assignable - The principle of Shewhart Control Chart-Charts for attribute and variable quality characteristics- Constructions and operation of $\bar{X}$

- Chart, R-Chart,

p - Chart and C-Chart.

UNIT – V

Queuing Theory: Pure Birth and Death process, M/M/1 & M/M/S & their related simple problems.

TEXT BOOKS:

1. Probability & Statistics by E. Rukmangadachari& E. Keshava Reddy, Pearson Publisher.
2. Probability & Statistics for engineers by Dr. J. Ravichandran WILEY-INDIA publishers.

REFERENCES:

1. Probability & Statistics by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S.Chand publications.
2. Statistical methods by S.P. Gupta, S.Chand publications.
3. Probability & Statistics for Science and Engineering by G.ShankerRao, UniversitiesPress.
4. Probability and Statistics for Engineering and Sciences by Jay L.Devore, CENGAGE.
5. Probability and Statistics by R.A. Jhonson and Gupta C.B.

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L	P	C
4	0	4

15A05301:Data Structures

Course Outcomes
CO1 Analyze and compare algorithms for efficiency using Big-O notation. able to implement 1D array and multi-dimensional array and the concept of Linked list.
CO2 Able to use Hash tables and understanding the operations and applications of stacks and Queues.
CO3 Formulating new solutions to programming problems using concept of Trees and graphs.
CO4 Evaluating the given problem using the efficient sorting techniques.
CO5 Finding the solution and understanding the concept of search and types of searching techniques

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3											2	
CO2	2												2	
CO3		3	3							3	3			3
CO4		3	3			2					3			3
CO5		3	3			2			2	3	3			3

Unit-1
Introduction and overview: Definition- Terminology- One Dimensional array- Multi Dimensional array- pointer arrays.
Linked lists: Definition- Single linked list- Circular linked list- Double linked list- Circular Double linked list- Application of linked lists.

Unit-2
Stacks: Introduction- Definition- Operations on Stacks-Applications of Stacks.
Queues: Introduction, Definition-Representations of Queues- Various Queue Structures- Applications of Queues.**Tables**: Hash tables.

Unit-3
Trees: Basic Terminologies- Definition and Concepts- Representations of Binary Tree- Operation on a Binary Tree-Types of Binary Trees-Binary Search Tree, Heap Trees, Height Balanced Trees, AVL Trees, Red Black Trees.
Graphs: Introduction- Graph terminologies- Representation of graphs- Operations on Graphs- Application of Graph Structures: Shortest path problem- topological sorting.

Unit-4
Sorting : Sorting Techniques- Sorting by Insertion: Straight Insertion sort- List insertion sort- Binary insertion sort- Sorting by selection: Straight selection sort- Heap Sort- Selection Sort Efficiency- Insertion Sorts: Straight

Insertion Sort- Shell Sort- Insertion Sort Efficiency. Exchange Sort: Bubble Sort- Quick Sort- Exchange Sort Efficiency. External Sorts: Merging Order Files-Merging Unorder Files- Sorting Process.

Unit-5

Searching: List Searches- Sequential Search- Variations on Sequential Searches- Binary Search- Analyzing Search Algorithm- Hashed List Searches- Basic Concepts- Hashing Methods- Collision Resolutions- Open Addressing- Linked List Collision Resolution- Bucket Hashing- - B-Trees-Operations on a B Tree.

Text Books:

1. Classic Data Structures‖, Second Edition by DebasisSamanta, PHI. (Units 1,2,3)
2. Data Structures A Pseudo code Approach with C‖, Second Edition by Richard F. Gilberg, Behrouz A. Forouzan, Cengage Learning. (Units 4,5)

Reference Books:

1. Fundamentals of Data Structures in C – Horowitz, Sahni, Anderson-Freed, Universities Press,Second Edition.
2. Schaum‘ Outlines – Data Structures – Seymour Lipschutz – McGrawHill- Revised FirstEdition.

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B.Tech. II – I Sem. (C.S.E) **L P C**
4 0 4

15A04302: Electrical devices and Circuits
(Common to EEE & CSE Engg.)

Learning Outcomes:
Students will:

1. Able to identify schematic symbols and understand the working principles of electronic devices e.g. Diode, Zener Diode, LED, BJT, JFET and MOSFET etc.
2. Learn how the primitives of Boolean algebra are used to describe the processing of binary signals and to use electronic components such as MOSFET's as building blocks in electronically implementing binary functions;
3. Characterize semiconductors, diodes, transistors and operational amplifiers
4. Design simple analog circuits

Course Outcomes	
CO1	Analyze the operating principles of major electronic devices, its characteristics and applications.
CO2	Recognize the different internal structure of PN junction including different types.
CO3	Design and analyze the DC bias circuitry of BJT and FET.
CO4	Design and analyze basic transistor amplifier circuits using BJT and FET

Mapping of COs to POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2												2		
CO2		2													
CO3				3										2	
CO4				2										2	

UNIT- I
Junction Diode Characteristics :Open circuited p-n junction, Biased p-n junction, p-n junction diode,

current components in PN junction Diode, diode equation,V-I Characteristics, temperature dependence on V-I characteristics, Diode resistance, Diode capacitance, energy band diagram of PN junction Diode. Special Semiconductor Diodes:Zener Diode, Breakdown mechanisms, Zener diode applications, LED, LCD, Photo diode, Varactor diode, Tunnel Diode, DIAC, TRIAC, SCR, UJT. Construction, operation and characteristics of all the diodes is required to be considered.

UNIT- II

Rectifiers and Filters:Basic Rectifier setup**,** half wave rectifier, full wave rectifier, bridge rectifier, derivations of characteristics of rectifiers, rectifier circuits-operation, input and output waveforms, Filters, Inductor filter, Capacitor filter, L- section filter, □- section filter, Multiple L- section and Multiple □ section filter ,comparison of various filter circuits in terms of ripple factors.

UNIT- III

Transistor Characteristics: BJT- Junction transistor, transistor current components, transistor equation, transistor configurations, transistor as an amplifier, characteristics of transistor in Common Base, Common Emitter and Common Collector configurations,Ebers-Moll model of a transistor, punch through/ reach through, Photo transistor, typical transistor junction voltage values.
FET- FETtypes, construction, operation, characteristics, parameters, MOSFET-types, construction, operation, characteristics, comparison between JFET and MOSFET.

UNIT- IV

Transistor Biasing and Thermal Stabilization :Need for biasing, operating point, load line analysis, BJT biasing- methods, basic stability, fixed bias, collector to base bias, self bias, Stabilization against variations in V_{BE},Ic, and β, Stability factors, (S, S', S''), Bias compensation, Thermal runaway, Thermal stability.

FET Biasing- methods and stabilization.

UNIT- V

Small Signal Low Frequency Transistor Amplifier Models:
BJT -Two port network, Transistor hybrid model, determination of h-parameters, conversion of h-parameters, generalized analysis of transistor amplifier model using h-parameters, Analysis of CB, CE and CC amplifiers using exact and approximate analysis, Comparison of transistor amplifiers.
FET: Generalized analysis of small signal model, Analysis of CG, CS and CD amplifiers, comparison of FET amplifiers.

Text Books:

1.J. Millman, C. Halkias, –Electronic Devices and Circuits‖, TataMc-Graw Hill, Second Edition,2010.
2.David A.Bell, –Electronic Devices and Circuits‖, Fifth Edition, Oxford University Press, 2009.
3.Salivahanan, Kumar, Vallavaraj, –Electronic Devices and Circuits‖, Tata Mc-Graw Hill, Second Edition

References:

1.Jacob Millman, C. Halkies, C.D.Parikh, –Integrated Electronics‖, Tata Mc-Graw Hill, 2009.
2.R.L. Boylestad and Louis Nashelsky,―Electronic Devices and Circuits‖,PearsonPublications,,9thEdition,2006.
3.BV Rao, KBR Murty, K Raja Rajeswari, PCR Pantulu, –Electronic Devices and Circuits‖, Pearson, 2nd edition.

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II YEAR B.Tech ISem	L	P	C
	4	0	4

15A04307: Digital Logic Design

Course Objective

- Ability to interpret, convert and represent different number systems and binary arithmetic.
- Acquire the skills to manipulate and examine Boolean algebra, logical operations, Boolean functions and their simplifications.
- Get familiarized with fundamental principles of digital design.
- Aquatinted with classical hardware design for both combinational and sequential logic circuits.
- To design different units of a digital computer.

Course Outcomes:
CO1 Able to interpret, convert and represent different number systems and binary arithmetic.
CO2 Able to design sequential and combinational circuits.
CO3 Able to design different units of a digital computer
CO4 Analyze and design modular combinatorial logic circuits containing decoders, multiplexers, demultiplexers, 7-segments display decoders and adders.
CO5 Use the functionality of flip-flops for analysis and design of sequential circuits.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2										2	3	3		
CO2			3									3		3	
CO3	2		3								2		3	3	
CO4		3	3		2								3	3	
CO5		3	3			1						3		3	

Unit - I :

Binary Systems: Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Compliments, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, Binary Logic.

Boolean Algebra And Logic Gates: Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates, Integrated Circuits

Unit – II:

Gate – Level Minimization: The Map Method, Four Variable Map, Five-Variable Map, Product of Sums Simplification, Don‘t-Care Conditions, NAND and NOR Implementation, Other Two Level Implementations, EX-OR Function, Other Minimization Methods

Unit – III :

Combinational Logic: Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers

Unit – IV :

Synchronous Sequential Logic: Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Design Procedure, Registers, Shift Registers, Ripple Counters, Synchronous Counters, Other counters

Unit – V :

Memory And Programmable Logic: Random access memory, memory decoding, Error Detection and Correction, Read-only Memory, Programmable Logic Array, Programmable ArrayLogic.

Digital Logic Circuits: RTL and DTL Circuits,Transistor-Transistor Logic (TTL), Emitter- Coupled Logic (ECL), MOS, CMOS Logic, Comparisons of Logic Families

Text Books :

1. Digital Design, M.Morris Mano &Micheal D. Ciletti, Pearson, 5th Edition, 2013.
2. Digital Logic & State Machine Design, David J. Comer, Oxford University Press, 3rd Reprinted Indian Edition, 2012

Reference Books :

1. Digital Logic Design, R.D. Sudhakar Samuel, Elsevier
2. Fundamentals of Logic Design, 5/e, Roth, Cengage
3. Switching and Finite Automata Theory,3/e,Kohavi, Jha, Cambridge.
4. Digital Logic Design, Leach, Malvino, Saha,TMH
5. Modern Digital Electronics, R.P. Jain, TMH

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B.Tech. II – I Sem. (C.S.E)	L	P	C
	4	0	4

15A05302:Discrete Mathematics

Course Objective

- Apply logical reasoning to solve a variety of problems.
- Understand and apply methods of discrete mathematics such as proofs, counting principles, number theory, logic and set theory to mathematical problems in a creative way.
- To apply the abstract concepts of graph theory in modelling and solving non-trivial problems in different fields of study.

Course Outcomes

- Able to apply mathematical concepts and logical reasoning to solve problems in different fields of Computer science and information technology.
- Able to apply the concepts in courses like Computer Organization, DBMS, Analysis of Algorithms, Theoretical Computer Science, Cryptography, Artificial Intelligence.

CO1	Able to apply mathematical concepts and logical reasoning to solve problems in different fields of Computer science and information technology.
CO2	Able to apply the concepts in courses like Computer Organization, DBMS, Analysis of Algorithms, Theoretical Computer Science, Cryptography, Artificial Intelligence
CO3	Demonstrate different traversal methods for trees and graphs.
CO4	Apply counting principles to determine probabilities.
CO5	Demonstrate and understanding of relations and functions and be able to determine their properties.

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3								2		3		
CO2	3		3								2	1	3		
CO3	3	2	3			1							3	3	
CO4	3	2	3										3		
CO5	3		3							1			3	3	

Unit-I:

The Language of Logic: Propositions, Logical Equivalences, Quantifiers, Arguments, ProofMethods.

The Language of Sets: The Concepts of a Set, Operations with Sets, Computer Operations with Sets, The Cardinality of a Set, Recursively Defined Sets.

Functions: The concept of Functions, Special Functions, Properties of Functions, The Pigeonhole principle, Composite Functions, Sequences and the Summation Notation.

Unit – II:

Relations: Boolean Matrices, Relations and Digraphs, Computer Representations of Relations, Properties of Relations, Operations on Relations, Transitive Closure, Equivalence Relations, Partial and Total Ordering.

Lattices & Boolean Algebra: Lattices as Partially Ordered Sets, Properties of Lattices, Lattices as Algebraic Systems, Sub lattices, Direct Product and Homomorphism, Boolean Algebra, Boolean Functions.

Unit –III:

Algebraic Structures: Algebraic Systems,Semigroups and Monoids, Groups, Subgroups and Homomorphism‘s, Normal Subgroups.

Combinatorics: The Fundamental Counting Principles, Permutations, Derangements, Combinations, Permutations and Combinations with Repetitions, The Binomial Theorem, The Generalized Inclusion- Exclusion Principle.

Unit-IV:

Induction and Algorithms: The Division Algorithm, Divisibility Properties, Nondecimal Bases, Mathematical Induction, Algorithm Correctness, The Growth Functions, Complexity of Algorithms.

Recursion: Recursively Defined Functions, Solving Recurrence Relations, Generating Functions, Recursive Algorithms, Correctness of Recursive Algorithms, Complexities of Recursive Algorithms.

Unit – V :

Graphs: Computer Representation of Graphs, Isomorphic Graphs, Paths, Cycles, and Circuits, Eulerian and Hamiltonial Graphs, Planar Graphs, Graph Coloring, Digraphs, Dags, Weighted Digraphs, DFS and BFS Algorithms.

Trees: Trees, Spanning Trees, Minimal Spanning Trees,Kruskal‘s and Prim‘s Algorithm, Rooted Trees, Binary Trees, and Binary Search Trees.

Text Books:

1. Discrete Mathematics with Applications, Thomas Koshy, Elsevier Academic Press.
2. Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblayand R. Manohar, TMH

Reference Books:

1. Discrete and Combinatorial Mathematics, Fifth Edition, R. P. Grimaldi, B.V. Ramana, Pearson
2. Discrete Mathematics Theory and Applications, D.S Malik and M.K. Sen, Cengage Learning
3. J .L.Mott, A.Kandel, T.P .Baker, Discrete Mathematics for Computer Scientists and Mathematicians, second edition 1986, Prentice Hall of India
4. C.L.Liu, Elements of Discrete Mathematics, Second Edition 1985, McGraw-Hill Book Company. Reprinted 2000
5. Discrete Mathematics, Norman L. Biggs, Second Edition, OXFORD Indian Edition.
6. K.H.Rosen, Discrete Mathematics and applications, 5th Edition 2003, TataMcGrawHillpublishingCompany
7.Graph Theory with Applications to Engineering & Computer Science: NarsinghDeo, PHI(2004)
8.Discrete Mathematical Structures‖ JayantGanguly, Sanguine

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15A05303:Data Structures Using C++ Lab

Course Objective:

1. Arm the students with the basic programming concepts.
2. Arm the students with the necessary constructs of C++ programming.
3. Choose the appropriate data structure and algorithm design method for a specifiedapplication.
4. To Gain knowledge in practical applications of data structures.

Course Outcomes	
CO1	Be able to design and analyze the time and space efficiency of the data structure ·
CO2	Be capable to identity the appropriate data structure for given problem
CO3	Ability to summarize searching and sorting techniques
CO4	Ability to describe stack, queue and linked list operation.
CO5	Ability to have knowledge of tree and graphs concepts.

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3				3		3		3	2			
CO2	3		3		3		3		3		3				
CO3			3		3		3		3		3	2			
CO4	3		3		3		3		3		3				
CO5	3		3		3		3		3		3				

List of Experiments:**Week 1**

1. Write a C++ program to implement class and access the class member and memberfunctions.
2. Write a C++ program to implement nested classes.
3. Write a C++ program to find area or triangle, area of square and area of cube usingfunction overloading.

Week 2

1. Write a C++ program to implement Complex number addition using copy constructor.
2. Write a C++ program to implement Complex number multiplication using copy constructor.
3. Design, develop, and execute a program in C++ to create a class called STRING and implement the

following operations. Display the results after every operation by overloading the operator <<.

i. STRING s1 = ‒JNTU‖

ii. STRING s2 = ‒ANANTHAPURAMU‖ STIRNG s3 = s1 + s2; (Use copy constructor)

Week 3

1. Design, develop, and execute a program in C++ based on the following requirements: An EMPLOYEE class is to contain the following data members and member functions: Data members: Employee_Number (an integer), Employee_Name (a string of characters), Basic_Salary (an integer) ,All_Allowances (an integer), IT (an integer), Net_Salary (an integer). Member functions: to read the data of an employee, to calculate Net_Salary and to print the values of all the data members. (All_Allowances = 123% of Basic; Income Tax (IT) = 30% of the gross salary (= basic_Salary _ All_Allowance); Net_Salary = Basic_Salary + All_Allowances – IT).

Week 4

1. Write a C++ program to create a class called matrix using a two dimensional array of integers. Implement the following operations by overloading the operator == which checks comparability of two matrices. And perform addition and subtraction by overloading the operator + & - respectively.

Week 5

1. Design, develop, and execute a program in C++ to create a class called STACK using an array of integers and to implement the following operations by overloading the operators
   + and - :
   i. s1=s1 + element; where s1 is an object of the class STACK and element is an integer to be pushed on to top of the stack.
   ii. s1=s1- ; where s1 is an object of the class STACK and – operator pops off the top element. Handle the STACK Empty and STACK Full conditions. Also display the contents of the stack after each operation, by overloading the operator <<.

Week 6

1. Write a C++ program to convert an infix expression into postfix expression.
2. Write a C++ program to evaluation postfix expression.

Week 7

1. Write a C++ Program to Implement Queue using arrays and Linked list.
2. Write a C++ Program to Implement Circular Queue.

Week 8

1. Write a C++ Program to Implement Ordered Doubly Linked list.
2. Write a C++ Program to Implement Double Ended Queue.

Week 9

1. Write a C++ Program to Implement Binary Search Tree Insertion, Searching andDeletion.

Week 10

1. Write a C++ Program to Implement Binary Search Tree Traverses using recursive andnon recursive.

Week 11

1. Write a C++ Program to Implement AVL Insertion.

Week 12

1. Write a Program to Sort the set of elements by using
   i). Quick Sort iii). Merge Sort.

Text Books:

1. Data structures and Algorithms using C++, AnandaRaoAkepogu and RadhikaRajuPalagiri, Pearson Education.
2. C++ Solutions for Mathematical Problems, Ghosh, Arun, New Age InternationalPublishers.
3. Data Structures A Pseudocode Approach with C++, IndiaEdition, R.F.GilbergandB.A.Forouzan,Cengage Learning.
4. Programming Principles and Practice using C++,B.Stroustrup,Addison-Wesley(Pearsoneducation).
5. Data Structures and STL, W.J.Collins,McGrawHill,International edition.
6. Data structures and Algorithms with OODesign patterns inC++,B.R.Priess,John Wiley&sons.
7. The Art,Philosophy, and Science of OOP with C++,RickMiller,SPD.
8. C++ for Programmers,P.J.Deitel and H.M.Deitel,PHI/Pearson

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B.Tech. II – I Sem. (C.S.E) **L P C**
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15A24302: Electrical And Electronics Engineering Lab

Course Outcomes	
CO1	Experimental verification of theorems.
CO2	Experiments and know their characteristics of DC motors, DC Generators and Transformers.
CO3	Design and analyze the application of diode as rectifiers.
CO4	Measure the h-parameters experimentally.
CO5	Design and construct BJT & FET amplifiers and plot frequency response.

Mapping of COs with Pos

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2			3									2	
CO2	2														
CO3		2		2										2	
CO4			1												
CO5				2									2		

PART- A : ELECTRICAL LAB

1. Verification of Superposition Theorem.
2. Verification of Thevenin‘s Theorem.
3. Open Circuit Characteristics of D.C.Shunt Generator.
4. Swinburne‘s Test on DC Shunt Machine (Predetermination of Efficiency of a Given DC Shunt 5Machine Working as Motor and Generator).
6. Brake Test on DC Shunt Motor. Determination of Performance Characteristics.
7. OC & SC Tests on Single-Phase Transformer (Predetermination of Efficiency and Regulation at Given Power Factors).

BASIC ELECTRONICS LAB
(Common to Mech. Engg. & CSE. Engg.)

Learning Outcomes:
Students will:
1. Able to correctly operate standard electronic test equipment such as oscilloscopes, signal analyzers, digital multi-meters, power supplies, frequency meters
2. Able to correctly analyze a circuit and compare its theoretical performance to actualperformance.
3. Can analyze, design and test Transistor characteristics
4. Can analyze, design and test amplifier circuits

5. Able to apply troubleshooting techniques to test digital circuits

Experiments:(Six Experiments)

1. P-N Junction Diode and Zener Diode Volt-Ampere Characteristics.

2. Half-Wave Rectifier- a) Without Filter b) With Capacitor Filter.

3. Full-Wave Rectifier- a) Without Filter b) With Capacitor Filter.

4. Bipolar Junction Transistor in CE Configuration-Input and Output Characteristics,Computation of β.

5. Junction field effect Transistor in Common Source Configuration Output and TransferCharacteristics.

6. Verification of Logic Gates- AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR

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15A05401:Computer Organization

Course Objective:

- To make the students understand the structure and behavior of various functionalmodules of a computer.
- To explore the memory and I/O organizations in depth
- To study the concepts of pipelining and multiprocessors

COURSE OUTCOMES	
CO1	Demonstrate computer architecture concepts related to design of modern processors, memories and I/Os
CO2	Able to explore the hardware requirements for cache memory and virtual memory
CO3	Ability to design algorithms to exploit pipelining and multiprocessors
CO4	Ability to use memory and I/O devices effectively
CO5	Detect pipeline hazards and identify possible solutions to those hazards

Mapping of CO's with PO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2		3								1		3		
CO2	2											2			
CO3		3	3									2	3	3	
CO4		3											3		
CO5		3	3			2								3	

UNIT I

NUMBER SYSTEMS AND COMPUTER ARITHMETIC- Signed and unsigned numbers, Addition and subtraction, multiplication, division, Floating point representation, logical operation, Gray code, BCD codes, Error detecting codes, Boolean algebra, Simplification of Boolean expressions, K-Maps,Combinational and Sequential Circuits- decoders, Encoders, Multiplexers, Half and Full adders, Shift registers, Sequential circuits- flip-flops.

UNIT II

MEMORY ORGANIZATION-Memory hierarchy, Main memory-RAM, ROM chips,Virtual memory- Memory Management requirements, Memory address map, memory contention to CPU, Associative Memory-Hardware logic, match, read and write logic, Cache Memory-Associative mapping, Direct mapping, Set-associative mapping, hit and miss ratio.

UNIT III

Register Transfer: Register Transfer Language – Register Transfer – Bus and Memory Transfers –Arithmetic

Micro operations – Logic Micro operations – Shift Micro operations.
Control Unit: Control Memory – Address Sequencing – Micro program Example – Design of ControlUnit

UNIT IV
INPUT -OUTPUT ORGANIZATION-Peripheral devices, input-output interface-I/0 Bus and interface modules, I/O versus Memory bus, isolated versus memory mapped I/O, Modes of transfer-Programmed I/O, Interrupt-initiated I/O, priority interrupts-Daisy chaining, parallel priority, interrupt cycle, DMA-
DMA control, DMA transfer, Input output processor-CPU-IOP communication.

UNIT V
PIPELINE AND VECTOR PROCESSING : Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.
MULTI PROCESSORS : Characteristics or Multiprocessors, Interconnection Structures, Interprocessor Arbitration, InterProcessor Communication and Synchronization Cache Coherance,Shared Memory Multiprocessors,Amdahl's Law.

Text Books :

1. Computer Systems Organization and Architecture‖, John D. Carpinelli, PEA, 2009.
2. Computer Systems Architecture‖, 3/e, M. Moris Mano, PEA, 2007

Reference Books :

1. Computer Organization‖, Carl Hamacher, ZvonksVranesic, SafeaZaky, 5/e, MCG, 2002.
2. Computer Organization and Architecture‖, 8/e, William Stallings, PEA, 2010.
3. Computer Systems Architecture a Networking Approach‖, 2/e, Rob Williams.
4. Computer Organization and Architecture‖ Ghoshal, Pearson Education, 2011.
5. Computer Organization and Architecture‖, V. Rajaraman, T. Radakrishnan.
6. Computer Organization and Design‖, P. Pal Chaudhuri, PHI
7. Structured Computer Organization‖, Andrew S. Janenbaum, Todd Austin
8. Computer Architecture‖ Parahmi, Oxford University Press

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15A05402:Data Base Management Systems

Course Objective

To provide the student with clear conceptual understandings related to databases. After this course, the student should gain knowledge in the relational model, SQL, database design, storage& indexing, failure recovery and concurrency control.

	Course Outcomes
CO1	Demonstrate the basic elements of a relational database management system,
CO2	Ability to identify the data models for relevant problems.
CO3	Ability to design entity relationship and convert entity relationship diagrams
	into RDBMS and formulate SQL queries on the respect data.
CO4	Apply normalization for the development of application software.
CO5	Ability to design basic database storage structures and access techniques: file and page organizations, indexing methods including B-tree, and hashing.

Mapping of CO's with PO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3		3		3			3			3		
CO2		2					3		3		2		3	3	3
CO3	3		3	2				1	3	3	2	3		3	3
CO4					3	1	3					3			3
CO5	3	2	3	2	3				3	3		3	3	3	

UNIT I:

The Worlds of Database Systems -The Evolution of Database Systems - Overview of aDatabase Management System - Outline of Database System Studies.

The Entitiy-Relationship Model – Elements of E/R Model – Design Principles – The Modelingof Constraints – Weak Entity Sets.

The Relational Data Model – Basics of the Relational Model – From E/R Diagrams toRelational Designs – Converting Subclass Structures to Relations.

UNIT II:

Functional Dependencies – Rules about Functional Dependencies -- Design of RelationalDatabase Schemas – Multivalued Dependencies.

Relational Algebra and Calculus– Preliminaries, Relational algebra: Selection and Projection , Set Operations, Renaming, Joins, Division, Relational Calculus – Expressive power of Algebra and Calculus.

UNIT III:

The Database Language SQL – Simple Queries in SQL – Queries Involving More than One Relation – Subqueries – Full Relation Operations – Database Modifications – Defining a Relation Schema in SQL – View Definitions, Transactions in SQL – Serializability, Atomicity,Transactions, Readonly Transactions, Dirty Reads, Other isolation levels.

Constraints and Triggers – Keys and Foreign keys – Constraints on Attributes and Tuples,Schema-level Constraints and Triggers.

UNIT IV:

Representing Data Elements – Data Elements and Fields – Records – Representing Block andRecord Addresses – Variable Length Data and Records – Record Modifications.

Index Structures – Indexes on Sequential Files – Secondary Indexes – B-Trees – Hash Tables.

UNIT V:

Coping with System Failures – Issues and Models for Resilient Operation – Undo Logging –Redo Logging – Undo/Redo Logging – Protecting Against Media Failures.

Concurrency Control – Serial and Serializable Schedules – Conflict Serializability – Enforcing Serializability by Locks – Locking Systems with Several Lock Modes -- Concurrency Control by Timestamps – Concurrency Control by Validation.

Text Book:

1.Database Systems, The Complete Book‖, Hector Garcia-Molina, Jeffrey D. Ullman and Jennifer Widom,6th impression, Pearson.

2.Data base Management Systems‖, Raghu Rama Krishnan, Johannes Gehrke, McGraw Hill, 3rd Edition.

References:

1. Fundamentals of Database Systems‖, ElmasriNavrate,6th edition, 2013, Pearson.
2. Data base Systems design‖, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
3. Introduction to Database Systems‖, C.J.Date, Pearson Education.
4. Data base System Concepts‖, Silberschatz, Korth, McGraw Hill, V edition

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15A05403:Programming with JAVA

Course Objective

- Study the syntax, semantics and features of Java Programming Language
- Study the Object Oriented Programming Concepts of Java Programming language
- Learn the method of creating Multi-threaded programs and handle exceptions
- Learn Java features to create GUI applications & perform event handling
- To be able to develop high quality, working software that solves real problems
- Able to comprehend the art of programming and, in particular, the structure andmeaning of basic Java programs

Course outcomes:

CO1 Ability to apply object oriented concepts and its use

CO2 Exposure to database programming using java by using JDBC and ODBC connectivity.

CO3 Understand development of JAVA applets, Swings, and Database connectivity by using JAVA applications.

CO4 Acquire skills to develop final project by acquired knowledge during curriculum.

CO5 Display proficiency in java programming by building stand-alone applications.

Mapping of CO's with PO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3										2		
CO2															
CO3															
CO4	3														2
CO5															

Unit - I :

The Java Language, The key attributes of object oriented programming language, JDK, simple program, Java keywords, identifiers in java, the java class libraries, introducing data types and operators, program control structures

Unit – II:

Introducing classes, objects, and methods, Arrays, multidimensional arrays, strings, a closer look at methods and classes, Inheritance

Unit – III :

Interface fundamentals, creating and implementing an interface, using interface references, implementing multiple interfaces, constants in interfaces, interfaces can be extended, nested interfaces, final thoughts on interface, packages, Exception handling

Unit – IV :
Byte streams and character streams, byte and character stream classes, using byte streams for reading and writing, reading and writing binary data, random access files, using characterstreams for file i/o, Multi threaded programming, Applet basics, a complete applet skeleton, applet initialization and termination, requesting repainting, using the status window, passing parameters to applets.

Unit – V :
Swings – the origin and design philosophy of swing, components and containers, layout managers, event handling, using a push button, jtext field, jlabel and image icon, the swing buttons, jtext field, jscrollpane, jlist, jcombobox, trees, jtable, an overview of jmenubar, jmenu and jmenuitem, creating a main menu, show messag edialog, show confirm dialog, show input dialog, show option dialog, jdialog, create a modeless dialog

Text Books :

1. Java Fundamentals A Comprehensive Introduction‖ Herbert Schildt and Dale Skrien, McGraw Hill.
2. Java – How to Program‖, Paul Deitel, Harvey Deitel, PHI

Reference Books :

1.Programming with Java‖ T.V.Suresh Kumar, B.Eswara Reddy, P.Raghavan Pearson Edition.
Java Programming by Chopra, Rajiv, New Age International Publishers.
2.Core Java‖, NageswarRao, Wiley Publishers.
3.Thinking in Java‖, Bruce Eckel, Pearson Education.
4.Programing In java‖, Malhotra, Oxford University Press
5.Head First Java‖, Kathy Sierra, Bert Bates, O‘Reilly
6.SCJP – Sun Certified Programmer for Java Study guide‖ – Kathy Sierra, Bert Bates, McGrawHill
7.Java in Nutshell‖, David Flanagan, O‘Reilly
8.Core Java : Volume I – Fundamentals, Cay S. Horstmann, Gary Cornell, The Sun Micro Systems Press

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II B.Tech.-II Sem .

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15A05404:Formal Languages and Automata Theory

Course Objective

The course aims to introduce the basic methods and conclusions of the Theory of Computation. At the end of the course, students learn to apply these methods to problems fromdifferent fields and be guided by the results in searching for computational solutions to the problems.

1. Understand formal definitions of machine models.
2. Classify machines by their power to recognize languages.
3. Understanding of formal grammars, analysis
4. Understanding of hierarchical organization of problems depending on their complexity
5. Understanding of the logical limits to computational capacity

Understanding of un decidable problems.

Course outcomes:
CO1 Construct finite state diagrams while solving problems of computer science
CO2 Find solutions to the problems using Turing machines
CO3 Design of new grammar and language.
CO4 Ability to apply mathematical and formal techniques for solving problems

Mapping of CO's with PO's

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	1	2		3									2	3	
CO2		3	2											2	
CO3	1		3		1					1			1	3	
CO4	3	2	3		2								3	2	

Unit - I :
Preliminaries: Sets, Relations and functions, Methods of proof, Graphs, Languages: BasicConcepts. **Grammars:** Definitions and classifications of grammar, Ambiguity, Simplification of CFGs,Normal forms.

Unit – II:
Finite State Automata: DFSA, NFSA, Regular Expressions
Finite State Automata: Characterization, Properties and decidability: FSA RegularGrammars, Pumping lemma for regular sets, Closure Properties, Decidability theorems.
Finite State Automata with Output and Minimization: Myhill-Nerode theorem, FiniteAutomata with output.
Variants of Finite Automata: Two way finite automata, Multi head Finite Automata.

Unit – III :
Pushdown Automata: The Pushdown Automation, Equivalence between acceptance byempty store and acceptance by Final State, Equivalence of CFG and PDA.
CFG-Properties and Parsing: Pumping Lemma for CFL, Closure Properties for CFL,Decidability results for

CFL, Sub families of CFL.

Unit – IV :
Turing Machines: Turing Machine as a acceptor, Turing Machine as a computing device, Techniques for Turing Machine Construction.
Variations of Turing Machine: Generalized Versions, Restricted Turing Machines, Turing Machines as Enumerated, Equivalence between Turing Machines and Type Zero Languages, Linear Bounded Automata.

Unit – V :
Universal Turing Machine and Decidability: Encoding and Enumeration of Turing Machines, Recursive and Recursively Enumerable Sets, Universal Turing Machines, Problems, Instances and Languages, Rice‘s Theorem, Reduction of Problems to show undecidability, Post‘s correspondence problem, Computable functions.
Time and Space Complexity: The RAM model, Time and Tape Complexity of Turing Machines.
New Models of Computations: DNA Computing, Membrane Computing

Text Books :

1. Introduction to Formal Languages, Automata Theory and Computation‖, Kamala Krithivasan, Rama R, PEARSON.

Reference Books :

1. Introduction to Automata Theory, Languages, and Computation‖, Third Edition, John E.Hopcroft, Rajeev Motwani, Jeffery D. Ullman, PEARSON.
2. Introduction To Languages And The Theory of Computation‖, John C Martin, The McGraw-Hill Companies, Third Edition. (TATA McGRAW HILL)
3. Introduction to Automata Theory, Formal Languages and Computation‖, Shyamalendukandar, PEARSON.
4. Theory of Computation‖, VivekKulkarni, OXFORD.
5. Theory of computer Science Automata, Languages and Computation‖, K.L.P. Mishra, N. Chandrasekaran, PHI, Third Edition.
6. Formal Languages and Automata Theory‖, C.K. Nagpal, OXFORD.
7. Fundamentals of the Theory of Computation, Principles and Practice‖, Raymond Greenlaw, H. James Hoover, MK(MORGAN KAUFMANN)

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B.Tech. II – II Sem. (C.S.E)	L	P	C
	4	0	`4

15A05405: Principles Of Programming Languages

Objectives:

- To briefly describe various programming paradigms.
- To provide conceptual understanding of High level language design and implementation .
- To introduce the power of scripting languages

COURSE Outcomes
CO1 Ability to express syntax and semantics in formal notation.
CO2 Ability to apply suitable programming paradigm for the application.
CO3 Gain Knowledge and comparison of the features programming languages.
CO4 Knowledge regarding functional paradigm and ability to write small programs using Scheme and ML

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1													1		
CO2														2	
CO3	2										2				
CO4	1								1					2	

UNIT-I

Preliminary Concepts: Reasons for studying, concepts of programming languages, Programming domains, Language Evaluation Criteria, influences on Language design, Language categories, Programming Paradigms – Imperative, Object Oriented, functional Programming , Logic Programming. Programming Language Implementation – Compilation and Virtual Machines, programming environments.

Syntax and Semantics: general Problem of describing Syntax and Semantics, formal methods of describing syntax - BNF, EBNF for common programming languages features, parse trees, ambiguous grammars, attribute grammars, denotational semantics and axiomatic semantics for common programming language features.

UNIT-II

Data types: Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization.

Expressions and Statements: Arithmetic relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements, Control Structures – Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements, guarded commands.

UNIT-III

Subprograms and Blocks: Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions user defined overloaded operators, co routines.

Abstract Data types: Abstractions and encapsulation, introductions to data abstraction, design issues, language examples, C++ parameterized ADT, object oriented programming in small talk, C++, Java, C#, Ada 95

UNIT-IV

Concurrency: Subprogram level concurrency, semaphores, monitors, massage passing, Java threads, C# threads.

Exception handling: Exceptions, exception Propagation, Exception handler in Ada, C++ and Java.

UNIT-V

Logic Programming Language : Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

Functional Programming Languages: Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages, Logic programming Languages

Scripting Language: Pragmatics, Key Concepts, Case Study : Python – Values and Types, Variables , Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library.

Text Books:

1. Concepts of Programming Languages Robert .W. Sebesta 8/e, Pearson Education,2008.
2. Programming Language Design Concepts, D. A. Watt, Wiley dreamtech,rp-2007.

References:

1. Programming Languages, 2nd Edition, A.B. Tucker, R.E. Noonan, TMH.
2. Programming Languages, K. C.Louden, 2nd Edition, Thomson,2003.
3. LISP, Patric Henry Winston and Paul Horn, Pearson Education.

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15A05406: Design and Analysis of Algorithms

Course Objectives:

1. To know the importance of the complexity of a given algorithm.
2. To study various algorithmic design techniques.
3. To utilize data structures and/or algorithmic design techniques in solving newproblems.
4. To know and understand basic computability concepts and the complexity classesP, NP, and NP-Complete.
5. To study some techniques for solving hard problems.

COURSE OUTCOMES	
CO1	Analyze the complexity of the algorithms
CO2	Use techniques divide and conquer, greedy, dynamic programming, backtracking, branch and bound to solve the problems
CO3	Identify and analyze criteria and specifications appropriate to new problems, and choose the appropriate algorithmic design technique for their solution.
CO4	Able to prove that a certain problem is NP-Complete
CO5	Ability to apply and implement learned algorithm design techniques and data structures to solve problems

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3				2					2				3
CO2	3				3		1			2			3		3
CO3		3		2	3			3					3	2	
CO4								3	2		2	1			3
CO5	3	3		2	3	2		3	2	2			3	2	

Unit - I :

Introduction: What is an Algorithm, Algorithm specification, Performance analysis.
Divide and Conquer: General method, Binary Search, Finding the maximum and minimum,Merge sort, Quick Sort, Selection, Stressen‘s matrix multiplication.

Unit – II:

Greedy Method: General method, Knapsack problem, Job Scheduling with Deadlines,Minimum cost Spanning Trees, Optimal storage on tapes, Single-source shortest paths.
Dynamic programming: General Method, Multistage graphs, All-pairs shortest paths,Optimal binary search trees, 0/1 knapsack, The traveling sales person problem.

Unit – III :
Basic Traversal and Search Techniques: Techniques for binary trees, Techniques for Graphs, Connected components and Spanning trees, Bi-connected components and DFS
Back tracking: General Method, 8 – queens problem, Sum of subsets problem, Graph coloring and Hamiltonian cycles, Knapsack Problem.
Unit – IV :
Branch and Bound: The method, Travelling salesperson, 0/1 Knapsack problem, Efficiencyconsiderations.
Lower Bound Theory: Comparison trees, Lower bounds through reductions – Multiplyingtriangular matrices, Inverting a lower triangular matrix, Computing the transitive closure.

Unit – V :
NP – Hard and NP – Complete Problems: NP Hardness, NP Completeness, Consequences of being in P, Cook‘s Theorem, Reduction Source Problems, Reductions: Reductions for some known problems

Text Books :

1. Fundamentals of Computer Algorithms‖, Ellis Horowitz, S. SatrajSahani and Rajasekhran, 2nd edition, 2012, University Press.
2. Design and Analysis of Algorithms‖, ParagHimanshu Dave, HimanshuBhalchandra Dave, Second Edition, Pearson Education.

References :

1. Introduction to Algorithms‖, secondedition,T.H.Cormen,C.E.Leiserson, R.L.Rivest,andC.Stein,PHI Pvt. Ltd./ Pearson Education
2. Introduction to Design and Analysis of Algorithms A strategic approach‖, R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, McGraw Hill.
3. Data structures and Algorithm Analysis in C++‖, Allen Weiss, Second edition, Pearson education.
4. Design and Analysis of algorithms‖, Aho, Ullman and Hopcroft,Pearson education.
5. Algorithms‖ – Richard Johnson baugh and Marcus Schaefer, Pearson Education

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15A54402:Human Values And Professional Ethics

OBJECTIVE:

- To create an awareness on Engineering Ethics and Human Values.
- To instill Moral and Social Values and Loyalty
- To appreciate the rights of Others

Students will be able to:

- identify and analyze an ethical issue in the subject matter under investigation or in a relevant field
- identify the multiple ethical interests at stake in a real-world situation or practice
- articulate what makes a particular course of action ethically defensible
- assess their own ethical values and the social context of problems
- identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects
- demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work
- integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research

Course Outcomes	
CO1	Develop awareness on ethics, human values & obligations related to Self, Family, Society and State.
CO2	Become morally and socially responsible.
CO3	As a social experimental list they can ensure less hazards & can find out engineering Solutions from the ethical platform.
CO4	Students Can know how to ensure safety by minimizing risk through detailed analysis & Can plan to get Intellectual property Rights (IPR).
CO5	Able to identify various global issues , moral &social responsibilities.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2					1	3	2							3
CO2	2						3								3
CO3							3	2					1		3
CO4							3		1		1				3
CO5							3			1		1			3

Unit I: HUMAN VALUES
Morals, Values and Ethics-Integrity-Work Ethic-Service learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty - Courage- Co Operation – Commitment – Empathy –Self Confidence Character – Spirituality.

Unit II: ENGINEERING ETHICS
Senses of ‗Engineering Ethics- Variety of moral issued – Types of inquiry – Moral dilemmas – Moral autonomy – Kohlberg‘s theory- Gilligan‘s theory- Consensus and controversy – Models of professional roles- Theories about right action- Self interest - Customs and religion –Uses of Ethical theories – Valuing time –Co operation – Commitment.

Unit III :ENGINEERING AS SOCIAL EXPERIMENTATION
Engineering As Social Experimentation – Framing the problem – Determining the facts – Codes of Ethics – Clarifying Concepts – Application issues – Common Ground - General Principles – Utilitarian thinking respect for persons.

UNIT IV: ENGINEERS RESPONSIBILITY FOR SAFETY AND RISK
Safety and risk – Assessment of safety and risk – Risk benefit analysis and reducing risk- Safety and the Engineer- Designing for the safety- Intellectual Property rights(IPR).

UINIT V: GLOBAL ISSUES
Globalization – Cross culture issues- Environmental Ethics – Computer Ethics – Computers as the instrument of Unethical behavior – Computers as the object of Unethical acts – Autonomous Computers- Computer codes of Ethics – Weapons Development - Ethics and Research – Analyzing Ethical Problems in research – Intellectual property Rights(IPR)

Text Books

1. Engineering ethics includes human values by M.Govindarajan, s. nataraja and vssenthilkumar PHI.2009.
2. Engineering Ethics‖ by Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009.
3. Ethics in Engineering‖ by Mike W. Martin and Roland Schinzinger – Tata McGraw-Hill– 2003.
4. Professional Ethics and Morals‖ by Prof.A.R.Aryasri, DharanikotaSuyodhana-Maruthi Publications.
5. Professional Ethics and Human Values‖ by A.Alavudeen, R.KalilRahman and M.Jayakumaran- Laxmi Publications.
6. Professional Ethics and Human Values‖ by Prof.D.R.Kiran.

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15A05407:Database Management Systems Lab

Course Objective

- To create database and query it using SQL queries, design forms and generatereports.
- Learn to use integrity constraints, referential integrity constraints, triggers,assertions

	Course Outcomes
CO1	Design databases
CO2	Retrieve information from data bases
CO3	Use procedures to program the data access and manipulation
CO4	Normalize a database
CO5	Create user interfaces and generate reports

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3		2					2				3	
CO2	3	1		1							1		1	3	
CO3	3		3			1			2					3	
CO4	3		3		2				2	2				3	
CO5	3											1		3	1

List of Experiments:

1. Practice session: Students should be allowed to choose appropriate DBMS, install it,configure it and start working on it: Create sample tables, execute some queries, useSQLPLUS features, use PL/SQL features like cursors.

2. A college consists of number of employees working in different departments. In this context, create two tables**employee** and **department**. Employee consists of columns empno, empname, basic, hra, da, deductions, gross, net, date-of-birth. The calculation of hra,da are as per the rules of the college. Initially only empno, empname, basic have validvalues. Other values are to be computed or updated later. Another table department is maintained containing deptno, deptname, description columns. Deptno is the primary keyin department table and referential integrity constraint exists between employee anddepartment tables. Perform the following operations on the above database:

   - Create tables department and employee with required constraints.

- Initially only the few columns (essential) are added. Add the remaining columnsseparately by using appropriate SQL command
- Basic column should not be null
- Add constraint that basic cannot be less than 5000.
- Calculate hra,da,gross and net by using PL/SQL program.
- Whenever salary is updated and its value becomes less than 5000 a trigger has tobe raised preventing the operation
- The assertions are: hra should not be less than 10% of basic and da should not beless than 50% of basic.
- The percentage of hra and da are to be stored separately
- When the da becomes more than 100% of the basic a message has to be generatedand with user permission da has to be merged with basic
  - Empno should be unique and has to be generated automatically
  - If the employee is going to retire in a particular month, automatically a message has to be generated
  - The default value for date-of-birth is 1 jan, 1970
  - When the employees called daily-wagers are to be added the constraint that salary should be greater than or equal to 5000 should be dropped
  - Display the information of the employees and departments with description of the fields
  - Display the average salary of all the departments
  - Display the average salary department wise
  - Display the maximum salary of each department and also all departments put together
  - Commit the changes whenever required and rollback if necessary
  - Use substitution variables to insert values repeatedly
  - Assume some of the employees have given wrong information about date-of-birth. Update the corresponding tables to change the value
  - Find the employees whose salary is between 5000 and 10000 but not exactly 7500
  - Find the employees whose name contains _en‘
  - Try to delete a particular deptno. What happens if there are employees in it and if there are no employees
  - Create alias for columns and use them in queries
  - List the employees according to ascending order of salary
  - List the employees according to ascending order of salary in each department
  - Use && wherever necessary
  - Amount 6000 has to be deducted as CM relief fund in a particular month which has to be accepted as input from the user. Whenever the salary becomes negative it has to be maintained as 1000 and the deduction amount for those employees is reduced appropriately
  - The retirement age is 60 years. Display the retirement day of all the employees
  - If salary of all the employees is increased by 10% every year, what is the salary of all the employees at the retirement
  - Find the employees who are born in leap year
  - Find the employees who are born on feb 29
  - Find the departments where the salary of atleast one employee is more than 20000
  - Find the departments where the salary of all the employees is less than 20000
  - On first January of every year a bonus of 10% has to be given to all the employees. The amount has to be deducted equally in the next 5 months

- As a designer identify the views that may have to be supported and create views
- As a designer identify the PL/SQL procedures necessary and create them using cursors
- Use appropriate Visual programming tools like oracle forms and reports, visual basic etc to create user interface screens and generate reports

Note: as a designer identify other operations required and add to the above list. The above operations are not in order. Order them appropriately. Use SQL or PL/SQL depending on the requirement.

3. Students may be divided into batches and the following experiments may be given to them to better understand the DBMS concepts. Students should gather the required information, draw ER diagrams, map them to tables, create tables, triggers, procedures, execute queries, create user interfaces, and generate reports.

    - Student information system
    - APSRTC reservation system
    - Hostel management
    - Library management
    - Indian Railways reservation
    - Super market management
    - Postal system
    - Banking system
    - Courier system
    - Publishing house system

Reference Books :

1. Learning Oracle SQL and PL/SQL‖, Rajeeb C. Chatterjee, PHI.
2. Oracle Database 11g PL/SQL Programming‖, M.McLaughlin,TMH.
3. Introduction to SQL‖, Rick F.VanderLans, Pearson education.
   Oracle PL/SQL‖, B.Rosenzweig and E.Silvestrova, Pearson education

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B.Tech. II – II Sem. (C.S.E)

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15A05408: Programming With JAVA Lab

Course Objective

- To introduce java compiler and eclipse platform.
- To impart hand on experience with java programming.

Course Outcomes	
CO1	Ability to apply object oriented concepts for programming and its use
CO2	Practical exposure to database programming using java by using JDBC and ODBC connectivity.
CO3	Implementation of JAVA applets, Swings, and Database connectivity by using JAVA applications.
CO4	Learning how to use java in different operating systems with different editors like eclipse and net beans
CO5	Acquire skills to develop final project by acquired knowledge during curriculum.

Mapping of COs with POs

	PO1	PO2	PO 3	PO 4	PO5	PO 6	PO 7	PO 8	PO9	PO10	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1			3										3		
CO2		2		3										3	
CO3					2										
CO4			3	2						3			2	3	
CO5								2		3			2	3	

Note:

1. **IDEs are not mandatory, encourage the use of Eclipse or Netbean platform**
2. **The list suggests the minimum program set. Hence, the concerned staff is requestedto add more problems to the list as needed**

Week-1:

1. Use Eclipse or Netbean platform and acquaint with the various menus. Create a test project, add a test class and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with java program to find prime numbers between 1 to n.

Week-2:

1. Write a Java program that prints all real and imaginary solutions to the quadratic equationax2 + bx + c = 0. Read in a, b, c and use the quadratic formula.
2. Write a Java program for sorting a given list of names in ascending order
3. Write a java program to accept a string from user and display number of vowels, consonants, digits and special characters present in each of the words of the given text.

Week -3:

Write a java program to make rolling a pair of dice 10,000 times and counts the numberof times doubles of are rolled for each different pair of doubles.

Hint: Math.random()

2. Write java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it's not a duplicate of any number already read display the complete set of unique values input after the user enters each new value.

   Write a java program to read the time intervals (HH:MM) and to compare system time if the system time between your time intervals print correct time and exit else try again torepute the same thing. By using StringToknizer class

Week-4:

1. Write a java program to split a given text file into n parts. Name each part as the name of the original file followed by .part<n> where n is the sequence number of the part file.
2. Write java program to create a super class called Figure that receives the dimensions of two dimensional objects. It also defines a method called area that computes the area of an object. The program derives two subclasses from Figure. The first is Rectangle and second is Triangle. Each of the sub class overridden area() so that it returns the area of a rectangle and a triangle respectively.
3. Write a Java program that creates three threads. First thread displays –Good Morning‖ every one second, the second thread displays –Hello‖ every two seconds and the third thread displays ―Welcome‖ every three seconds

1. rite a Java program that correctly implements producer consumer problem using the concept of inter thread communication
2. Write a java program to find and replace pattern in given file,
3. Use inheritance to create an exception super class called ExceptionA and exception sub class ExceptionB and ExceptionC, where ExceptionB inherits from ExceptionA and ExceptionC inherits from ExceptionB. Write a java program to demonstrate that the catch block for type ExceptionA catches exception of type ExceptionB and ExceptionC

Week-6:

1. Write a java program to convert an ArrayList to an Array.
2. Write a Java Program for waving a Flag using Applets and Threads
3. Write a Java Program for Bouncing Ball (The ball while moving down has to increase thesize and decrease the size while moving up)

Week-7:

1. Write a Java Program for stack operation using Buttons and JOptionPane input andMessage dialog box.
2. Write a Java Program to Addition, Division, Multiplication and subtraction usingJOptionPane dialog Box and Text fields.

Week-8:

1. Write a Java Program for the blinking eyes and mouth should open while blinking.
2. Implement a Java Program to add a new ball each time the user clicks the mouse.Provided a maximum of 20 balls randomly choose a color for each ball.

Week-9:

1. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Jtable component

2. Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an ArithmeticException Display the exception in a message dialog box.

Week-10:

1. Write a Java Program to implement the opening of a door while opening man should present before hut and closing man should disappear.
2. Write a Java code by using JtextField to read decimal value and converting a decimalnumber into binary number then print the binary value in another JtextField

Week-11:

1. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display theresult.
2. Write a Java program for handling mouse events.

Week-12:

1. Write a java program establish a JDBC connection, create a table student with properties name, register number, mark1,mark2, mark3. Insert the values into the table by using the java and display the information of the students at front end.

Text Books :

1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI
2. Java The Complete Reference‖ by Herbert Schildt, TMH, 8th Edition
3. Java Programming by Chopra, Rajiv, New Age International Publishers.

Reference Books :

1. Introduction to Java programming, Sixth edition, Y.Daniel Liang, Pearson Education
2. Programming in java Sachine
3. Big Java, 2ndedition, Cay Horstmann, Wiley Student Edition, Wiley India PrivateLimited.
4. Introduction to Programming with Java, J.Dean&R.Dean, McGraw Hill education.

3. Java Programming, D S Malik, cengage learning, India Edition

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III B.Tech.-I Sem

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15A05501: Operating Systems

Course Objectives:

- To make the students understand the basic operating system concepts such as processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection.
- To get acquaintance with the class of abstractions afford by general purpose operating systems that aid the development of user applications.

Course Outcomes	
CO1	Able to use operating systems effectively.
CO2	Write System and application programs to exploit operating system functionality.
CO3	Add functionality to the exiting operating systems
CO4	Design new operating systems
CO5	Understand what makes a computer system function and the primary PC components.

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				2			1	1		3	2	3		
CO2	3	1	2	3						2	3		3	3	
CO3	3			3							3			3	
CO4			2	3									3	3	2
CO5					2	1				2		2			2

UNIT I

Operating Systems Overview: Operating system functions, Operating system structure, operating systems Operations, protection and security, Computing Environments, Open- Source Operating Systems

System Structures: Operating System Services, User and Operating-System Interface, systems calls, Types of System Calls, system programs, operating system structure, operating system debugging, System Boot.

Processes: Process concept, process Scheduling, Operations on processes, Inter process Communication, Examples of IPC systems.

UNIT II

Threads: overview, Multicore Programming, Multithreading Models, Thread Libraries, Implicit Threading, Threading Issues.

Process Synchronization: The critical-section problem, Peterson_s Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic problems of synchronization, Monitors, Synchronization examples, Alternative approaches.

CPU Scheduling: Scheduling-Criteria, Scheduling Algorithms, Thread Scheduling, Multiple-Processor Scheduling, Real-Time CPU Scheduling, Algorithm Evaluation.

UNIT III

Memory Management: Swapping, contiguous memory allocation, segmentation, paging, structure of the page table.

Virtual memory: demand paging, page-replacement, Allocation of frames, Thrashing, Memory-Mapped Files, Allocating Kernel Memory

Deadlocks: System Model, deadlock characterization, Methods of handling Deadlocks, Deadlock prevention, Detection and Avoidance, Recovery from deadlock.

UNIT IV

Mass-storage structure: Overview of Mass-storage structure, Disk structure, Disk attachment,Disk scheduling, Swap-space management, RAID structure, Stable-storage implementation.

File system Interface: The concept of a file, Access Methods, Directory and Disk structure, Filesystem mounting, File sharing, Protection.

File system Implementation: File-system structure, File-system Implementation, Directory Implementation, Allocation Methods, Free-Space management.

UNIT V

I/O systems: I/O Hardware, Application I/O interface, Kernel I/O subsystem, Transforming I/O requests to Hardware operations.

Protection: Goals of Protection, Principles of Protection, Domain of protection, Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability-Based systems, Language – Based Protection

Security: The Security problem, Program threats, System and Network threats, Cryptography as a security tool, User authentication, Implementing security defenses, Firewalling to protect systems and networks, Computer–security classifications.

Text Books:

1. Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Wiley , Eight Edition, 2014.

Reference Books:

1. Operating systems by A K Sharma, Universities Press,
2. Operating Systems, S.Haldar, A.A.Aravind, Pearson Education.
3. Modern Operating Systems, Andrew S Tanenbaum, Second Edition, PHI.
4. Operating Systems, A.S.Godbole, Second Edition, TMH.
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
6. Operating Systems, G.Nutt, N.Chaki and S.Neogy, Third Edition, Pearson Education.
7. Operating Systems, R.Elmasri, A,G.Carrick and D.Levine, Mc Graw Hill.
8. Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.
9. Operating System Desgin, Douglas Comer, CRC Press, 2nd Edition.

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15A05502: Compiler Design

Course Objective

This course is a de facto capstone course in Computer Science, as it combines skills in software design, programming, data structures and algorithms, theory of computing, documentation, and machine architecture to produce a functional compiler.

- Realize that computing science theory can be used as the basis for real applications
- Introduce the major concept areas of language translation and compiler design.
- Learn how a compiler works
- Know about the powerful compiler generation tools and techniques, which are useful to theother non-compiler applications
- Know the importance of optimization and learn how to write programs that execute faster

Course Outcomes
C01 Able to design a compiler for a simple programming language
CO2Able to use the tools related to compiler design effectively and efficiently
CO3 Able write an optimized code.
CO4 Use the knowledge of patterns, tokens & regular expressions for solving a problem in the field of data mining.
CO5 To develop program to solve complex problems in compiler

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				3				1	2			1	3	
CO2	3	2		1	3						2			3	
CO3	3				3					1				3	
CO4	3	2	2		3									3	
CO5	3	2	2		3	1								3	

Unit - I :

Introduction: Language processors, Phases of a compiler, Pass and phase, Bootstrapping, Compiler construction tools, Applications of compiler technology.

Lexical Analysis: Role and Responsibility, Input buffering, Specification of tokens, Recognition oftokens, LEX tool, Design of a Lexical Analyzer generator

Unit – II:

Syntax Analysis: Role of the parser, Context Free Grammars- Definition, Derivations, Parse trees, Ambiguity, Eliminating ambiguity, Left recursion, Left factoring.

TOP Down Parsing: Recursive descent parsing, Non-recursive predictive parsing, LL(1) grammars,Error recovery in predictive parsing.

Bottom Up Parsing: Handle pruning, Shift-Reduce parsing, Conflicts during shifts- reduce parsing,SLR Parsing, Canonical LR(1) parsers, LALR parsers, Using ambiguous grammars, YACC tool.

Unit – III :

Syntax Directed Translation: Syntax Directed Definitions, Evaluation orders for SDD‘s, Application of SDT, SDT schemes, Implementing L-attribute SDD‘s.

Intermediate Code Generation: Need for intermediate code, Types of intermediate code, Three address code, Quadruples, Triples, Type expressions, Type equivalence, Type checking, Translation of expressions, control flow statements, switch statement, procedures, back patching

Unit – IV :

Run Time Storage Organization: Storage Organization, Stack Allocation of Space, Access to Nonlocal Dat a on the Stack, Introduction to Garbage Collection

Machine-Independent Optimizations: Basic Blocks and Flow Graphs, Optimization of Basic Blocks, The Principal Sources of Optimization, Introduction to Data-Flow Analysis, Constant Propagation, Partial-Redundancy Elimination, Loops in Flow Graphs.

Unit – V :

Code Generation : Issues in the Design of a Code Generator, The Target Language, Addresses inthe Target Code, A Simple Code Generator, Peephole Optimization, Register Allocation and Assignment, Dynamic Programming Code-Generation.

Text Books :

1.Compilers Principles, Techniques and Tools‖, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman., Pearson.
2. Compiler Design‖, K. Muneeswaran., Oxford University Press, 2012

Reference Books :

1.Compiler Construction‖, K.V.N Sunitha, Pearson, 2013
2.Engineering A Compiler‖, Second Edition, Keith D. Cooper & Linda Torczon., MK(Morgan Kaufmann) (ELSEVIER)
3.Compilers Principles and Practice‖, Parag H. Dave, Himanshu B. Dave.,PEARSON
4.Compiler Design‖, SandeepSaxena, Rajkumar Singh Rathore., S.Chand publications
5.Compiler Design‖, SantanuChattopadhyay., PHI
6.Principals of Compiler Design‖, Nadhni Prasad, Elsevier

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15A05503: DATA MINING

Course Objective

- Understand data mining principles and techniques: Introduce DM as a cutting edge business intelligence method and acquaint the students with the DM techniques for building competitive advantage through proactive analysis, predictive modeling, and identifying new trends and behaviors.
- Building basic terminology.
- Learn how to gather and analyze large sets of data to gain useful businessunderstanding.
- Learn how to produce a quantitative analysis report/memo with the necessaryinformation to make decisions.
- Describing and demonstrating basic data mining algorithms, methods, and tools
- Identifying business applications. Other applications of data mining.
- Develop and apply critical thinking, problem-solving, and decision-making skills.

Course Outcomes
CO1 Student should be able to Apply pre-processing statistical methods for any given raw data.
CO2: Student should be able to Analyze and evaluate performance of algorithms for Association Rules.
CO3: Student must be able to Apply Classification Algorithms to analyze data for different applications.
CO4: Students should able to apply and demonstrate clustering algorithm for myriad applications
CO5 Student should be able to justify appropriate mining algorithm for the given dataset.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				3								3		
CO2		2		3									3		
CO3	3	2		2	3								3		
CO4	3	3	2		3						2		3		
CO5			3			3		3	3	3				2	

UNIT 1

Introduction: What is data mining, what kind of data can be mined, what kind of patterns canbe mined, which technologies are used, which kinds of applications are targeted, major issues in data mining.

Getting to Know Your Data: Data Objects and Attribute Types, Basic Statistical Descriptionsof Data, Data Visualization, Measuring Data Similarity and Dissimilarity.

UNIT 2

Data Preprocessing: Data Quality: Why Preprocess the Data? ,Major Tasks in Data Preprocessing , Data Cleaning**:** Missing Values ,Noisy Data, Data Cleaning as a Process, Data Integration: Entity Identification Problem, Redundancy and Correlation Analysis, Tuple Duplication ,Data Value Conflict Detection and Resolution , Data Reduction: Overview of Data Reduction Strategies, Wavelet Transforms, Principal Components ,Attribute Subset Selection ,Regression and Log-Linear Models: Parametric Data Reduction ,Histograms, Clustering , Data Transformation and Data Discretization: Data Transformation Strategies Overview ,Data Transformation by Normalization, Discretization by Binning , Discretization by Histogram Analysis, Discretization by Cluster, Decision Tree, and Correlation Analyses , Concept Hierarchy Generation for Nominal Data.

UNIT 3

Mining Frequent Patterns, Associations, and Correlations Basic Concepts:, Frequent Itemset Mining Methods: Apriori Algorithm: Finding Frequent Itemsets by Confined Candidate Generation ,Generating Association Rules from Frequent Itemsets ,Improving the Efficiency of Apriori ,A Pattern-Growth Approach for Mining Frequent Itemsets, Mining Frequent Itemsets Using the Vertical Data Format ,Mining Closed and Max Patterns, Pattern Evaluation Methods: Strong Rules Are Not Necessarily Interesting ,From Association Analysis to Correlation Analysis, A Comparison of Pattern Evaluation Measures. Advanced Pattern Mining Pattern Mining: A Road Map, Pattern Mining in Multilevel, Multidimensional Space.

UNIT 4

Classification Basic Concepts, Decision Tree Induction**:** Decision Tree Induction ,Attribute Selection Measures, Tree Pruning ,Scalability and Decision Tree Induction ,Visual Mining for Decision Tree Induction, Bayes Classification Methods, Rule-Based Classification, Model Evaluation and Selection, Techniques to Improve Classification Accuracy: Introducing Ensemble Methods, Bagging Boosting and AdaBoost ,Random Forests, Improving Classification Accuracy of Class-Imbalanced Data.

UNIT 5

Cluster Analysis: Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid- Based Methods, Evaluation of Clustering, High-Dimensional Data:Clustering High- Dimensional Data: Problems, Challenges, and Major Methodologies,Subspace Clustering Methods, Biclustering , Dimensionality Reduction Methods and Spectral Clustering.

Text Books:

1. Data Mining – Concepts and Techniques - Jiawei Han , Micheline Kamber, and Jian Pei, Morgan Kaufmann Publishers, 3rdEdition, ELSEVIER.

REFERENCE BOOKS:

1. Insight into Data Mining, K.P.Soman ,S.Diwakar, V.Ajay,PHI,2008.
2. Data Mining Introductory and advanced topics –Margaret H Dunham, Pearson education
3. Data Mining Techniques – Arun K Pujari,2nd edition, Universities Press.
4. Data Mining, V. Pudi and P. RadhaKrishna, Oxford University Press.
5. Data Mining: Methods and Techniques, A.B.MShawkat Ali and S.A. Wasimi,Cengage Learning.

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B.Tech. III – I Sem. (C.S.E)

L	P	C
4	0	4

15A05504: Software Engineering

Course Objectives

- To understand the software life cycle models.
- To understand the software requirements and SRS document.
- To understand the importance of modeling and modeling languages.
- To design and develop correct and robust software products.
- To understand the quality control and how to ensure good quality software.
- To understand the planning and estimation of software projects.
- To understand the implementation issues, validation and verification procedures.
- To understand the maintenance of software

Course Outcomes	
CO1	Define and develop a software project from requirement gathering to implementation.
CO2	Obtain knowledge about principles and practices of software engineering.
CO3	Focus on the fundamentals of modeling a software project.
CO4	Obtain knowledge about estimation and maintenance of software systems
CO5	Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3		2		2	1		2			2	3	
CO2	3			1							2			3	
CO3	3	2	3			2						1	2	3	
CO4	3		3		2		2		1					3	
CO5	3	2				2				2	2			3	

Unit - I :
Software and Software Engineering: The Nature of Software, The Unique Nature of WebApps, Software Engineering, Software Process, Software Engineering Practice, Software Myths.
Process Models: A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process

Terminology, Product and Process.

Agile Development: Agility, Agility and the Cost of Change, Agile Process, Extreme Programming, Other Agile Process Models

Unit – II:

Requirements Analysis And Specification: Requirements Gathering and Analysis, SoftwareRequirement Specification (SRS), Formal System Specification.

Software Design: Overview of the Design Process, How to Characterise of a Design?, Cohesionand Coupling, Layered Arrangement of Modules, Approaches to Software Design.

Unit – III :

Function-Oriented Software Design: Overview of SA/SD Methodology, Structured Analysis, Developing the DFD Model of a System, Structured Design, Detailed Design, Design Review, Over view of Object Oriented design.

User Interface Design: Characteristics of Good User Interface, Basic Concepts, Types of UserInterfaces, Fundamentals of Component-based GUI Development, A User Interface Design Methodology.

Unit – IV :

Coding And Testing: Coding, Code Review, Software Documentation, Testing, Unit Testing, Black-Box Testing, White-Box Testing, Debugging, Program Analysis Tool, Integration Testing, Testing Object-Oriented Programs, System Testing, Some General Issues Associated with Testing.

Unit – V :

Software Reliability And Quality Management: Software Reliability, Statistical Testing, Software Quality, Software Quality Management System, ISO 9000, SEI Capability MaturityModel.

Computer Aided Software Engineering: Case and its Scope, Case Environment, Case Support in Software Life Cycle, Other Characteristics of Case Tools, Towards Second Generation CASE Tool, Architecture of a Case Environment.

Software Maintenance: Characteristics of Software Maintenance.

Software Reuse: what can be Reused? Why almost No Reuse So Far?, Basic Issues in Reuse Approach, Reuse at Organisation Level.

Text Books :

1. Software Engineering A practitioner's Approach, Roger S. Pressman, Seventh EditionMcGrawHill International Edition.
2. Fundamentals of Software Engineering, Rajib Mall, Third Edition, PHI.

Reference Books :

1.Software Engineering, Ian Sommerville, Ninth edition, Pearson education. 2.Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 20083.Software Engineering, A Precise Approach, PankajJalote, Wiley India,2010.

4.Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.

5.Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer Internationaledition, 2006.

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B.Tech. III – I Sem. (C.S.E)

L	P	C
4	0	4

15A05505: Microprocessors & Interfacing

Course Objective

- Study the instruction set of 8085 microprocessor and its architecture
- Study the instruction set of 8086 microprocessor and its architecture
- Learn assembling language programming using 8086 microprocessor
- Interfacing 8051, 8255, 8237, and 8259 and peripherals

Course Outcomes	
CO1	Understands the internal architecture and organization of 8085 &8086 processors, MSP430 controller.
CO2	Design and implement programs on 8086 microprocessor.
CO3	Understands the interfacing techniques to 8086 and MSP 430 and can develop assembly language programming to design microprocessor/ micro controller based systems.
CO4	Program MSP 430 for designing any basic Embedded System.
CO5	Design and implement some specific real time applications.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1							2						
CO2		2	3						2						
CO3		3	3						2				3	2	
CO4	2	2	2						2					2	
CO5									2						

Unit - I :Microprocessors-Evolution and Introduction: Microprocessors and Micro Controllers, Microprocessor based system, Origin of Microprocessor, Classification of Microprocessors, Types ofMemory, I/O Devices, Technology Improvements Adapted to Microprocessors and Computers,Introduction to 8085 processor, Architecture of 8085, Microprocessor instructions, classification of instructions, Instruction set of 8085. Intel 8086 Microprocessor architecture, Features, and Signals: Architecture of 8086, Accessing memory locations, PIN details of 8086

Unit – II: 8086 Programming: Addressing Modes of 8086, Instruction Set of 8086: AssemblyLanguage

Programming8086, Modular Programming. procedures and Macros

Unit – III :8086 Interrupts: Interrupt types in 8086, Processing of Interrupts by 8086, Dedicated interrupt types in 8086, Software interrupts-types 00H-FFH, Priority among 8086 interrupts, Interrupt service routines, BIOS interrupts or functional calls, Interrupt handlers, DOS services-INT 21H, System calls-BIOS services.

Unit - IV : Memory and I/O Interfacing: Physical memory organization in 8086, Formation of system bus, Interfacing RAM and EPROM chips using only logic gates, Interfacing RAM/ EPROMchips using decoder IC and logic gates, I/O interfacing, Interfacing 8-bit input device with 8086, Interfacing output device using 8086, Interfacing printer with 8086, Interfacing 8-bit and 16-bit I/O devices or ports with 8086, Interfacing CRT terminal with 8086

Unit – V :Interfacing Peripherals: Features and Interfacing of programmable devices for 8086 systems: Intel 8255 programmable peripheral interface, Interfacing switches and LEDS, Interfacing seven segment displays, Traffic light control, Interfacing analog to digital converters, Intel Timer IC8253, Introduction to serial communication, 8259 programmable controller, 8237 DMA controller

Text Books :

1. Microprocessor and Interfacing 8086,8051, 8096 and advanced processors‖, Senthil Kumar, Saravanan, Jeevanathan, Shah, Oxford Publishers, 2012.
2. The X86 Microprocessors‖, Lyla B. Das. Pearson, 2012.

Reference Books :

1. Microprocessor and Interfacing: Programming and Hardware‖, Douglas V.Hall, McGrawHill
2. 8086 microprocessor: Programming and Interfacing the PC‖, Kenneth Ayala, Cengage Learning
3. ARM system-on-chip architecture‖, Steve Furber, Addison-Wesley Professional
4. The Intel Microprocessors‖, Barry B. Brey, Prentice Hall

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B.Tech. III – I Sem. (C.S.E)	**L**	**P**	**C**
	4	**0**	**4**

15A54501: Management Science

Course Objective: The objective of the course, is to equip the student the fundamental knowledge of management science and its application for effective management of human resource, materials and operation of an organization. It also aims to expose the students about the latest and contemporary developments in the field of management**.**

COURSE OUTCOMES	
CO1	To apply the concepts & principles of management & designs of organization in a practical world.
CO2	To design good plant layout and apply Work-study principles, Quality Control techniques, in real life industry & To maintain & control the Inventory & students can able to identify the importance of marketing in emerging world. To design good plant layout and apply Work-study principles, Quality Control techniques, in real life industry & To maintain & control the Inventory & students can able to identify the importance of marketing in emerging world.
CO3	To apply the concepts of HRM in Recruitment, Selection, Training & Development.
CO4	To develop PERT/CPM Charts for projects of an enterprise and estimate time & cost of project & to analyze the business through SWOT .
CO5	They can aware of the latest and contemporary issues of management science.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1							1								
CO2									1						
CO3							1								
CO4										1					
CO5											1				

UNIT I: INTRODUCTION TO MANAGEMENT:

Management-Concept and meaning-Nature-Functions-Management as a science and art and both. Schools of management thought-Taylor‘s scientific theory-Henry Fayol‘s principles- Weber‘s Ideal Bureaucracy-Eltan Mayo‘s Human relations-Systems theory- Situational or Contingency theory-Social responsibilities of management.**Organizational structure and design**: Features of organizational structure-work specialization-Departmentation-Span of control-Centralization and Decentralization.

Organisational designs-Line organization-Line & Staff Organization-Functional Organization-Matrix Organization-Project Organization- Committee form of organization.

UNIT II OPERATIONS MANAGEMENT:

Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study- Statistical Quality Control**:***C*chart, *P*chart, (simple Problems) Deming_s contribution to quality.**Material Management:**Objectives-Inventory-Functions,types, inventory classification techniques-EOQ-ABC Analysis-Purchase Procedure and Stores Management. **Marketing Management:** Concept- Meaning - Nature-Functions of Marketing- Marketing Mix- Channels of distribution -Advertisement and sales promotion- Marketing Strategies based on Product LifeCycle.

UNIT III: HUMAN RESOURCES MANAGEMENT (HRM):

HRM- Definition and meaning – nature-Managerial and Operative functions-Evolution of HRM-Human Resource Planning(HRP)-Employee Recruitment-sources of recruitment-employee selection-process and tests in employee selection- Employee training and development-On- the- job and Off- the-job training methods-Performance Appraisal systems-Concept-Methods of Performance Appraisal-Placement-Employee Induction-Wage and Salary Administration-

Objectives-Essentials of Wage and Salary Administration-Job Analysis-Process -Job Evaluation-Employee Grievances-techniques of handling Grievances.

UNIT IV : STRATEGIC MANAGEMENT:

Definition& meaning-Setting of Vision-Mission- Goals- Corporate Planning Process- Environmental Scanning-Steps in Strategy Formulation and Implementation-SWOT Analysis.**Project Management (PERT/CPM):**Network Analysis-Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying Critical Path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing. (Simple problems).

UNIT V: CONTEMPORARY ISSUES IN MANAGEMENT:

The concept of MIS- Materials Requirement Planning (MRP)- Just-In-Time (JIT) System- Total Quality Management (TQM)- Six Sigma Concept- Supply Chain Management- Enterprise Resource Planning (ERP)- Performance Management- Business Process Outsourcing (BPO), Business Process Re-engineering and Bench Marking -Balanced Score Card-Knowledge Management.

The students are required to submit any one of the following- two assignments/ a miniproject/submission of any two case studies in the subject.

Learning Outcome: After completion of this course, the prospective engineering technocrats will be able to understand various fundamentals of functional areas such general management, plant and materials management, marketing management, human resource management, statistical quality control techniques, strategic management and also aware of the latest and contemporary issues of management science.

TEXT BOOKS:

1. A.R Aryasri: Management Science, TMH, 2013
2. Stoner, Freeman, Gilbert, Management, Pearson Education,New Delhi, 2012.

REFERENCE BOOKS:

1. Kotler Philip & Keller Kevin Lane: Marketing Mangement , PHI,2013.
2. Koontz & Weihrich: Essentials of Management, 6/e, TMH, 2005.
3. Thomas N.Duening& John M.Ivancevich ManagementPrinciples and Guidelines,Biztantra.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2004.
5. Memoria & S.V.Gauker, Personnel Management, Himalaya, 25/e, 2005
6. Samuel C.Certo: Modern Management, 9/e, PHI, 2005
7. Schermerhorn, Capling, Poole & Wiesner: Management, Wiley, 2002.
8. Parnell: Strategic Management, Biztantra, 2003.
9. Lawrence R Jauch, R.Gupta &William F.Glueck: Business Policy and Strategic Management, Frank Bros., 2005.
10. L.S.Srinath: PERT/CPM,Affiliated East-West Press, 2005.

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B.Tech. III – I Sem. (C.S.E)	**L**	**P**	**C**
	0	**4**	**2**

15A05506: Operating Systems and Data Mining Lab

Course Objectives:

- To understand the design aspects of operating system
- To solve various synchronization problems
- Learn how to build a data warehouse and query it (using open source tools like Pentaho Data Integration and Pentaho Business Analytics), Learn to perform data mining tasks using a data mining toolkit (such as open source WEKA), Understand the data sets and data preprocessing, Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering and regression, Exercise the data mining techniques with varied inputvalues for different parameters.

Course Outcomes	
CO1	Ensure the development of applied skills in operating systems related areas
CO2	Able to write software routines modules or implementing various concepts of operating system
CO3	Ability to perform data preprocessing tasks and Demonstrate performing association rule mining on data sets
CO4	Ability to perform classification, clustering and regression on data sets
CO5	Ability to design data mining algorithms

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1										3			2		
CO2				2						2				2	
CO3				1	2	2									
CO4				2	3	2								2	
CO5				3		2								3	

PART-A Operating Systems

1. Simulate the following CPU scheduling algorithms
a) Round Robin b) SJF c) FCFS d) Priority
2. Simulate all file allocation strategies
a) Sequential b) Indexed c) Linked
3. Simulate MVT and MFT
4. Simulate all File Organization Techniques
a) Single level directory b) Two level c) Hierarchical d) DAG

5. Simulate Bankers Algorithm for Dead Lock Avoidance
6. Simulate Bankers Algorithm for Dead Lock Prevention
7. Simulate all page replacement algorithms
a) FIFO b) LRU c) LFU Etc. …
8. Simulate Paging Technique of memory management

Reference Books :

1. Operating System Concepts‖, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth edition, John Wiley.
2. Operating Systems: Internals and Design Principles‖, Stallings, Sixth Edition–2009, PearsonEducation
3. Modern Operating Systems‖, Andrew S Tanenbaum, Second Edition, PHI.
4. Operating Systems‖, S.Haldar, A.A.Aravind, Pearson Education.
5. Principles of Operating Systems‖, B.L.Stuart, Cengage learning, India Edition.
6. Operating Systems‖, A.S.Godbole, Second Edition, TMH.
7. An Introduction to Operating Systems‖, P.C.P. Bhatt, PHI

Part: B Data Mining

Task 1: Credit Risk Assessment

Description:

The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient.
To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.
1. Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.
2. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.
3. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

The German Credit Data:

Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data. In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer !)

A few notes on the German dataset

- DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).
- Owns_telephone. German phone rates are much higher than in Canada so fewer people own telephones.
- foreign_worker. There are millions of these in Germany (many from Turrkey). It is very hard to get German citizenship if you were not born of German parents.

- There are 20 attributes used in judging a loan applicant. The goal is the classify the applicant into one of two categories, good or bad.

Subtasks: (Turn in your answers to the following tasks)

1. List all the categorical (or nominal) attributes and the real-valued attributes seperately. (5 marks)

2. What attributes do you think might be crucial in making the credit assessment ? Come up with some simple rules in plain English using your selected attributes. (5 marks)

3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training. (10 marks)
4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy? (10 marks)
5. Is testing on the training set as you did above a good idea? Why or Why not ? (10 marks)
6. One approach for solving the problem encountered in the previous question is using cross-validation? Describe what is cross-validation briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why? (10 marks)
7. Check to see if the data shows a bias against "foreign workers" (attribute 20), or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss. (10 marks)
8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.) (10 marks)
9. Sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifcations equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)? (10 marks)
10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model? (10 marks)
11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase? (10 marks)
12. (Extra Credit): How can you convert a Decision Trees into "if-then-else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules. PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one ! Can you predict what attribute that might be in this dataset ? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the

rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR. (10 marks)

Task Resources:

- Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)
- Decision Trees (Source: Tan, MSU)
- Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)
- Weka resources:
  - Introduction to Weka (html version) (download ppt version)
  - Download Weka
  - Weka Tutorial
  - ARFF format
  - Using Weka from command line

Task 2: Hospital Management System

Data Warehouse consists Dimension Table and Fact Table.

REMEMBER The following

Dimension

The dimension object (Dimension):

_ Name

_ Attributes (Levels) , with one primary key

_ HierarchiesOne time dimension is must.

About Levels and Hierarchies

Dimension objects (dimension) consist of a set of levels and a set of hierarchies defined over those levels. The levels represent levels of aggregation. Hierarchies describe parent-child relationships among a set of levels.

For example, a typical calendar dimension could contain five levels. Two hierarchies can be defined on these levels:

H1: YearL > QuarterL > MonthL > WeekL > DayL

H2: YearL > WeekL > DayL

The hierarchies are described from parent to child, so that Year is the parent of Quarter, Quarter the parent of Month, and so forth.

About Unique Key Constraints

When you create a definition for a hierarchy, Warehouse Builder creates an identifier keyfor each level of the hierarchy and a unique key constraint on the lowest level (Base Level) Design a Hospital Management system data warehouse (TARGET) consists of DimensionsPatient, Medicine, Supplier, Time. Where measures are _ NO UNITS‘, UNIT PRICE.

Assume the Relational database (SOURCE) table schemas as followsTIME (day, month, year),

PATIENT (patient_name, Age, Address, etc.,)

MEDICINE (Medicine_Brand_name, Drug_name, Supplier, no_units, Uinit_Price, etc.,)

SUPPLIER :(Supplier_name, Medicine_Brand_name, Address, etc.,)

If each Dimension has 6 levels,decide the levels and hierarchies, Assume the level namessuitably. Design the Hospital Management system data warehouse using all schemas. Give the example 4-D cube with assumption names.

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L	P	C
0	**4**	**2**

15A05507: Compiler Design and Assembly Language Programming Lab

Course Objective
- To implement some of the functionality of the compiler
- To do programming using compiler related tools

Course Outcomes	
CO1	Develop compiler tools
CO2	Design simple compiler
CO3	To Learn Assembler Directives and Instructions of 8086
CO4	Execution of different programs for 8086 in Assembly Level Language using an assembler

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				3				1	2			1	3	
CO2	3	2		1	3						2			3	
CO3	3				3					1				3	
CO4	3	2	2		3									3	

Complier Design Lab
1. Write a program to search for a given pattern in a set of files. It should support regular expressions. It should work similar to grep and fgrep of Linux environment.
2. Write programs for DFA, NFA.
3. Consider the following regular expressions:a) (0 + 1)* 1(0+1)(0+1)
   b) $(ab^*c + (def)^+ + a^*d^+e)^+$
   c) $((a + b)^*(c + d)^*)^+ + ab^*c^*d$
   Write separate programs for recognizing the strings generated by each of the regularexpressions mentioned above (Using FA).
4. Given a text-file which contains some regular expressions, with only one RE in each line of the file. Write a program which accepts a string from the user and reports which regular expression accepts that string. If no RE from the file accepts the string, then report that no RE is matched.
5. Design a PDA for any given CNF. Simulate the processing of a string using the PDA and show the parse tree.
6. Design a Lexical analyzer for identifying different types of tokens used in C language.

Note: The reserved keywords such as if, else, class, structetc must be reported as invalid identifiers. C allows identifier names to begin with underscore character too.

7. Simulate a simple desktop calculator using any lexical analyzer generator tool (LEX or FLEX).
8. Program to recognize the identifiers, if and switch statements of C using a lexical analyzergenerator tool.
9. Consider the following grammar:S -->
   ABC
   A-->abA | abB--> b |
   BC
   C--> c | cC
   Design any shift reduced parser which accepts a string and tells whether the string isaccepted by above grammar or not.
10. Design a YACC program that reads a C program from input file and identify all valid C identifiers and for loop statements.
11. Program to eliminate left recursion and left factoring from a given CFG.
12. YACC program that reads the input expression and convert it to post fix expression.
13. YACC program that finds C variable declarations in C source file and save them into thesymbol table, which is organized using binary search tree.
    YACC program that reads the C statements from an input file and converts them intoquadruple three address intermediate code identifiers and for loop statements.
14. Program to eliminate left recursion and left factoring from a given CFG.
15. YACC program that reads the input expression and convert it to post fix expression.
16. YACC program that finds C variable declarations in C source file and save them into thesymbol table, which is organized using binary search tree.
17. YACC program that reads the C statements from an input file and converts them intoquadruple three address intermediate code

Reference Books :

1. ―Compiler Design using FLEX and YACC‖, Das, PHI.
2. ―Compiler Design in C‖, Holub, PHI.

Assembly Language Programming Lab

Course Objective

- To Learn Assembler Directives and Instructions of 8086
- To Understand the programming Concepts of 8086.
- To Write basic Programs for 8086 using an assembler.

Course Outcomes

- Execution of different programs for 8086 in Assembly Level Language using an assembler

List of Experiments:

1. Introduction to assembler.

2. Assembly Language Programs for Arithmetic operation-Multi byte addition and subtraction, Multiplication and Division –Signed and unsigned Arithmetic operations on 8086.

3. Assembly Language Programs for ASCII-arithmetic operation on 8086.

4. Assembly Language Programs for Logic operations-Shift and rotate for 8086.

5. Assembly Language Programs for converting packed BCD to unpacked BCD, BCD to ASCII conversion, and number conversions for 8086.

6. Assembly Language Programs for using string operation and instruction prefix: Move Block, Reversestring, Sorting, Inserting, Deleting, Length of the string, String comparison for 8086.
7. Assembly Language Programs for DOS/BIOS programming: Reading keyboard (Buffered with andwithout echo)-Display characters, Strings for 8086.
8. Assembly Language Programs for demonstrating the use of MACROS and Procedures in 8086.
9. Assembly Language Programs for searching a number or character in a string for 8086.
10. Assembly Language Programs for 64 bit arithmetic operations for 8086 (using various addressingmodes). ‖.

Reference Books :

1. Microprocessor and Interfacing 8086,8051, 8096 and advanced processors‖, Senthil Kumar, Saravanan, Jeevanathan, Shah, Oxford Publishers, 2012.
2. 8086 microprocessor: Programming and Interfacing the PC‖, Kenneth Ayala, Cengage Learning
3. The X86 Microprocessors‖, Lyla B. Das. Pearson, 2012.

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L	P	C
4	0	4

15A05601: Computer Networks

Course Objectives:

- Study the evolution of computer networks and future directions.
- Study the concepts of computer networks from layered perspective.
- Study the issues open for research in computer networks

Course Outcomes	
CO1	Students are able to analyze basic transmissions of data by understanding OSI layers.
CO2	Students are able to analyze various routing protocols in Data Link Layer
CO3	Students are able to classify suitable routing algorithms for network applications
CO4	students are able to interpret design principles of TCP and UDP for Network connection Establishment
CO5	Students are able to implement working principle of client/server application with application layer protocols

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3		3							3		3		
CO2	3	3		3							3		3		
CO3	2						3							2	
CO4	3	3	3	3										3	
CO5	2		3		3	2	3						3	3	

Unit I

Introduction: Networks, Network Types, Internet History, Standards and Administration, Network Models: Protocol Layering, TCP/IP Protocol Suite, The ISO Model.

The Physical layer: Data and Signals, Transmission impairment, Data rate limits, Performance, Transmission media: Introduction, Guided Media, Unguided Media, Switching: Introduction, Circuit Switched Networks, Packet switching.

Unit II

The Data Link Layer: Introduction, Link layer addressing, Error detection and Correction:Cyclic codes, Checksum, Forward error correction, Data link control: DLC Services, Data linklayer protocols, HDLC, Point to Point Protocol, Media Access control: Random Access,Controlled Access, Channelization, Connecting devices and virtual LANs: Connecting Devices.

Unit III

The Network Layer: Network layer design issues, Routing algorithms, Congestion control algorithms, Quality of service, Internetworking, The network layer in the Internet: IPV4 Addresses, IPV6, Internet Control protocol, OSPF, BGP, IP, ICMPv4, IGMP.

Unit IV

The Transport Layer: The Transport Service, Elements of Transport Protocols, Congestion Control, The internet transport protocols: UDP, TCP, Performance problems in computer networks, Network performance measurement.

Unit V

The Application Layer: Introduction, Client Server Programming, WWW and HTTP, FTP, e- mail, TELNET, Secure Shell, Domain Name System, SNMP.

Text Books:

1. Data communications and networking‖, Behrouz A. Forouzan, Mc Graw Hill Education, 5th edition, 2012.
2. Computer Networks‖, Andrew S. Tanenbaum, Wetherall, Pearson, 5th edition, 2010.

References:

1. Data Communication and Networks, Bhushan Trivedi, Oxford
2. Internetworking with TCP/IP – Principles, protocols, and architecture- Volume 1, Douglas E. Comer, 5th edition, PHI
3. Computer Networks‖, 5E, Peterson, Davie, Elsevier.
4. Introduction to Computer Networks and Cyber Security‖, Chawan- Hwa Wu, Irwin, CRC Publications.
5. Computer Networks and Internets with Internet Applications‖, Comer

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15A05602: Object Oriented Analysis and Design Using UML

Course Objective:

- To understand how to solve complex problems
- Analyze and design solutions to problems by using object oriented approach
- To study the Unified Modeling Language and use it for problem solving

COURSE OUTCOMES	
CO1	Students are able to model any applications using object oriented concepts
CO2	Student must be able to develop class Diagrams, Object Diagram and Interaction Diagram.
CO3	Student must be able to develop the use cases, use cases Diagrams and Activity Diagram for the given applications
CO4	Student must be able to design state chart Diagrams, Component Diagram and Deployment Diagram.
CO5	Student must be able to create a documentation of the project for the unified Library application

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2		3										2		
CO2		2	3	2	3									3	
CO3	3	2	3	3	3									3	
CO4	3	2	3	3	3									3	
CO5	3	3		3		3				3					3

UNIT I

Introduction: The Inherent Complexity of software, the structure of complex systems, bringing order to chaos, designing complex systems, evolution of object model, foundation of object model, elements of object model, applying the object model.

UNIT II

Classes and Objects: Nature of object, relationships among objects, nature of a class, relationship among classes, interplay of classes and objects, building quality classes and objects, importance of proper classification, identifying classes and objects, key abstractions and mechanisms.

UNIT III

Introduction to UML: Why we model, conceptual model of UML, architecture, Software development life cycle, classes, relationships, common mechanisms, class diagrams, object diagrams, advanced classes, advanced relationships.

UNIT IV

Structural and Behavioral Modeling: Interfaces, types & roles, packages, instances, interactions, use cases, use case diagrams, activity diagrams, component and component diagrams.

UNIT V

Advanced Behavioral and Architectural Modeling: Events and signals, state machine, processes and threads, time and space, state diagrams, deployment & deployment diagrams, collaborations.

Text Books:

1. Object- Oriented Analysis And Design with Applications‖, Grady BOOCH, Robert A. Maksimchuk, Michael W. ENGLE, Bobbi J. Young, Jim Conallen, Kellia Houston, 3rd edition, 2013, PEARSON

2. The Unified Modeling Language User Guide‖, Grady Booch, James Rumbaugh, Ivar Jacobson, 12th Impression, 2012, PEARSON.

Reference Books:

1. Object-oriented analysis and design using UML‖, Mahesh P. Matha, PHI.
2. Head first object-oriented analysis and design‖, Brett D. McLaughlin, Gary Pollice, Dave West, O‟Reilly.
3. Object-oriented analysis and design with the Unified process‖, John W. Satzinger, Robert B. Jackson, Stephen D. Burd, Cengage Learning.
4. The Unified modeling language Reference manual‖, James Rumbaugh, Ivar Jacobson, Grady Booch, Addison-Wesley.

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15A05603: Unix and Shell Programming

Course Objectives:

1. A theoretical and practical study of the UNIX operating system and shell programmingover time.
2. Stating how the shell functions at the user interface and command line interpreter.
3. Create scripts to automate common tasks in UNIX system, and to guard against maliciousintents against the UNIX operating system.
4. Modify built-in shell variables and create and use user-defined shell variables.
5. Create shell programs which process interrupts, pass signals, invoke sub-shells andfunctions, and trap signals.
6. Use I/O redirection, pipes, quoting, and filename expansion mechanisms.
7. To provide support for distributed and networked applications in UNIX environment.
8. To understand the usage of UNIX inter process communications (IPC).
9. To understand the concepts of multithreaded programming and socket programming.

Course Outcomes:

CO1. The course delegates will have the fundamental skills required to write simple and complex Shell scripts to automate jobs and processes in the Unix environment.

CO2. Identify and use UNIX/Linux utilities to create and manage simple file processing operations, organize directory structures with appropriate security, and develop shell scripts to perform more complex tasks.

CO3. Work confidently in Unix/Linux environment.

CO4. Write shell scripts to automate various tasks.

CO5. Effectively use the UNIX/Linux system to accomplish typical personal, office, technical, and software development tasks.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		1										2	2	
CO2		3											3		
CO3				3		2								3	
CO4			3	2									2		
CO5										2				2	

Unit I

Introduction: Operating System, History of UNIX, Overview and Features of Unix System, Structure of Unix System, Unix Environment.

Editors in Unix: introduction, Stream editor, Emacs Editor.

Unix File System: Introduction of Files, Organization of File Systems, Accessing File Systems, Structure of File Systems.

Unix Commands: Basic Commands, Advanced Unix Commands: File Access Permissions, Pipe Operator, cut, paste, wc, sort, head, tail, diff, cmp, uniq, comm, time, Conversions between DOS and Unix, man.

Unit II

File management and Compression Techniques: Managing and Compressing Files, Computer Devices, Disk related Commands, Compression and Uncompressing Files, Important Unix System Files, Shell Variables, Export of Local and Global Shell Variables.

Files and Directories: File Concept, File types, File System Structure,file metadata-Inodes, kernel support for files, system calls for file I/O operations- open, creat, read, write, close, lseek, dup2,file status information-stat family, file and record locking-lockf and fcntl functions,file permissions - chmod, fchmod,file ownership-chown,lchown,fchown, links-soft links and hard links – symlink, link, unlink.

Directories: Creating,removing and changing Directories-mkdir, rmdir, chdir, obtaining current working directory-getcwd, Directory contents,Scanning Directories-opendir, readdir, closedir,rewinddir, seekdir, telldir functions.

Unit III

Signals: Process Basics, Processes States and Transitions, Zombie Process, Context switching, Threads, ps-status of Process.

System calls: Introduction, File-related System calls (open, create, read, write, lseek, close, mknod, link and unlink, access, and chown, chmod), Directory Handling System calls (mkdir, rmdir, chdir, opendir, readdir, telldir, closedir). Porcess related System calls (exec, fork, wait,exit).

Unit IV

AWK Script: AWK Command, print, printf, Displaying Content of Specified Patterns, Comparison Operators, Compound Expressions, Arithmetic Operators, Begin and end Sections, User-defined Variables, if else Statement, Built-in Variables, Changing Input Filed Separator, Functions, Loops, Getting Input from User, Search and Substitute Functins, Copying results into Another file. **Bourne Shell**: Introduction, beginning Bourne Shell Scripting, Writing Shell Scripts, Command Line Parameters, read, for Loop, While Loop, if Statement, Bourne Shell Commands.

Unit V

Interprocess Communications: Interprocess Communication, Synchronization, Filters.

Sockets- Introduction to Berkeley Sockets, IPC over a network, Client-Server model,Socket address structures (Unix domain and Internet domain),Socket system calls for connection oriented protocol and connectionless protocol, example-client/server programs-Single Server Client connection,Multiple simultaneous clients, Comparison of IPC mechanisms.

Text Books:

1. UNIX and SHELL Programming‖, B.M. HARWANI, OXFORD UNIVERSITY PRESS.
2. Unix System Programming using C++, T.Chan, PHI.
3. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH,2006.

References:

1. UNIX and Linux System Administration Handbook‖, Evi Nemeth, Garth Snyder, Trent R. Hein and Ben Whaley, PHI.
2. Essential Linux Administration: A Comprehensive Guide for Beginners‖, Chuck Easttom, Cengage Learning.
3. The Linux Programming Interface: A Linux and UNIX System Programming Handbook‖, Michael Kerrisk, No Starch Press.
4. A Practical Guide to Linux Commands, Editors, and Shell Programming‖, 3rd Edition, Mark G. Sobell, PHI.
5. Advanced Programming in the UNIX Environment‖, 3rd Edition, W. Richard Stevens and Stephen A. Rago, Addison-Wesley professional.
6. UNIX Network Programming‖, W. Richard Stevens, PHI–Unix: *The Ultimate Guide",* Sumitabha Das, Tat Mcgraw-Hill Edition, Indian reprint 2012

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	L	P	C
B.Tech. III – II Sem. (C.S.E)	**4**	**0**	**4**

15A05604: Web Technologies

Course Objectives:

- Learn the fundamentals of HTML and JavaScript
- Learn to communicate over a network using java
- Learn do design server side programs and access them from client side

Course Outcomes:

CO1 Ability to design websites and do client side validations
CO2 Share information over a network
CO3 Ability to write server side programs.
CO4 Exposure to database programming using java
CO5 Ability to develop dynamic web page by the use of java script

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2				1	1				2		2	3	
CO2	3													3	
CO3	3		2								2			3	
CO4	3	2		2				1		2				3	2
CO5	3		2	2					2	2			2	3	2

Unit I

Fundamentals: Introduction to the Web, Web servers and Clients, Resources, URL and its Anatomy, Message Format, Persistent and Non-persistent connections, Web Caching, Proxy, Java and the Net, Java Network Classes and Interfaces, Looking up Internet Address, Client/Server programs, Socket programming, e-mail client, POP3 programs, Remote method invocation, Example.

Unit II

HTML: HTML and its Flavors, HTML basics, Elements, Attributes and Tags, Basic Tags, Advanced Tags, Frames, Images, Meta tag, Planning of Web page, Model and Structure for a Website, Designing Web pages, Multimedia content.

Cascading style sheets: Advantages, Adding CSS, Browser compatibility, CSS and page layout,Selectors.

Unit III

JavaScript: Introduction, Variables, Literals, Operators, Control structure, Conditional statements, Arrays, Functions, Objects, Predefined objects, Object hierarchy, Accessing objects, Events, Event handlers, Multiple windows and Frames, Form object and Element, Advanced JavaScript and HTML, Data entry and Validation, Tables and Forms, DHTML with javascript.

Unit IV

Server side programming: Internet programming paradigm, Sever-side programming, Languages for CGI, Applications, Server environment, Environment variables, CGI building blocks,CGI scripting using C, Shell script, Writing CGI program, CGI security, Alternatives and Enhancement to CGI, Server-side Java, Advantages over Applets, Servlet alternatives, Servlet strengths, Servlet architecture, Servlet life cycle, Generic and HTTP Servelet, First servlet, Passing parameters to servlets, Retrieving parameters, Server-side include, Cookies, Fileters, Problems with servlet, Security issues, JSP and HTTP, JSP Engines, How JSP works, JSP and Servlet, Anatomy of a JSP page, JSP syntax, JSP components.

Unit – V

Sever side programming: continued: Beans, Session tracking, Users passing control and data between pages, Sharing session and Application data, Database connectivity, JDBC drivers, Basic steps, Loading a driver, Making a connection, Execute and SQL statement, SQL statements, Retrieving the result, Getting database information, Scrollable and updatable resultset, Result set metadata, Introduction to JavaBeans, Bean builder, Advantages of Java Beans, BDK introspection, Properties, BeanInfo interface, Persistence, Customizer, JavaBeans API, EJB, Introduction to Structs Framework.

Text Books:

1. Web Technologies‖, Uttam K. Roy, Oxford Higher Education., 1st edition, 10th impression, 2015

References:

1.Java How to program‖, Paul deitel, Harvey deital, PHI.
2. Introduction to Java Programming‖, Y.Daniel Liang, 6th Edition, Pearson Education, 2007
3. The J2EE Tutorial‖, Stephanie Bodoff et al, 2nd Edition, Pearson Education, 2004.
4. Web Technologies‖, Roy, Oxford University Press
5.Web Technologies‖ Srinivasan, Pearson Education, 2012
6.Java EE 5 for Beginners‖, Ivan Bayross, Sharanam Shah, Cynthia Bayrossand Vaishali shai,SPD.
7.Programming the Worldwide Web‖, Robert W.Sebesta, 7th edition, 2009, Pearson Education.

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L	P	C
4	0	4

15A05605: Software Testing Methodologies

Course objectives:

- Study the significance of testing
- Study the testing to be done at various levels.
- Understand the procedure for designing test cases.

Course Outcomes:

CO1 Ability to systematically test the applications
CO2 Ability to write test cases
CO3 Ability to use testing tools effectively.
CO4 Find practical solutions to the problems
CO5 Solve specific problems alone or in teams

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3											2		
CO2				3										2	
CO3			2										1		
CO4						2								2	
CO5										3			2		

Unit – 1

Introduction to Quality: Introduction, Historical perspective of quality, what is quality?(Is it a fact or perception?),Definitions of Quality, Core components of Quality, Quality view, Financial Aspect of Quality, Definition of Quality, customers, suppliers and processes, Total Quality management(TQM), Quality principles of _Total Quality Management, Quality Management Through Statistical Process Control and Cultural changes, Continual Improvement Cycle, Quality in different areas, Bench Marketing and Metrics, Problem solving Techniques, Problem solving Software Tools.

Software Quality: Introduction, Constraints of Software product Quality Assessment, Customer is a King, Quality and Productivity Relationship, Requirements of Product, Organisation culture, Characteristics of Software, Software Development process, Types of Products, Some other Schemes of Criticality Definitions, Problematic areas of SDLC, Software Quality Management, Why software has defects?, Process related to software Quality, Quality management System Structure, Pillars of Quality Management System, Important aspects of Quality management.

Fundamentals of Software Testing: Introduction, Historical Perspective of Testing, Definition of Testing, Approaches to Testing, popular definitions of Testing, Testing during Development Life Cycle, Requirement Traceability Matrix, Essential of Software Testing, Workbench, Important features of Testing, Misconceptions about Testing, Principles of Software Testing, salient features of Software Testing, Test policy, Test Strategy or Approach, Test planning, Testing process and Number of defects found in testing, Test team Efficiency, Mutation Testing, Challenges in testing, Test team approach , Process problems faced by testing, Cost Aspect of Testing, Establishing Testing policy , Methods, Structured approach to Testing, categories of defects, Defect , error, or Mistake in software, Developing Test Strategy, Developing Testing Methodology, Testing process, Attitude towards Testing, People challenges in software Testing, Raising Management awareness for Testing, Skills Required by Tester.

Unit – 2

Configuration Management: Introduction, Configuration Management, Cycle of Configuration Management, Configuration Management Process, Auditing Configuration Library,Configurable Item, Baselining, Storage of configurable Items in library, Using automated configuration tools, Configuration management Planning.

Risk Analysis: Introduction, Advantages and disadvantages of automated System, Risk, constraints, Project Risks, Product Risks, Risks faced due to software System, Software Implementation Skills, Identification of Risks, Types of Software Risks, Handling of risks in Testing, Types of Actions for risk control Management, Risks and testing, Assumptions in testing, Prioritisations in testing, Risks of Testing.

Software verification and validation: Introduction, verification, verification workbench, Methods of verification, Types of review on the basis of stage/phase, Example of Entities Involved in verification, Reviews in verification life cycle, Converge in Verification, concerns of verification, validation, validation workbench, levels of validation, converge in validation, Acceptance testing, Management of verification and validation, software development verification and validation activities.

Unit- 3

V-Test Model: Introduction, v model for Software, Testing during Proposal stage, testing during Requirement stage, testing during Test- planning phase, testing during design phase, testing during coding, VV model, Critical Roles and responsibilities.

Defect Management: Introduction, Defect Classification, Defect management process, Defect Life Cycle, Defect Template, Defect Management Process, Estimate expected Impact of defect, Why Defect Management needs a Risk Discussion?, Testing for Finding Defects, Reporting a defect.

Unit-4

Levels of Testing: Introduction, Proposal Testing, Requirement Testing, Design Testing, Code review, Unit Testing, Module Testing, Integration Testing, Bing-Bang Testing, Sandwich Testing, Critical path First, Subsystem Testing, System Testing, Testing stages.

Acceptance Testing: Introduction, Acceptance Testing Criteria, Importance of Acceptance Criteria, Alpha Testing, Beta Testing, Gamma Testing, Acceptance Testing during each phase of software development, consideration of Alpha and Beta Testing , Fits for Acceptance Testing, Define Acceptance Criteria, Criticality of Requirements, Factors affecting Criticality of Requirements, Developing Acceptance planning, Software Acceptance plan, User Responsibilities in Acceptance test plan, Executing Acceptance plan.

Testing Tools: Introduction, Features of Test tools, Guidelines for selecting a tool, Tools and skills of tester, Static testing tools, dynamic testing tools, Advantages and disadvantages of using tools, When to use Automated Test tool, Testing using Automated Testing tool, Difficulties while Introducing new tools, process of Procurement of COTS, Procurements of tools from contractor, Advantages of tools developed by external Organisations, Contracting a Software, Process of Procurement of tools from contactor.

Unit-5

Testing Process: Introduction, Test policy, content of policy in general, Test Strategy, content of Test Strategy in general, Test planning, Test plan, Quality plan and test plan, Quality plan template, Test plan Template, Guidelines for developing the Test plan, Test Administration definition, Test estimation, Test standards, Building test data and test cases, Test scenario, test cases, Test management software, Test log document, Effective test cases, Test file, Building test data, Generation of test data, tools used to Build test data, Roles and Responsibilities in Testing Life cycle, Test Progress Monitoring.

Test Metrics and Test Reports: Introduction, Testing Related data, Defect data, Efficiency/ Productivity data, categories of product/project Test Metrics, Estimated, Budgeted, Approved and actual, Resources consumed in Testing, Effectiveness of Testing, Defect Density, Defect Leakage ratio(Defect life),Residual defect density, Test team Efficiency, Test case Efficiency,

Rework, MTBF/MTTR, Implementing Measurement Reporting system in an organisation, Test Reports, Project Test status Report, Test Reports, Integration test Reports, System test report , Acceptance test report, guidelines for writing and using reports, Final test reports, Test status reports, Benchmarketing.

Text Book:

1. Software Testing Principles, Techniques and Tools by M G Limaye, M G Hill.

Reference Books:

1. Fundamentals of Software Testing by Rex Black, Erik Van Veenendaal and Dorothy Graham
2. Software Testing by Sanjay Mohapatra,sumankumarkanth M G HILL.
3. The Craft of Software Testing by Brian Marik. pearson Edition.

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	4	**0**	**4**

15A05606a: Human Computer Interaction
(Open Elective/Cbcs)

Course Objectives:

- Gain an overview of Human-Computer Interaction (HCI), with an understanding of user interface design in general, and alternatives to traditional "keyboard and mouse" computing
- Become familiar with the vocabulary associated with sensory and cognitive systems as relevant to task performance by humans
- Be able to apply models from cognitive psychology to predicting user performance in various human-computer interaction tasks and recognize the limits of human performance as they apply to computer operation
- Be familiar with a variety of both conventional and non-traditional user interface paradigms

Course Outcomes:
CO1 Find innovative ways of interacting with computers
CO2 Help the disabled by designing non-traditional ways of interacting
CO3 Use cognitive psychology in the design of devices for interaction.
CO4 Acquire knowledge deep learning and be able to implement deep learning models for language, vision, speech, decision making, and more.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2		1	1									1	1	
CO2	1			1										1	
CO3	1	1	2	1									2	1	
CO4	1		1											1	

UNIT- I

Introduction: Importance of user Interface – definition, importance of good design, Benefits of good design, A brief history of Screen design.

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics

Web user Interface - popularity, characteristics- Principles of user interface.

UNIT- II

Design process – Understanding how people interact with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business functions.

Screen Designing: Design goals – Screen meaning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT- III

System menus: Structures of Menus, Functions of Menus, Content of Menus, Kinds of Graphical menus
Windows: Window characteristics, Components of a window, Window presentation styles, Types of windows, Windom management

UNIT- IV

Controls: Characteristics of device based controls, Selecting the proper device based controls, Operable controls, Text Entry/Read-only controls, Selection controls, Combination Entry/selection controls, Selecting the proper controls.

UNIT- V

Graphics: Icons, Multimedia, Color-what is it, Color uses, Color and Human vision, Choosingcolors
Testing: The purpose and importance of usability testing, Scope of testing, Prototypes, Kinds of Tests, Developing and conducting the test.

Text books:

1. The essential guide to user interface design‖, Wilbert O Galitz,, Wiley, 2nd edition, 2013.

References:

1. Designing the user interface‖, 3rd Edition Ben Shneidermann, Pearson Education Asia.
2. Human –Computer Interaction‖, D.R.Olsen, Cengage Learning.
3. Human – Computer Interaction‖, I.Scott Mackenzie, Elsevier Publishers.
4. Interaction Design‖, Prece, Rogers, Sharps, Wiley Dreamtech.
5. User Interface Design‖, Soren Lauesen , Pearson Education.
6. Human –Computer Interaction‖, Smith - Atakan, Cengage Learning

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	4	0	4

15A05606b : Introduction to Machine Learning

(Open Elective/CBCS)

Objectives:

- To understand the basic theory underlying machine learning.
- To be able to formulate machine learning problems corresponding to differentapplications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To be able to apply machine learning algorithms to solve problems of moderate complexity.

Course Outcomes	
CO1	Ability to understand what is learning and why it is essential to the design of intelligent machines.
CO2	Apply theoretical foundations of decision trees to identify best split and Bayesian classifier to label data points
CO3	Acquire knowledge in deep learning and be able to implement deep learning models for language, vision, speech and decision making
CO4	Illustrate the working of classifier models like SVM, Neural Networks and identify classifier model for typical machine learning applications
CO5	Illustrate and apply clustering algorithms and identify its applicability in real life problems.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2				3		1						3		
CO2		3	2	1											
CO3	2	3	2		3	1							3	2	
CO4					3										
CO5		3							1	1		1	3	2	

Unit I:

What is Machine Learning?, Examples of machine learning applications, supervised Learning: learning a class from examples, Vapnik- Chervonenkis dimension, probably approximately correct learning, noise, learning multiple classes, regression, model selection and generalization, dimensions of a supervised machine learning algorithm. Decision Tree Learning: Introduction, Decisions Tree representation, Appropriate problems for decision tree learning, the basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, issues in decision tree learning, Artificial Neural Networks: Introduction, Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back

Propagation Algorithm, Remarks on the BACKPROPGRATION Algorithm, An illustrative Example: Face Recognition, Advanced Topics in Artificial Neural Networks.

Unit 2:

Evaluating Hypotheses: Motivation, Estimating hypothesis accuracy, basics of sampling theory, a general approach for deriving confidence intervals, differences in error of two hypothesis, comparing learning algorithms, Bayesian Learning: Introduction, Bayes Theorem, Bayes Theorem and Concept Learning, Maximum Likelihood and least squared error hypothesis,Maximum Likelihood hypothesis for predicting probabilities, Minimum Description Length Principle, Bayes Optimal Classifier, Gibbs Algorithm , Naïve Bayes Classifier , Bayesian Belief Network, EM Algorithm

Unit 3:

Dimensionality Reduction: Introduction, Subset selection, principle component analysis, feature embedding, factor analysis, singular value decomposition and matrix factorization, multidimensional scaling, linear discriminant analysis, canonical correlation analysis, Isomap, Locally linear embedding, laplacian eigenmaps, Clustering: Introduction, Mixture densities, K- Means clustering, Expectations- Maximization algorithm, Mixture of latent variable models, supervised learning after clustering, spectral clustering, Hierarchal clustering, Choosing the number of clusters, Nonparametric Methods: Introduction, Non Parametric density estimation, generalization to multivariate data, nonparametric classification, condensed nearest neighbor, Distance based classification, outlier detection, Nonparametric regression: smoothing models, how to choose the smoothing parameter

Unit 4:

Linear Discrimination: Introduction, Generalizing the linear model, geometry of the linear discrimination, pair wise separation, parametric discrimination revisited, gradient descent, logistic discrimination, discrimination by regression, learning to rank, Multilayer Perceptrons: Introduction, the perceptron, training a perceptron, learning Boolean functions, multilayer perceptrons, MLP as a universal approximator, Back propagation algorithm, Training procedures, Tuning the network size, Bayesian view of learning, dimensionality reduction, learning time, deep learning

Unit 5:

Kernel Machines: Introduction, Optimal separating hyperplane, the non separable case: Soft Margin Hyperplane, ν-SVM, kernel Trick, Vectorial kernels, defining kernels, multiple kernel learning, multicast kernel machines, kernel machines for regression, kernel machines for ranking, one-class kernel machines, large margin nearest neighbor classifier, kernel dimensionality reduction, Graphical models: Introduction, Canonical cases for conditional independence, generative models, d separation, belief propagation, undirected Graphs: Markov Random files, Learning the structure of a graphical model, influence diagrams.

Text Books:

1) Machine Learning by Tom M. Mitchell, Mc Graw Hill Education, Indian Edition, 2016.
2) Introduction to Machine learning, Ethem Alpaydin, PHI, 3rd Edition, 2014

References Books:

1) Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis, CRC Press Book

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15A05606c: Computer Graphics(Open Elective/CBCS)

Course Objective

- To know about different graphics hardware
- To study different techniques and algorithms related to Computer Graphics.
- To make the students understand the creation, storage, and manipulation of models and imagesof objects.
- Understand the basic concepts of multimedia and gain the skills required to work with them

Course Outcomes	
CO1	Ability to develop programs to control the content.
CO2	Ability to develop programs to control the structure
CO3	Ability to develop programs to control the appearance of objects.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1				2										2	
CO2	1	2		2										2	
CO3		2		2										2	

Unit - I :
Introduction: Computer-Aided design, Presentation graphics, Computer Art, Entertainment, Education and Training, Visualization, Image processing, Graphics user interfaces.
Graphics Systems: Video display devices, Raster scan systems, Random scan systems, Graphics monitors and workstations, Input devices, Hard-copy devices, Graphics software

Unit – II:
Basic Graphic algorithms: Overview, Scan converting lines, Scan converting Circles, Scan converting Ellipse, Filling rectangles, Filling polygons, Filling ellipse Arcs, Pattern filling, Clipping lines, Clipping circles and ellipse, Clipping polygons, Generating characters.
Geometrical Transformations: 2D Transformation, Homogeneous co-ordinates and matrix representation of 2D transformations, Composition of 2D transformations, The window-to-view port transformation, Efficiency.

Unit – III :
3D Transformations: Matrix representation of 3D transformations, Composition of 3D transformations, Transformations as a change in coordinate system.
Viewing in 3D: Projections, Specifying an arbitrary 3D view, Examples of 3D viewing.

Unit – IV

Curves and surfaces: Polygon meshes, Parametric cubic curves: Hermite curves, Bezier curves, Uniform non rational B-splines, Non uniform Non rational B-splines

Parametric Bicubic surfaces: Hermite surfaces, Bezier surfaces, B-spline surfaces

Visual realism: Why realism, Fundamental difficulties,Rendering techniques for line drawings, Rendering techniques for shaded images, Dynamics.

Unit – V :

Visible surface determination: Functions of two variables, Techniques for efficient visible surface algorithms, Algorithms for visible-line determination, The z-buffer algorithm, List priority algorithms,Scan line algorithms.

Illumination and Shading: Illumination models, Shading models for polygons, Surface detail, Shadows, Transparency.

Text Books :

1. Computer Graphics C version‖, Donald Hearn and M. Pauline Baker, 2nd edition, 2011, Pearson.
2. Computer Graphics Principles and Practice in C‖, Foley, Dam, Feiner, John, 2nd Edition, 2013, Pearson.

Reference Books :

1. Computer Graphics with Virtual Reality System‖, Rajesh K.Mourya, Wiley India.
2. Principles of Computer Graphics, Theory and Practice‖, Shalini, GovilPai, Springer.

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15A05606d: Artificial Neural Networks
(Open Elective/CBCS)

Course Objectives:

- To Survey of attractive applications of Artificial Neural Networks.
- To practical approach for using Artificial Neural Networks in various technical, organizational and economic applications.

Course Outcomes	
CO1	Create different neural networks of various architectures both feed forward and feed backward
CO2	Perform the training of neural networks using various learning rules.
CO3	Perform the testing of neural networks and do the perform analysis of these networks for various pattern recognition applications

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2												1		
CO2			2										2		
CO3		2													

UNIT I: INTRODUCTION: History of Neural Networks, Structure and Functions of Biological and Artificial Neuron, Neural Network Architectures, Characteristics of ANN, Basic Learning Laws and Methods.

UNIT II:SUPERVISED LEARNING: Single Layer Neural Network and architecture, McCulloch-Pitts Neuron Model, Learning Rules, Perceptron Model, Perceptron Convergence Theorem, Delta learning rule, ADALINE, Multi-Layer Neural Network and architecture, MADALINE, Back Propagation learning, Back Propagation Algorithm.

UNIT III:UNSUPERVISED LEARNING-1: Outstar Learning, Kohenen Self Organization Networks, Hamming Network and MAXNET, Learning Vector Quantization, Mexican hat.

UNIT IV:UNSUPERVISED LEARNING-2: CounterPropagation Network -Full Counter Propagation network, Forward Only Counter Propagation Network, Adaptive Resonance Theory (ART) -Architecture, Algorithms.

UNIT V :ASSOCIATIVE MEMORY NETWORKS : Introduction, Auto Associative Memory

,Hetero Associative Memory, Bidirectional Associative Memory(BAM) -Theory And Architecture, BAM Training Algorithm, Hopfield Network: Introduction, Architecture Of Hopfield Network.

TEXT BOOKS:

1. B.Yegnanarayana‖ Artificial neural networks‖ PHI ,NewDelhi.
2. S.N.Sivanandam ,S.N.Deepa, –Introduction to Neural Networks using MATLAB 6.0–, TATA MCGraw-Hill publications.
3. J .M. Zurada ,‖Introduction to Artificial neural systems‖ –Jaico publishing.

REFERENCE BOOKS:

1. S.Rajasekaran and G.A.Vijayalakshmi pai ―Neural Networks.Fuzzy Logic and geneticAlgorithms‖.
2. James A Freeman and Davis Skapura‖ Neural Networks Algorithm, applications andprogramming Techniques ‖, Pearson Education, 2002.
3. Simon Hakins ―Neural Networks ― Pearson Education.

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15A05606e:Grid Computing(Open elective/CBCS)

Course Objectives:

- To make Students will learn about Grid Computing and its technologies.
- To make Students to implement web service and its related technologies.
- To make Students to understand the Grid Infrastructure and to use toolkits.

Course Outcomes	
CO1	Understand Grid Infrastructure and its applications.
CO2	Use XML and Grid related technologies.
CO3	Analyze OGSA Platform components.
CO4	Understand OGSI and Grid services.
CO5	Use Grid Computing toolkits.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1			2									3		
CO2		2											2		
CO3		2											2		
CO4		2											2		
CO5		2											2		

UNIT-I

INTRODUCTION

Grid Computing values and risks – History of Grid computing – Grid computing model and protocols – overview of types of Grids

UNIT-II

TYPES OF GRIDS

Desktop Grids : Background – Definition – Challenges – Technology – Suitability – Grid server and practical uses; Clusters and Cluster Grids; HPC Grids; Scientific in sight – application and Architecture – HPC application development environment and HPC Grids; Data Grids; Alternatives to Data Grid – Data Grid architecture.

UNIT-III

ARCHITECTURE AND MANAGEMENT

The open Grid services Architecture – Analogy – Evolution – Overview – Building on the OGSA platform – implementing OGSA based Grids – Creating and Managing services – Services and the Grid – Service Discovery – Tools and Toolkits – Universal Description Discovery and Integration (UDDI)

UNIT-IV

NATIVE PROGRAMMING AND SOFTWARE APPLICATIONS

Desktop supercomputing – parallel computing – parallel programming paradigms – problems of current parallel programming paradigms – Desktop supercomputing programming paradigms – parallelizing existing applications – Grid enabling software applications – Needs of the Grid users – methods of Grid deployment – Requirements for Grid enabling software – Grid enabling software applications.

UNIT-V

APPLICATIONS , SERVICES AND ENVIRONMENTS

Application integration – application classification – Grid requirements – Integrating applications with Middleware platforms – Grid enabling Network services – managing Grid environments – Managing Grids – Management reporting – Monitoring – Data catalogs and replica management – portals – Different application areas of Grid computing.

Text Books:

1. Ahmar Abbas, ―Grid Computing , A Practical Guide to Technology and Applications‖,Firewall media , 2004.
2. Joshy Joseph , Craig Fellenstein , ―Grid Computing‖, Pearson Education , 2004.
3. Fran Berman, Geoffrey Fox, Tony Hey, ―Grid Computing-Making -The Global Infrastructure A Reality‖,John Wiley & Sons Ltd, 2003.
4. Rajkumar Buyya,High Performance Cluster Computing: Architectures and Systems, Vol.1,PHI,1999.

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15A05606f: Distributed Systems
(Open elective/CBCS)

Course Objectives:

- Understand the need for distributed systems and their applications
- Understand the concepts of remote procedure calls, remote file systems, distributed agreement, clock synchronization, and security.

Course Outcomes	
CO1	Able to Understand how the resources are shared and communicated from one system to another system
CO2	Able to Understand and use global states in different problems.
CO3	Able to Understand how transactions and distributed transactions are working in distributed environment.
CO4	Able to Understand how to provide security for sharable resources and processes in distributed environment.
CO5	Able to Understand architectures like RMI, CORBA, etc.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1				2							2		
CO2	1												2		
CO3					2								2		
CO4		1			2								2		
CO5		2			1								2		

UNIT I

Characterization of Distributed Systems-Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System Models-Introduction, Architectural and Fundamental models, Networking and Internetworking, Inter process Communication, Distributed objects and Remote Invocation-Introduction, Communication between distributedobjects, RPC, Events and notifications, Case study-Java RMI.

UNIT II

Operating System Support- Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture, Distributed File Systems- Introduction, File Service architecture, case study- SUN network file systems.
Name Services-Introduction, Name Services and the Domain Name System, Case study of the Global Name Service, Case study of the X.500 Directory Service.

UNIT III

Peer to Peer Systems–Introduction, Napster and its legacy, Peer to Peer middleware, Routing overlays, Overlay case studies-Pastry, Tapestry, Application case studies-Squirrel, Ocean Store.
Time and Global States-Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging.
Coordination and Agreement-Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

UNIT IV

Transactions and Concurrency control-Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control. Distributed Transactions-Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery, Replication-Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data.

UNIT V

Security-Introduction, Overview of Security techniques, Cryptographic algorithms, Digital signatures, Case studies-Kerberos, TLS,802.11 WiFi.
Distributed shared memory, Design and Implementation issues, Sequential consistency and Ivy case study, Release consistency and Munin case study, Other consistency models, CORBA case study-Introduction, CORBA RMI,CORBA Services.

TEXT BOOKS:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education.
2. Distributed Systems,S.Ghosh,Chapman&Hall/CRC,Taylor&Francis Group,2010.

REFERENCE BOOKS:

1. Distributed Computing,S.Mahajan and S.Shah,Oxford University Press.
2. Distributed Operating Systems Concepts and Design,Pradeep K.Sinha,PHI.
3. Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, TMH.
4. Reliable Distributed Systems,K.P.Birman,Springer.
5. Distributed Systems – Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, PearsonEducation.
6. Distributed Operating Systems and Algorithm Analysis,R.Chow,T.Johnson,Pearson.
7. Distributed Operating Systems,A.S.Tanenbaum,Pearson education.
8. Distributed Computing,Principles,Algorithms and Systems,Ajay D.Kshemakalyani and Mukesh Singhal,Cambridge,rp 2010.

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15A55601: Advanced Communications Skills Lab
(Compulsory Audit Course))

Course Outcomes	
CO1	Accomplishment of sound vocabulary and its proper use contextually
CO2	Flair in Writing and felicity in written expression
CO3	Effective Speaking Abilities for enhanced job prospects
CO4	Able to use technology to enhance job opportunities
CO5	Develop language competency and become confident users of English in interviews, Group Discussions, and Public Speaking

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1							1								
CO2								2							
CO3										1					
CO4								2			1				
CO5															

1. INTRODUCTION

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information to organise ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.

- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

2. OBJECTIVES:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

3. SYLLABUS:

The following course content to conduct the activities is prescribed for the Advanced CommunicationSkills (ACS) Lab:

UNIT-I: COMMUNICATIVE COMPETENCY

1. Reading Comprehension
2. Listening comprehension
3. Vocabulary for competitive purpose
4. Spotting errors

UNIT-II: TECHNICAL WRITING

1. Report writing
2. Curriculum vitae
3. E-mail writing
4. Abstract & Synopsis Writing
5. Reviewing (Book/Film)

UNIT-III: PRESENTATIONAL SKILLS

1. Oral presentation
2. Power point presentation
3. Poster presentation
4. Stage dynamics
5. Body Language

UNIT-IV: CORPORATE SKILLS

1. Telephonic skills
2. Net Etiquettes
3. SMART Goal setting

4. Time Management
5. Negotiation Skills

UNIT-V: GETTING READY FOR JOB

1. Group discussions-II
2. Interview skills
3. Answering Strategies
4. Mock Interviews

4. LEARNING OUTCOMES:

- Accomplishment of sound vocabulary and its proper use contextually
- Flair in Writing and felicity in written expression.
- Effective Speaking Abilities
- Enhanced job prospects.

5. MINIMUM REQUIREMENT:

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilitiesto accommodate at least 60 students in the lab:

- Spacious room with appropriate acoustics.
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ
- T. V, a digital stereo & Camcorder
- Headphones of High quality

6. SUGGESTED SOFTWARE:

The software consisting of the prescribed topics elaborated above should be procured and used.

1. **K-VAN SOLUTIONS-Advanced communication lab**
2. **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
3. **TOEFL & GRE**(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
4. **Train2success.com**

7. BOOKS RECOMMENDED:

1. **Objective English for Competitive Exams**, Hari Mohana Prasad, 4th edition, Tata Mc Graw Hill.
2. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, O U Press 2009.
3. Books on **TOEFL/GRE/GMAT/CAT/IELTS** by Barron's/DELTA/Cambridge University Press.2012.
4. **Soft Skills for Everyone,** Butterfield Jeff, Cengage Publications, 2011.
5. **Practice Psychometric Tests**: How to familiarize yourself with genuine recruitment tests, 2012.

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B.Tech III- II Sem.	**L**	**P**	**C**
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15A05607: Unified ModelingLanguage &Software Testing Lab

Course Objective

- Practice the notation for representing various UML diagrams
- Analyze and design the problem by using UML diagrams
- Become familiar with all phases of OOAD
  To learn to use the following (or Similar) automated testing tools to automate testing:

- Win Runner/QTP for functional testing.
- LoadRunner for Load/Stress testing.
- Test Director for test management.
- JUnit,HTMLUnit,CPPUnit.
  - To study state-of-art tools for software testing and Middleware technologies

Course Outcomes	
CO1	Ability to Practice the notation for representing various UML diagrams
CO2	Able to Analyze and design the problem by representing using UML diagrams
CO3	Able to Construct and test simple programs
CO4	Able to support in generating test cases and test suites.
CO5	Understanding the use of bug tracking and testing tool Bugzilla, Selenium tool to perform testing

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2												2	
CO2			3	3									2	3	
CO3				3									1	2	
CO4					3	2								2	
CO5				2	2	3	2							2	

Part A: UML ProgramsUML diagrams to be developed are:

1. Use Case Diagram
2. Class Diagram
3. Sequence Diagram
4. Collaboration Diagram
5. State Diagram
6. Activity Diagram
7. Component Diagram
8. Deployment Diagram
9. Test Design

Problems that may be considered are:

1. Library management system
2. Employee management system of an organization
3. ATM system
4. Railway reservation system

Part B:Testing Programs

Sample problems on testing:

1. Write programs in ‗C' Language to demonstrate the working of the following constructs: i) do...while ii) while….do iii) if…else iv) switch v) for
2. ―A program written in ‗C' language for Matrix Multiplication fails‖ Introspect the causes for its failure and write down the possible reasons for its failure.
3. Take any system (e.g. ATM system) and study its system specifications and report the various bugs.
4. Write the test cases for any known application (e.g. Banking application)
5. Create a test plan document for any application (e.g. Library Management System)
6. Study of any testing tool (e.g. Win runner)
7. Study of any web testing tool (e.g. Selenium)
8. Study of any bug tracking tool (e.g. Bugzilla, bugbit)
9. Study of any test management tool (e.g. Test Director)
10. Study of any open source-testing tool (e.g. Test Link)
11. Take a mini project (e.g. University admission, Placement Portal) and execute it. During the Life cycle of the mini project create the various testing documents* and final test report document.

Additional problems on testing:

1. Test the following using JUnit and CPPUnit:
   i) Sorting problems ii)Searching problems iii)Finding gcd of two integers iv)Finding factorial of a number.
2. Test web based forms using HTMLUnit.
3. Test database stored procedures using SQLUnit.

(Use sufficient number of test cases in solving above Problems)

*Note: To create the various testing related documents refer to the text ―Effective Software Testing Methodologies by William E. Perry‖

REFERENCE BOOKS:

1. Software Testing Concepts and Tools,P.Nageswara Rao,dreamtech press.
2. Software Testing Tools,Dr.K.V.K.K.Prasad,dreamtech Press.
3. Software Testing with Visual Studio Team System 2008, S.Subashini, N.Satheesh kumar,SPD.
4. Learning UML 2.0,Russ Miles and Kim Hamilton,O'Reilly,SPD.
5. Mastering UML with Rational Rose,W.Boggs&M.Boggs,Wiley India.

6. Management Shapers Series by Universities Press (India) Pvt Ltd., Himayatnagar, Hyderabad2008.
7. Handbook for Technical Writing by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
8. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata McGraw-Hill 2009.
9. Word Power Made Handy, Shalini Verma, S Chand Publications, 2011.
10. Effective Technical Communication, Ashrif Rizvi, TataMcGrahill, 2011.

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B.Tech. III – II Sem. (C.S.E)	**L**	**P**	**C**
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15A05608: Web Technologies and Shell Programming Lab

Part A: Web Technologies Lab

COURSE OUTCOMES	
CO1	Prepare Software Requirement Specification document. Analyze and translate a specification into a design.
CO2	Realize design practically, using an appropriate software engineering methodology
CO3	Able to use modern engineering tools for specification, design, implementation, and testing.
CO4	Ability to apply object oriented concepts for programming and its use.
CO5	Practical WEB Development using java by using JDBC and ODBC connectivity. Implementation of servlets and PHP connectivity by using MYSQL applications.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	3	3	3		2		1				2	3	
CO2					3						1		2	3	
CO3			3	3	3	1						1		3	
CO4				3	3		2							3	3
CO5			3							1				3	3

Hardware and Software required:

1. A working computer system with either Windows or Linux
2. A web browser either IE or Firefox
3. Apache web server or IIS Webserver
4. XML editor like Altova Xml-spy [www.Altova.com/**XML**Spy – free], Stylus studio, etc.,
5. A database either MySQL or Oracle
6. JVM (Java virtual machine) must be installed on your system
7. BDK(Bean development kit) must be also be installed

<u>Week-1</u>:

Design the following static web pages required for an online book store web site.

1) HOME PAGE:

The static home page must contain three **frames**.

Top frame : Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description ofthese pages will be given below).

Left frame : At least four links for navigation, which will display the catalogue ofrespective links.

For e.g.: When you click the link **—CSE‖** the catalogue for **CSE** Books should be displayed in the Right frame.

Right frame: The *pages to the links in the left frame must be loaded here*. Initially this page contains description ofthe web site.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Description ofthe Web Site			

Fig 1.1

2) LOGIN PAGE:

This page looks like below:

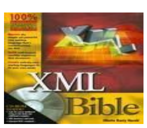
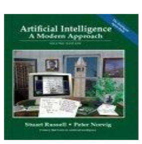
Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart

CSE ECE EEE CIVIL	Login : [ ] Passwor[ ] Submit Reset

3) CATALOGUE PAGE:

The catalogue page should contain the details ofall the books available in the web site in a table. The details should contain the following:

1. Snap shot ofCover Page.
2. Author Name.
3. Publisher.
4. Price.
5. Add to cart button.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	  	Book : XML Bible Author : Winston Publication : Wiely Book : AI Author : S.Russel Publication : Princeton hall Book : Java 2 Author : Watson Publication : BPB	$ 40.5 $ 63 $ 35.5	Add to cart Add to cart Add to cart

		publications		
		Book : HTML in 24 hours Author : Sam Peter Publication : Sam publication	$ 50	

Note: Week 2 contains the remaining pages and their description.

Week-2:

4) CART PAGE:
The cart page contains the details about the books which are added to the cart.

The cart page should look like this:

<table>
<tr><td>Logo</td><td colspan="4">Web Site Name</td></tr>
<tr><td>Home</td><td>Login</td><td>Registration</td><td>Catalogue</td><td>Cart</td></tr>
<tr><td>CSE
ECE
EEE
CIVIL</td><td colspan="4">
<table>
<tr><th>Book name</th><th>Price</th><th>Quantity</th><th>Amount</th></tr>
<tr><td>Java 2</td><td>$35.5</td><td>2</td><td>$70</td></tr>
<tr><td>XML bible</td><td>$40.5</td><td>1</td><td>$40.5</td></tr>
<tr><td></td><td></td><td>Total amount -</td><td>$130.5</td></tr>
</table>
</td></tr>
</table>

5) REGISTRATION PAGE:

Create a –*registration form* –with the following fields

1) Name (Text field)
2) Password (password field)
3) E-mail id (text field)
4) Phone number (text field)
5) Sex (radio button)
6) Date ofbirth (3 select boxes)
7) Languages known (check boxes – English, Telugu, Hindi, Tamil)
8) Address (text area)

WEEK 3:

VALIDATION:

Write *JavaScript* to validate the following fields ofthe above registration page.

1. Name (Name should contains alphabets and the length should not be less than 6 characters).
2. Password (Password should not be less than 6 characters length).
3. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)
4. Phone number (Phone number should contain 10 digits only).

Note : You can also validate the login page with these parameters.

Week-4:

Design a web page using **CSS (C**ascading **S**tyle **S**heets**)** which includes the following:

1) Use different font, styles:

In the style definition you define how each selector should work (font, color etc.). Then, in the body ofyour pages, you refer to these selectors to activate the styles.

For example:

```
<HTML>

<HEAD>

<style type="text/css">

B.headline {color:red, font-size:22px, font-family:arial, text-
decoration:underline}

</style>



</HEAD>



<BODY>

<b>This is normal bold</b><br>
Selector {cursor:value}



For example:



<html>

<head>

<style type="text/css">

.xlink {cursor:crosshair}
```

```
</HTML>
```

2) Set a background image for both the page and single elements on the page. You can define the background image for the page like this:

```
BODY {background-image:url(myimage.gif),}
```

3) Control the repetition ofthe image with the background-repeat property. As background-repeat: repeat Tiles the image until the entire page is filled, just like an ordinary background image in plain HTML.

4) Define styles for links as

A:link
A:visited
A:active
A:hover

Example:

```
<style type="text/css">
A:link {text-decoration: none}
A:visited {text-decoration: none}
A:active {text-decoration: none}
A:hover {text-decoration: underline, color: red,}
</style>
```

5) Work with layers:

For example:

LAYER 1 ON TOP:

```
<div style="position:relative, font-size:50px, z-index:2,">LAYER 1</div><div
style="position:relative, top:-50, left:5, color:red, font-size:80px, z-

index:1">LAYER 2</div>
```

LAYER 2 ON TOP:

```
<div style="position:relative, font-size:50px, z-index:3,">LAYER 1</div><div
style="position:relative, top:-50, left:5, color:red, font-size:80px, z-

index:4">LAYER 2</div>
```

6) Add a customized cursor:

Selector {cursor:value}

For example:

```
<html>

<head>

<style type="text/css">

.xlink {cursor:crosshair}
```

```
<body>

<b>

<a href="mypage.htm" class="xlink">CROSS LINK</a>

<br>
```

Week-5:

Write an XML file which will display the Book information which includes the following:

1) Title ofthe book
2) Author Name
3) ISBN number
4) Publisher name
5) Edition
6) Price

Write a Document Type Definition (DTD) to validate the above XML file.
Display the XML file as follows.
The contents should be displayed in a table. The header ofthe table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns.
Use XML schemas XSL and CSS for the above purpose.
Note: Give at least for 4 books. It should be valid syntactically.
Hint: You can use some xml editors like XML-spy

Week-6: **VISUAL BEANS:**

Create a simple visual bean with a area filled with a color.
The shape ofthe area depends on the property shape. If it is set to true then the shape ofthe area is Square and it is Circle, if it is false.
The color ofthe area should be changed dynamically for every mouse click. The color should also be changed if we change the color in the –property window –.

Week-7:

1) Install IIS web server and APACHE.

While installation assign port number 4040 to IIS and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port.

2) Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root.

Access the pages by using the urls : http://localhost:4040/rama/books.html (for tomcat) http://localhost:8080/books.html (for Apache)

Week-8: User Authentication :

Assume four users user1,user2,user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a PHP for doing the following.
1. Create a Cookie and add these four user id's and passwords to this Cookie.
2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.
If he is a valid user(i.e., user-name and password match) you should welcome him by name(user-name) else you should display ― You are not an authenticated user ''.
Use init-parameters to do this.

Week-9:

Install a database(Mysql or Oracle).
Create a table which should contain at least the following fields: name, password, email-id, phone number(these should hold the data from the registration form).
Write a PHP program to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.
Insert the details ofthe users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).

Week-10:

Write a PHP which does the following job:
Insert the details ofthe 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).

Week-11:

Create tables in the database which contain the details of items (books in our case like Book name , Price, Quantity, Amount) ofeach category. Modify your catalogue page (week 2)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using PHP

Week-12:

HTTP is a stateless protocol. Session is required to maintain the state.
The user may add some items to cart from the catalog page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time(i.e., from different systems in the LAN using the ip-address instead oflocalhost). This can be achieved through the use ofsessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated (by using the method session.invalidate()).
Modify your catalogue and cart PHP pages to achieve the above mentioned functionality using sessions.

PART-B
Shell Programming Lab

1. Practice session: practice use of some basic Linux commands. Document the syntax and semantics of those commands. Practice programs on shell variables, control statements etc.
2. Practice session: Study the features of Linux environment and submit a report on it.
3. Write a shell script that accepts a name from the user and displays whether it is a file, directory or something else.
4. Write a shell script that creates users
5. Write a shell script that searches for a given string in a file
6. Write a shell script that compiles all C files in your home directory and creates executable files
7. Write a shell script that given a filename as argument, deletes all even lines in a file
8. Implement the grep command in C language
9. Write a shell script that removes duplicate lines from a file
10. Write a shell script that enhances find command by adding error messages that explain why the command failed.
11. Write a shell script to backup files in a specified directory
12. Write a shell script that finds all links to a file
13. Write an awk script to count the number of lines in a file that do not contain vowels.
14. Write an awk script to find the number of characters, words and lines in a file.
15. Write C programs that illustrate communication between two unrelated processes using named pipe(FIFO File).
16. Write a C program in which a parent writes a message to a pipe and the child reads the message.
17. Write a C program (sender.c) to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.
18. Write a C program (receiver.c) that receives the messages (from the above message queue and displays them.
19. Configure mail server and file server.
20. Write Client and Server programs in C for connection oriented communication between Server and Client processes using Unix Domain sockets to perform the following:Client process sends a message to the Server Process. The Server receives the message, reverses it and sends it back to the Client.The Client will then display the message to the standard output device.

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15A05701: SERVICE ORIENTED ARCHITECTURE

Objectives:
The course should enable the student

- Understand SOA and evolution of SOA.
- Understand web services and primitive, contemporary SOA.
- Understand various service layers.
- Understand service-oriented analysis and design based on guidelines.

Course Outcomes:
CO1 Design and motivate software architecture for large scale software systems
C02 Recognize major software architectural styles, design patterns, and frameworks
CO3 Describe a software architecture using various documentation approaches and architectural description languages
CO4 Generate architectural alternatives for a problem and select among them
CO5 Use well-understood paradigms for designing new systems

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1													1		
CO2				2										2	
CO3				3										2	
CO4	2												2		
CO5			1		2								1		

UNIT I
Introducing SOA: Fundamental SOA, Common Characteristics of Contemporary SOA, Common Tangible Benefits of SOA, Common Pitfalls of Adopting SOA.
The Evolution of SOA: An SOA Timeline, The Continuing Evolution of SOA, The Roots ofSOA.

UNIT II
Web Services and Primitive SOA: The Web Services Frame Work, Services, Service Descriptions, Messaging.
Web Services and Contemporary SOA (Part I-Activity management and Composition): Message Exchange Patterns, Service Activity, Coordination, Atomic Transactions, Orchestration, Choreography.
Web Services and Contemporary SOA (Part-II-Advanced Messaging, Metadata and Security): Addressing, Reliable Messaging, Correlation, Policies, Metadata exchange, Security.

UNIT III
Principles of Service-Orientation: Service–Orientation and the Enterprise, Anatomy of SOA, Common Principles of Service–Orientation, Interrelation between Principles of Service- Orientation, Service Orientation and Object Orientation, Native Web Services Support for Principles of Service-Orientation.

Service Layers: Service-Orientation and Contemporary SOA, Service Layer abstraction, Application Service Layer, Business Service Layer, Orchestration Service Layer, Agnostic Services, Service Layer Configuration Scenarios.

UNIT IV

SOA Delivery Strategies: SOA Delivery Lifecycle Phases, The Top-Down Strategy, The Bottom-up Strategy, The Agile Strategy.

Service Oriented Analysis (Part I-Introduction): Introduction to Service Oriented Analysis, Benefits of a Business Centric SOA, Deriving Business Services.

Service Oriented Analysis (Part-II-Service Modelling): Service Modeling, Service Modelling Guidelines, Classifying Service Model Logic, Contrasting Service Modeling Approaches.

Service Oriented Design (Part I-Introduction): Introduction to Service-Oriented Design, WSDL Related XML Schema Language Basics, WSDL Language Basics, Service Interface Design Tools.

Service Oriented Design (Part II-SOA Composition Guidelines): SOA Composing Steps, Considerations for Choosing Service Layers, Considerations for Positioning Core SOA Standards, Considerations for Choosing SOA Extensions.

UNIT V

Service Oriented Design (Part III- Service Design): Service Design Overview, Entity-Centric Business Service Design, Application Service Design, Task-Centric Business Service Design, Service Design Guidelines.

Service Oriented Design (Part IV-Business Process Design): WS-BPEL Language Basics, WS- Coordination Overview, Service Oriented Business Process Design.

TEXT BOOKS:

1. Service-Oriented Architecture-Concepts, Technology, and Design, Thomas Erl, PearsonEducation.
2. Understanding SOA with Web Services, Eric Newcomer, Greg Lomow, PearsonEducation.

REFERENCE BOOKS:

1. The Definitive guide to SOA, Jeff Davies & others, Apress, Dreamtech.
2. Java SOA Cook book, E.Hewitt, SPD.
3. SOA in Practice, N.M.Josuttis, SPD.
4. Applied SOA, M.Rosen and others, Wiley India pvt. Ltd.
5. Java Web Services Architecture, J.Mc Govern, and others, Morgan KaufmannPublishers, Elsevier.
6. SOA for Enterprise Applications, Shankar.K, Wiley India Edition.
7. SOA-Based Enterprise Integration, W.Roshen, TMH.
8. SOA Security, K.Rama Rao, C.Prasad, dreamtech press.

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15A05702: Cryptography and Network Security

Course Objectives:

- Extensive, thorough and significant understanding of the concepts, issues, principles and theories of computer network security
- Identifying the suitable points for applying security features for network traffic
- Understanding the various cryptographic algorithms and implementation of the same at software level
- Understanding the various attacks, security mechanisms and services

Course Outcomes:

CO1: Students should be able to apply mathematical concepts demonstrate basic cryptographic algorithms.
CO2: Students should be able to analyze basic concepts and public key cryptographic algorithms using number theory.
CO3:Students should be able to solve issues related to authentication using secure hash functions and digital signatures
CO4:Students should be able to invent key management and distribution for solving electronic mail security problems
CO5:Students should be able to classify SSL and IP security to restrain malicious programs and viruses

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3				2	3				2		3		
CO2	2	3	2	2	2								3	2	
CO3	3		3	3	3	3	3						3	3	
CO4	3		2	3	3		2		2				3	3	
CO5		3		3	3		3						3		

Unit-I

Computer Security concepts, The OSI Security Architecture, Security attacks, Security services and Security mechanisms, A model for Network Security
Classical encryption techniques- symmetric cipher model, substitution ciphers, transposition ciphers, Steganography.
Modern Block Ciphers: Block ciphers principles, Data encryption standard (DES), Strength of DES, linear and differential cryptanalysis, block cipher modes of operations, AES, RC4.

Unit-II

Introduction to Number theory – Integer Arithmetic, Modular Arithmetic, Matrices, Linear Congruence, Algebraic Structures, GF(2^n) Fields, Primes, Primality Testing, Factorization, Chinese remainder Theorem, Quadratic Congruence, Exponentiation and Logarithm.

Public-key cryptography - Principles of public-key cryptography, RSA Algorithm, Diffie-Hellman Key Exchange, ELGamal cryptographic system, Elliptic Curve Arithmetic, Elliptic curve cryptography

Unit-III

Cryptographic Hash functions: Applications of Cryptographic Hash functions, Requirements and security, Hash functions based on Cipher Block Chaining, Secure Hash Algorithm (SHA)
Message Authentication Codes: Message authentication Requirements, Message authentication functions, Requirements for Message authentication codes, security of MACs, HMAC, MACs based on Block Ciphers, Authenticated Encryption
Digital Signatures-RSA with SHA & DSS

Unit-IV

Key Management and distribution: Symmetric key distribution using Symmetric Encryption, Symmetric key distribution using Asymmetric, Distribution of Public keys, X.509 Certificates, Public key Infrastructure.
User Authentication: Remote user Authentication Principles, Remote user Authentication using Symmetric Encryption, Kerberos, Remote user Authentication using Asymmetric Encryption, Federated Identity Management, Electronic mail security: Pretty Good Privacy (PGP), S/MIME.

Unit-V

Security at the Transport Layer(SSL and TLS) : SSL Architecture, Four Protocols, SSL Message Formats, Transport Layer Security, HTTPS, SSH
Security at the Network layer (IPSec): Two modes, Two Security Protocols, Security Association, Security Policy, Internet Key Exchange.
System Security: Description of the system, users, Trust and Trusted Systems, Buffer Overflow and Malicious Software, Malicious Programs, worms, viruses, Intrusion Detection System(IDS), Firewalls

Text books:

1. Cryptography and Network Security‖, Behrouz A. Frouzan and Debdeep Mukhopadhyay, Mc Graw Hill Education, 2nd edition, 2013.

2.Cryptography and Network Security: Principals and Practice‖, William Stallings, Pearson Education , Fifth Edition, 2013.

References:

1. Network Security and Cryptography‖, Bernard Menezes , Cengage Learning.
2. Cryptography and Security‖, C.K. Shymala, N. Harini and Dr. T.R. Padmanabhan, Wiley-India.
3. Applied Cryptography, Bruce Schiener, 2nd edition, John Wiley & Sons.
4. Cryptography and Network Security‖, Atul Kahate, TMH.
5. Introduction to Cryptography‖, Buchmann, Springer.
6. Number Theory in the Spirit of Ramanujan‖, Bruce C.Berndt, University Press
7. Introduction to Analytic Number Theory‖, Tom M.Apostol, University Press

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15A05703: Advanced Computer Architecture

Course Objective

- Discuss the concept of parallel processing and the relationship between parallelism and performance
- Understand the organization of computer structures that can be electronically configured and reconfigured
- Discuss the performance advantages that multithreading can offer along with the factors that make it difficult to derive maximum benefits from this approach

Course Outcomes

CO1 Realize Parallelism and Parallel architectures

CO2 Ability to use Instruction Level Parallelism

CO3 Ability to useThread level parallelism.

CO4 Understand the various models to achieve memory consistency.

CO5 Understand the performance and efficiency in advanced multiple-issue processors.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1												1		
CO2			2	2									2		
CO3			2	2									2		
CO4		1												2	
CO5	2									2			3		

Unit - I :

Evolution of Computer Architecture, System Attributes to performance; Shared Memory Multiprocessors, Distributed Memory Multiprocessors, A Taxonomy of MIMD Computers; architecture of Vector Super computers, operational model of SIMD computer, PRAM models and PRAM variantsConditions of Parallelism- data and resource dependencies, hardware and software parallelism, Program partitioning and Scheduling- grain sizes and latency, grain packing and scheduling, static multi processor scheduling, Program flow mechanisms- control flow vs data flow, demand driven mechanisms, comparison of flow mechanisms, System interconnect architectures- network properties and routing, static and dynamic connection networks

Unit – II:

Principles of scalable performances- performance metrics and measures- parallelism profile in programs, mean performance, efficiency, utilization and quality, benchmarks and performance measures, characteristics of parallel processing applications, Speed up performance laws- Amdahl‘s law, Gustafson‘s law, memory bounded speed up model, Scalability metrics and goals,

Bus systems- back plane bus specification, Addressing and Timing protocols, Arbitration, transaction and interrupt, IEEE future bus standard requirement set, Shared memory organizations- Interleaved memory organization, band width and fault tolerance, memory allocation schemes, Atomicity and event ordering

Unit – III :
Linear Pipeline Processors- asynchronous and synchronous models, clocking and timing control, speedup, efficiency, and throughput, Non linear pipeline processors- reservation and latency analysis, collision free scheduling, pipeline schedule optimization, Instruction pipe line design- instruction execution phases, mechanisms for instruction pipelining, dynamic instruction scheduling, branch handling techniques, static arithmetic pipelines.
Hierarchical bus system, cross bar switch and multiport memory, multistage and combining networks, multistage and combining networks, The cache coherence problem, message passing mechanism- message routing schemes, deadlock virtual channels, flow control strategies, multicastrouting algorithms

Unit – IV :
Vector processing principles- vector instruction types, vector access memory schemes, early super computers, Multi vector multiprocessors- performance directed design rules, architecture of Cray and MPP, Compound vector operations, vector loops and chaining, SIMD computer organizations

Unit – V :
Latency-hiding techniques- shared virtual memory, prefetching techniques, distributed coherent caches, scalable coherence interface, relaxed memory consistency, principles of multithreading and context switching policies,
MPD architecture, The Tera multiprocessor system, Data flow computer architecture

Text Books :

1. Advanced Computer Architecture- Parallelism, Scalability, Programmability‖ KAI Hwang & Naresh Jotwani, Mc Graw Hill Publishing, Second Edition,

Reference Books :

1. Computer Architecture- A Quantitative Approach‖Hennessy Patterson, Elsevier, Fifth Edition
2. Advanced Computer Architecture- Parallelism, Scalability, Programmability‖, Kai Hwang, TMH.

Computer Architecture, Concepts and Evolutions, Garrit A Blaauw, PEA

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15A05704: Software Architecture

Course Objectives:

- Introduction to the fundamentals of software architecture.
- To understand interrelationships, principles and guidelines governing architecture and evolution over time.

- To understand various architectural styles of software systems.
- To understand design patterns and their underlying object oriented concepts.
- Software architecture and quality requirements of a software system
- Fundamental principles and guidelines for software architecture design, architectural styles, patterns, and frameworks.
- Methods, techniques, and tools for describing software architecture and documenting design rationale.
- Software architecture design and evaluation processes.

Course Outcomes:

CO1 Design and motivate software architecture for large scale software systems
C02 Recognize major software architectural styles, design patterns, and frameworks
CO3 Describe a software architecture using various documentation approaches and architectural description languages
CO4 Generate architectural alternatives for a problem and select among them
CO5 Use well-understood paradigms for designing new systems

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2	1	1									1	2	
CO2			2	3		1									
CO3	1								2				2		
CO4		2			2					1			3	1	
CO5			3		1									2	

UNIT I: ENVISIONING ARCHITECTURE

What is software Architecture-What is Software Architecture, Other Points of View, Architectural Patterns, Reference Models, and Reference Architectures, Importance of Software Architecture, Architectural Structures and views.

ENVISIONING ARCHITECTURE:

Architecture Business Cycle- Architectures influences, Software Processes and the Architecture Business Cycle, Making of –Good‖ Architecture.

ARCHITECTURAL DESIGN: Software Architecture, Architectural Genres, ArchitecturalStyles, Architectural Design.

COMPONENT-LEVEL DESIGN: What is a Component, Designing Class- Based ComponentsConducting Component-Level Design, Component-Level Design for WebApps.

UNIT II: DESIGNING THE ARCHITECTURE WITH STYLES

Designing the Architecture: Architecture in the Life Cycle, Designing the Architecture, Formatting the Team Structure, Creating a Skeletal System.

Architecture Styles: Architectural Styles, Pipes and Filters, Data Abstraction and Object- Oriented Organization, Event-Based, Implicit Invocation, Layered Systems, Repositories, Interpreters.

UNIT III: CREATING AN ARCHITECTURE-I

Creating an Architecture: Understanding Quality Attributes – Functionality and Architecture, Architecture and Quality Attributes, System Quality Attributes, Quality Attribute. Scenarios in Practice, Other System Quality Attributes, Business Qualities, Architecture Qualities.

Achieving Qualities: Introducing Tactics, Availability Tactics, Modifiability Tactics, Performance Tactics, Security Tactics, Testability Tactics, Usability Tactics.

UNIT IV: CREATING AN ARCHITECTURE-II

Documenting Software Architectures: Use of Architectural Documentation, Views, Choosing the RelevantViews, Documenting a view, Documentation across Views. Reconstructing Software Architecture: Introduction, Information Extraction, Database Construction, View Fusion, and Reconstruction.

UNIT V: ANALYZING ARCHITECTURES

The ATAM: Participants in the ATAM, Outputs of The ATAM, Phases Of the ATAM. The CBAM: Decision-Making Context, The Basis for the CBAM, Implementing the CBAM. The World Wide Web:A Case study in Interoperability- Relationship to the Architecture Business Cycle, Requirements and Qualities, Architecture Solution, Achieving Quality Goals.

TEXT BOOKS:

1. Software Architectures in Practice , Len Bass, Paul Clements, Rick Kazman, 2nd Edition,Pearson Publication.

2. Software Architecture , Mary Shaw and David Garlan, First Edition, PHI Publication, 1996.\

REFERENCES BOOKS:

1. **Software Design: From Programming to Architecture**, Eric Braude**,** Wiley, 2004.

2. N. Domains of Concern in Software Architectures and Architecture Description Languages. Medvidovic and D. S. Rosenblum. USENIX.

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15A05705: Software Project Management

Course Objective

- Understanding the specific roles within a software organization as related to project and process management.
- Understanding the basic infrastructures competences (e.g., process modeling and measurements.)
- Describe the principles, techniques, methods & tools for model based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experienced based creation and improvements of models(process management) .
- Understanding the basic steps of project planning, project management, quality assurance, and process management and their relationships.
- To provide basic project management skills with a strong emphasis on issues and problems associated with delivering successful IT projects.

Course Outcomes

CO1 To describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
CO2 To compare and differentiate organization structures and project structures.
CO3 To implement a project to manage project schedule, expenses and resources with the application of suitable project management tools.
CO4 Understand and practice the process of project management and its application in delivering successful IT projects.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	PSO 1	PSO2	PSO3
CO1	2	2											3		
CO2				1									2	1	
CO3			2	3	2					2				2	
CO4		1		2									3		

UNIT I

Conventional Software Management: The waterfall model, conventional software Management performance. Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

UNIT II

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality,peer inspections.
The old way and the new : The principles of conventional software engineering, principles of modern software management, transitioning to an iterative process.

UNIT III

Life cycle phases: Engineering and production stages, inception, Elaboration, construction,transition phases. **Artifacts of the process**: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts. Model based software architectures: A Management perspective and technical perspective.

UNIT IV

Work Flows of the process: Software process workflows, Inter Trans workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic status assessments. Iterative Process **Planning:** Work breakdown structures, planning guidelines, cost and schedule estimating, Interaction planning process, Pragmatic planning. **Project Organizations and Responsibilities**: Line-of-Business Organizations, Project Organizations, evolution of Organizations.

Process Automation: Automation Building Blocks, The Project Environment.

UNIT V

Project Control and Process instrumentation: The server care Metrics, Management indicators, quality indicators, life cycle expectations pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminates, Example.
Future Software Project Management: Modern Project Profiles, Next generation Software economics, modern Process transitions.
Case Study: The Command Center Processing and Display System-Replacement (CCPDS-R)

TEXT BOOKS:

1. Software Project Management, Walker Royce, Pearson Education, 2012
2. Software Project Management, Bob Hughes & Mike Cotterell, Fifth edition,TataMc-Graw Hill,2006

REFERENCE BOOKS:

1. Applied Software Project Management, Andrew Stellman& Jennifer Greene,O'Reilly, 2006
2. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly,2007
3. Software Engineering Project Managent, Richard H. Thayer & Edward Yourdon, second edition, Wiley India, 2004.
4. Agile Project Management, Jim Highsmith, Pearson education, 2004
5. The art of Project management, Scott Berkun, O'Reilly, 2005.
6. Software Project Management in Practice, PankajJalote, Pearson Education, 2002

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15A05706: Algorithms for Big Data (Moocs)

Course objective:

In this course, you will learn how to design and analyse algorithms in the streaming and property testing models of computation.

The algorithms will be analysed mathematically, so it is intended for a mathematically mature audience with prior knowledge of algorithm design and basic probability theory.

Traditional algorithms work well when the input data fits entirely within memory. In many modern application contexts, however, the size of the input data is too large to fit within memory. In some cases, data is stored in large data centres or clouds and specific parts of it can be accessed via queries. In some other application contexts, very large volume of data may stream through a computer one item at a time. So the algorithm will get to see the data typically as a single pass, but will not be able to store the data for future reference. In this course, we will introduce computational models, algorithms and analysis techniques aimed at addressing such big data contexts.

Course Outcomes:

- To learn the concepts of algorithms and Map Reduce.
- To learn how to analyze Big Data using different tools.

Unit 1:

Basic definitions, Conditional probability, Example problems, Karger's mincut algorithm, Analysis of Karger's mincut algorithm, Random variables, Randomized quick sort, Problem solving video - The rich get richer, Problem solving video - Monty Hall problem, Bernoulli, Binominal and Geometric distributions, Taill Bounds, Application of Chernoff bond, Application of Chebyshev's inequality.

Unit 2 :

Intro to Big Data Algorithms, SAT Problem, Classification of States, Stationary Distribution of a Markov Chain, Celebrities case study, Random Walks on undirected Graphs, Intro to Streaming, Morris Algorithm, Reservoir Sampling, Approximate Median.

Unit 3:

Overview, Balls, bins, hashing, Chain hasing , SUHA, Power of Two choices, Bloom filter, Pair wise independence, Estimating expectation of continuous function, Universal hash functions, Perfect hashing, Count- min filter for heavy hitters in data streams, doubly stochastic trastion matrix, Random Walks on Linear Structures, Lollipop Graph, Cat and Mouse

Unit4:

Estimating frequency moments, Property testing framework, Testing connectivity, Enforce & Testing Introduction, Testing if a graph is biclique, Testing bipratiteness.

Unit 5:

Property testing and random walk algorithms, Testing if a graph is bipartite (using random walks), Graph streanuing algorithms: Introduction, Graph streanuing algorithms: Matching, Graph streanuing algorithms: Graph sparsification, MapReduce, K- Machine Model(aka Pregel Model)

References:

1) [MU] Probability and Computing: Randomized Algorithms and Probabilistic Analysis, by Mitzenmacher and Upfal.
2) [Ron] Algorithmic and Analysis Techniques in Property Testing, by Dana Ron.
3) [CGHJ] Synopses for Massive Data: Samples, Histograms, Wavelets, Sketches, by Graham Cormode, Minos Garofalakis, Peter J. Haas and Chris Jermaine.
4) http://nptel.ac.in/courses/106106142/

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15A05707: Network Security Lab

Course Objectives

- Understand the basic functions of each layer in the reference models
- Students will be able to simulate the algorithms for flow control, error control and routing protocols
- Understand the basics of the cryptographic algorithms

COURSE OUTCOMES	
CO1	Understanding of cryptographic algorithms and implementation of the same in C or C++
CO2	Performance evaluation of various cryptographic algorithms
CO3	Understanding the buffer overflow and format string attacks
CO4	Implementation of proxy based security protocols in C or C++ with features like confidentiality, integrity and authentication

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3	3									3		
CO2				3	2								2		
CO3	2												3		
CO4				3		2								3	

1. Working with Sniffers for monitoring network communication (Ethereal)
2. Understanding of cryptographic algorithms and implementation of the same in C orC++
3. Using openssl for web server - browser communication
4. Using GNU PGP
5. Performance evaluation of various cryptographic algorithms
6. Using IPTABLES on Linux and setting the filtering rules
7. Configuring S/MIME for e-mail communication
8. Understanding the buffer overflow and format string attacks
9. Using NMAP for ports monitoring

10. Implementation of proxy based security protocols in C or C++ with features like confidentiality, integrity and authentication

Following are some of the web links, which help to solve the above assignments

- http://linuxcommand.org/man_pages/openssl1.html
- http://www.openssl.org/docs/apps/openssl.html
- http://www.queen.clara.net/pgp/art3.html
- http://www.ccs.ornl.gov/~hongo/main/resources/contrib/gpg-howto/gpg-howto.html
- https://netfiles.uiuc.edu/ehowes/www/gpg/gpg-com-0.htm

http://www.ethereal.com/docs/user-guide/

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15A05708: Service oriented architecture Lab

COURSE OUTCOMES	
CO1	Able to Develop components such as Order Processing, Payment Processing, etc., using .NET component technology
CO2	Able to Develop components such as Order Processing, Payment Processing, etc., using EJB Component Technology.
CO3	Able to Develop a Service Orchestration Engine (workflow) using WS-BPEL and Implement Service Composition
CO4	Able to Develop a J2EE client to access a .NET web service, J2EE web service.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1				3	3									3	
CO2				2	3									3	
CO3				3	3					3				3	
CO4				3	3					3				3	

Student is expected to complete the following experiments as a part of laboratory work.

1. Develop at least 5 components such as Order Processing, Payment Processing, etc., using .NET component technology.
2. Develop at least 5 components such as Order Processing, Payment Processing, etc., using EJB Component Technology.
3. Invoke .NET components as web services.
4. Invoke EJB components as web services.
5. Develop a Service Orchestration Engine (workflow) using WS-BPEL and Implement Service Composition. For Example, a business process for planning business travels will invoke several services. This process will invoke several airline companies (such as American Airlines, Delta Airlines etc.) to check the airfare price and buy at the lowest price.
6. Develop a J2EE client to access a .NET web service.
7. Develop a .NET client to access a J2EE web service

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15A05801a : Artificial Intelligence
(Elective I)

Course Objective:

- To learn the difference between optimal reasoning Vs human like reasoning
- To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities
- To learn different knowledge representation techniques
- To understand the applications of AI namely, Game Playing, Theorem Proving, Expert Systems, Machine Learning and Natural Language Processing

Learning Outcome:

- Possess the ability to formulate an efficient problem space for a problem expressed in English
- Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.
- Possess the skill for representing knowledge using the appropriate technique
- Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems, Machine Learning and Natural Language Processing.

Course Outcomes:

CO1 Possess the ability to formulate an efficient problem space for a problem expressed in English
CO2 Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.
CO3 Possess the skill for representing knowledge using the appropriate technique
CO4 Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems, Machine Learning and Natural Language Processing

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2		1											1	
CO2	1		2				1						2		
CO3		2			2				2					2	
CO4	1	2	2				1	1		1			2	1	

UNIT I

Introduction: History, Intelligent Systems, Foundations of AI, sub areas of AI, applications. Problem solving– State – Space search and control strategies: Introduction, general problem solving, characteristics of problem, exhaustive searches, Heuristic search techniques, iterative- deepening A*, Constraint Satisfaction and Planning. Game Playing, Bounded Look-ahead strategy and use of Evaluation functions, Alpha-Beta Pruning

UNIT II

Logic concepts and Logic programming: - Introduction, Propositional Calculus, Propositional Logic,Natural Deduction System, Axiomatic System, Semantic Tableau System in propositional Logic, Resolution Refutation in Propositional Logic, Predicate Logic, Logic Programming. Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network, Extended Semantic Networks for KR, KnowledgeRepresentation using Frames, advanced knowledge representation Techniques.

UNIT III

Expert System and Applications: Introduction, Phases in Building Expert systems, expert systemarchitecture, expert systems Vs Traditional Systems, Truth Maintenance Systems, Application of Expert Systems, List of shells and tools. Uncertainty Measure – Probability

Theory: - Introduction, Probability Theory, Bayesian Belief Networks, Certainty factor theory, Dempster-Shafer Theory

UNIT IV

Machine-Learning Paradigms: - Introduction, Machine Learning systems. Supervised and unsupervisedlearning. Inductive learning, learning decision Tree, Deductive Learning. Clustering, Support Vector Machines. Artificial Neural Networks: - Introduction, artificial neural Networks, Single-Layer Feed-Forward Networks, Multi-Layer Feed-Forward Network, Radial- Basis Function Networks, Design Issues of Artificial Neural Networks, Recurrent Networks

UNIT V

Fuzzy Logic : - Fuzzy sets, Fuzzy sets, Evolutionary Programming, Genetic Programming Concepts, swarmIntelligence Ant colony Paradigm, Natural Language Processing

Text Books :

1. Artificial Intelligence, Saroj Kaushik, Cengage Learning 2011
2. Artificial intelligence, A Modern Approach, Russell, Norvig, Pearson Education, Second Edition. 2004

Reference Books :

1. Artificial intelligence, Rich, Knight, Nair, Tata McGraw Hill, Third Edition 2009

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15A05801b: Pattern Recognition

Elective- I

Course objectives:

The objective of this course is to enable the students to understand the fundamentals of

- Pattern recognition. The students should learn to choose an appropriate feature
- Pattern classification algorithm for a pattern recognition problem, properly implementthe algorithm using modern computing tools such as Matlab, OpenCV, C, C++ and correctly.
- Analyze, and report the results using proper technical terminology.

COURSE OUTCOMES	
CO1	Student understands the fundamental pattern recognition and machine learning theories
CO2	Student has the ability to design and implement certain important pattern recognition techniques
CO3	Student has the capability of applying the pattern recognition theories to applications of interest.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2											2		
CO2		2		3		2								3	
CO3		2	3	2									2	3	

Unit - I :

Introduction to Pattern Recognition: Data Sets for Pattern Recognition, Different Paradigms for Pattern Recognition,
Pattern Representation: Data Structures for Pattern Representation, Representation of Clusters, Proximity Measures, Size of Patterns, Abstractions of the Data Set, Feature, Feature Selection, Evaluation of Classifiers, Evaluation of Clustering

Unit – II:

Nearest Neighbour Based Classifiers: Nearest Neighbour Algorithm, Variants of the NN Algorithm , Use of the

Nearest Neighbour Algorithm for Transaction Databases, Efficient Algorithms, Data Reduction, Prototype Selection,

Bayes Classifier: Bayes Theorem, Minimum error rate classifier, Estimation of Probabilities,Comparison with the NNC, Naive Bayes Classifier, Bayesian Belief Network.

Unit – III :

Hidden Markov Models: Markov Models for Classification, Hidden Markov Models,Classification Using HMMs, Classification of Test Patterns.

Decision Trees: Introduction, Decision Trees for Pattern Classification, Construction of Decision Trees, Splitting at the Nodes, Over fitting and Pruning, Example of Decision TreeInduction.

Unit – IV :

Support Vector Machines: Introduction, Linear Discriminant Functions, Learning the Linear Discriminant Function, Neural Networks, SVM for Classification, Linearly Separable Case, Non-linearly Separable Case.

Combination of Classifiers: Introduction, Methods for Constructing Ensembles ofClassifiers, Methods for Combining Classifiers, Evaluation of Classifiers, Evaluation ofClustering

Unit – V :

Clustering: Clustering and its Importance, Hierarchical Algorithms, Partitional Clustering, Clustering Large Data Sets, An Application to Handwritten Digit Recognition: Description ofthe Digit Data, Pre-processing of Data, Classification Algorithms, Selection of Representative Patterns.

Text Books :

1. Pattern Recognition an Introduction, V. Susheela Devi M. Narasimha Murty,University Press.
2. Pattern Recognition, Segrios Theodoridis, Konstantinos Koutroumbas, Fourth Edition,Elsevier

Reference Books :

1. Pattern Recognition and Image Analysis, Earl Gose, Richard John Baugh, Steve Jost,PHI 2004.
2. C. M. Bishop, ‗Neural Networks for Pattern Recognition‘, Oxford University Press,Indian Edition, 2003.
3.Pattern Classification, R.O.Duda, P.E.Hart and D.G.Stork, Johy Wiley, 2002

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15A05801c : Adhoc and Sensor Networks
(Elective I)

Course Objective:

- To understand the concepts of sensor networks
- To understand the MAC and transport protocols for adhoc networks
- To understand the security of sensor networks
- To understand the applications of adhoc and sensor networks

COURSE OUTCOMES	
CO1	Ability to learn current technology trends for the implementation and deployment of wireless ad-hoc/sensor networks
CO2	Ability to learn the challenges in designing MAC, routing and transport protocols for wireless ad-hoc/sensor networks.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1		2	3		2				3			3		
CO2	2			2					3	2			3		

UNIT- I

Introduction to Ad Hoc Wireless Networks: Characteristics of MANETs, Applications of MANETs,Challenges.

Routing in MANETs: Topology-based versus Position-based approaches, Topology based routing protocols, Position based routing, Other Routing Protocols.

UNIT-II

Data Transmission In MANETs: The Broadcast Storm, Multicasting, Geocasting

TCP over Ad Hoc Networks: TCP Protocol overview, TOP and MANETs, Solutions for TOP overAd Hoc

UNIT- III

Basics of Wireless Sensors and Applications: The Mica Mote, Sensing and Communication Range, Design issues, Energy consumption, Clustering of Sensors, Applications

Data Retrieval In Sensor Networks: Classification of WSNs, MAC layer, Routing layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

UNIT- IV

Security: Security in Ad hoc Wireless Networks, Key Management, Secure Routing, Cooperation in MANETs, Intrusion Detection Systems. Sensor Network Platforms and Tools: Sensor Network Hardware, Sensor Network Programming Challenges, Node-Level Software Platforms

UNIT- V

Operating System — TinyOS Imperative Language: nesC, Dataflow style language: T1nyGALS, Node- Level Simulators, ns-2 and its sensor network extension, TOSSIM

TEXT BOOKS

1. Ad Hoc and Sensor Networks — Theory and Applications, Car/os Corderlo Dharma RAggarwal, World Scientific Publications /Cambridge University Press, March 2006
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, LeonidasGuibas, Elsevier Science imprint, Morgan Kauffman Publishers, 2005, rp 2009.

REFERENCE BOOKS

1. Wireless Sensor Networks — Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbachbook, CRC Press, Taylor & Francis Group, 2010
2. Wireless Ad hoc Mobile Wireless Networks — Principles, Protocols and Applications, SubirKumar Sarkar, et al., Auerbach Publications, Taylor & Francis Group, 2008.
3. Ad hoc Networking, Charles E.Perkins, Pearson Education, 2001.
4. Wireless Ad hoc Networking, Shih-Liri Wu, Yu-Chee Tseng, Auerbach Publications, Taylor &Francis Group, 2007
5. Wireless Ad hoc and Sensor Networks — Protocols, Performance and Control, JagannathanSarangapani, CRC Press, Taylor & Francis Group, 2007, rp 2010.
6. Security in Ad hoc and Sensor Networks, Raheem Beyah, et al., World Scientific Publications /Cambridge University Press, 2010
7. Ad hoc Wireless Networks — A communication-theoretic perspective, Ozan K.Tonguz,Giatuigi Ferrari, Wiley India, 2006, rp2009.

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15A05802a: Design Patterns
(Elective II)

Course Objectives

- Identifying the appropriate patterns for design problems.
- To understand design patterns and their underlying object oriented concepts.
- To understand implementation of design patterns and providing solutions to real worldsoftware design problems.
- To understand patterns with each other and understanding the consequences of combiningpatterns on the overall quality of a system.

Course Outcomes:

CO1: Know the underlying object oriented principles of design patterns.
CO2 :Understand the context in which the pattern can be applied.
CO3 :Understand how the application of a pattern affects the system quality and its tradeoffs.
CO4 :Understands the importance of design patterns in software development.
CO5 :Learns that design patterns are solutions, and they can solve many problems that can be encountered in the future.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			2							1			2		
CO2	2		1				2			2				1	
CO3	1												1		
CO4		2		1		2							1		
CO5	1		2		1				1				2	1	

UNIT-I

Introduction: What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

UNIT-II

A Case Study: Designing a Document Editor : Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary .

Creational Patterns : Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

UNIT-III

Structural Pattern Part-I : Adapter, Bridge, Composite. Structural Pattern Part-II : Decorator, açade, Flyweight, Proxy.

UNIT-IV

Behavioral Patterns Part-I : Chain of Responsibility, Command, Interpreter, Iterator.Behavioral Patterns Part-II : Mediator, Memento, Observer.

UNIT-V

Behavioral Patterns Part-II (cont‘d):State, Strategy, Template Method ,Visitor, Discussion of Behavioral Patterns.

What to Expect from Design Patterns, A Brief History, The Pattern Community An Invitation, A Parting Thought.

TEXT BOOK :

1. Design Patterns By Erich Gamma, Pearson Education

REFERENCE BOOKS:

1. Pattern‘s in JAVA Vol-I By Mark Grand, Wiley DreamTech.
2. Pattern‘s in JAVA Vol-II By Mark Grand, Wiley DreamTech.
3. JAVA Enterprise Design Patterns Vol-III By Mark Grand, Wiley DreamTech.
4. Head First Design Patterns By Eric Freeman-Oreilly-spd
5. Design Patterns Explained By Alan Shalloway,Pearson Education.
6. Pattern Oriented Software Architecture, F.Buschmann &others, John Wiley & Sons.

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15A05802b: Natural Language Processing

(Elective II)

Course Objectives:

Upon completion, students will be able to explain and apply fundamental algorithms and techniquethe area of natural language processing (NLP). In particular, students will:

- Understand approaches to syntax and semantics in NLP.
- Understand current methods for statistical approaches to machine translation.
- Understand language modeling.
- Understand machine learning techniques used in NLP.

Course Outcome:

COURSE OUTCOMES	
CO1	Understand the fundamental concepts of Natural Language Processing
CO2	Apply fundamental algorithms and techniques in the area of natural language processing (NLP)
CO3	Different approaches to syntax and semantics in NLP
CO4	Learn useful systems for language processing and related tasks involving text processing.
CO5	Understand the theoretical underpinnings of natural language processing in linguistics and formal language theory.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			2							1			2		
CO2	2		1				2			2				1	
CO3	1												1		
CO4		2		1		2							1		
CO5	1		2		1				1				2	1	

UNIT – I

Introduction to Natural Language Understanding, Syntactic Processing: Grammars and Parsing

UNIT-II:

Features and Augmented Grammars, Toward Efficient Parsing, Ambiguity Resolution

UNIT –III

Statistical Methods: Probabilistic Context-Free Grammars, Best-First Parsing.

UNIT-IV

Semantic Interpretation: Linking Syntax and Semantics, Ambiguity Resolution, other Strategies for Semantic Interpretation.

UNIT-V

Context and World Knowledge: Using World Knowledge, Discourse Structure, Defining a Conversational Agent.

TEXT BOOK:

1.Natural Language Understanding – James Allen, Second Edition, Pearson Education.

REFERENCE BOOKS:

1. Speech and Language Processing – Daniel Jurafsky, James H.Martin.
2. Foundations of Statistical Natural Language Processing – Christopher Manning, HinrichSchutze, MIT Press.
3. Artificial Intelligence, Elaine Rich and Kevin Knight, Second Edition, Tata McGraw Hill.

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15A05802c: Data Analytics
Elective II

Course Objective:

- To introduce the terminology, technology and its applications
- To introduce the concept of Analytics for Business
- To introduce the tools, technologies & programming languages which is used in day today analytics cycle

COURSE OUTCOMES	
CO1	Analyze data, test claims, and draw valid conclusions using appropriate statistical methodology.
CO2	Use appropriate resources to research, develop and contribute to advances and trends within the field of Data Analytics
CO3	Formulate and use appropriate models of data analysis to solve hidden solutions to business-related challenge.
CO4	Use appropriate models of analysis, assess the quality of input, and derive insight from results.
CO5	Apply computing theory, languages and algorithms, as well as mathematical and statistical models, and the principles of optimization to appropriately formulate and use data analyses

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1		3	1				2			3		
CO2	1	3	2	2						3			3	2	
CO3	2			2	3	1							1	2	
CO4				3	2	2				3	1	2			
CO5			3	2						3			3		

Unit I

Introduction to Analytics and R programming (NOS 2101)

Introduction to R, RStudio (GUI): R Windows Environment, introduction to various data types, Numeric, Character, date, data frame, array, matrix etc., Reading Datasets, Working with different file types .txt,.csv etc. Outliers, Combining Datasets, R Functions and loops.

Summary Statistics - Summarizing data with R, Probability, Expected, Random, Bivariate Random variables, Probability distribution. Central Limit Theorem etc.

Unit II

SQL using R & Correlation and Regression Analysis (NOS 2101)

Introduction to NoSQL, Connecting R to NoSQL databases. Excel and R integration with R connector.

Regression Analysis, Assumptions of OLS Regression, Regression Modelling. Correlation, ANOVA, Forecasting, Heteroscedasticity, Autocorrelation, Introduction to Multiple Regression etc.

Unit III

Understand the Verticals - Engineering, Financial and others (NOS 2101)

Understanding systems viz. Engineering Design, Manufacturing, Smart Utilities, Production lines, Automotive, Technology etc.

Understanding Business problems related to various businesses

Unit IV

Manage your work to meet requirements (NOS 9001)

Understanding Learning objectives, Introduction to work & meeting requirements, Time Management, Work management & prioritization, Quality & Standards Adherence,

Unit V

Work effectively with Colleagues (NOS 9002)

Introduction to work effectively, Team Work, Professionalism, Effective Communication skills, etc.

NOS * National Occupational Standards

Text Books:

1. Student's Handbook for Associate Analytics.
2. Introduction to Scientific Programming and Simulation Using R, Owen Jones, Robert Maillardet and Andrew Robinson, Second Edition, CRC Press, 2014
3. A First Course in Statistical Programming with R, Braun W. J., Murdoch D. J.. — Cambridge University Press, 2007
4. Data Manipulation with R, Jaynal Abedin and Kishor Kumar Das, Second Edition, Packt publishing, BIRMINGHAM – MUMBAI.
5. Beginning R The Statistical Programming language- Mark Gardener, John Wiley & Sons, Inc, 2012

Reference Books:

1. Introduction to Probability and Statistics Using R, ISBN: 978-0-557-24979-4, is a textbook written for an undergraduate course in probability and statistics.
2. An Introduction to R, by Venables and Smith and the R Development Core Team. This may be downloaded for free from the R Project website (http://www.r-project.org/, see Manuals). There are plenty of other free references available from the R Projectwebsite.
3. Time Series Analysis and Mining with R**,** Yanchang Zhao
4. Graphics for Statistics and Data Analysis with R – Kevin J. Keen, CRC Press, 2010
5. Data Analysis and Graphics Using R, Third Edition, John Maindonald, W. John Braun, Cambridge University Press, 2010
6. Exploratory Data Analysis with R – Roger D. Peng, Leanpub publications, 2015
7. Introduction to Probability and Statistics Using R, G. jay Kerns, First Edition, 2011
8. The Art of Data Science- A Guide for anyone Who Works with Data – Roger D. Peng and Elizabeth Matsui, Leanpub Publications, 2014
9. Montgomery, Douglas C., and George C. Runger, Applied statistics and probability for engineers. John Wiley & Sons, 2010.The Basic Concepts of Time Series Analysis.

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15a05803a : Mobile Computing
(Elective III)

Course Objectives:

- Understand mobile ad hoc networks, design and implementation issues, and available solutions.
- Acquire knowledge of sensor networks and their characteristics

Course Outcomes	
CO1	Students able to use mobile computing more effectively
CO2	Students gain understanding of the current topics in MANETs and WSNs, both from an industry and research point of views.
CO3	Acquire skills to design and implement a basic mobile ad hoc or wireless sensor network via simulations

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1				3		2							3	1	
CO2	1												1		
CO3				3	2									2	

UNIT-I:

Wireless LANS and PANS: Introduction, Fundamentals of WLANS, IEEE 802.11 Standards, HIPERLAN Standard, Bluetooth, Home RF.

Wireless Internet:

Wireless Internet, Mobile IP, TCP in Wireless Domain, WAP, Optimizing Web over Wireless.

UNIT-II:

AD HOC Wireless Networks: Introduction, Issues in Ad Hoc Wireless Networks, AD Hoc WirelessInternet.

MAC Protocols for Ad Hoc Wireless Networks: Introduction, Issues in Designing a MAC protocolfor Ad Hoc Wireless Networks, Design goals of a MAC Protocol for Ad Hoc Wireless Networks,Classifications of MAC Protocols, Contention - Based Protocols, Contention - Based Protocols withreservation Mechanisms, Contention – Based MAC Protocols with Scheduling Mechanisms, MACProtocols that use Directional Antennas, Other MAC Protocols.

UNIT -III:

Routing Protocols: Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classification of Routing Protocols, Table –Driven Routing Protocols, On – Demand Routing Protocols, Hybrid Routing Protocols, Routing Protocols with Efficient Flooding Mechanisms,Hierarchical Routing Protocols, Power – Aware Routing Protocols.

Transport Layer and Security Protocols: Introduction, Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks,Other Transport Layer Protocol for Ad Hoc Wireless Networks, Security in Ad Hoc Wireless Networks,Network Security Requirements, Issues and Challenges in Security Provisioning, Network SecurityAttacks, Key Management, Secure Routing in Ad Hoc Wireless Networks.

UNIT –IV:

Quality of Service: Introduction, Issues and Challenges in Providing QoS in Ad Hoc Wireless Networks, Classification of QoS Solutions, MAC Layer Solutions, Network Layer Solutions, QoSFrameworks for Ad Hoc Wireless Networks.

Energy Management: Introduction, Need for Energy Management in Ad Hoc Wireless Networks,Classification of Ad Hoc Wireless Networks, Battery Management Schemes, Transmission PowerManagement Schemes, System Power Management Schemes.

UNIT –V:

Wireless Sensor Networks: Introduction, Sensor Network Architecture, Data Dissemination, DataGathering, MAC Protocols for Sensor Networks, Location Discovery, Quality of a Sensor Network,Evolving Standards, Other Issues.

TEXT BOOKS:

1. Ad Hoc Wireless Networks: Architectures and Protocols - C. Siva Ram Murthy and B.S.Manoj, PHI,2004.
2. Wireless Ad- hoc and Sensor Networks: Protocols, Performance and Control - JagannathanSarangapani, CRC Press

REFERENCE BOOKS:

1. Ad hoc Mobile Wireless Networks – Subir Kumar sarkar, T G Basvaraju, C Puttamadappa,Auerbach Publications,2012.
2. Wireless Sensor Networks - C. S. Raghavendra, Krishna M. Sivalingam, 2004, Springer.
3.Ad- Hoc Mobile Wireless Networks: Protocols & Systems, C.K. Toh , Pearson Education

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B.Tech. IV – II Sem. (C.S.E)

L	P	C
4	0	4

15A05803b: Cloud Computing

(Elective III)

Course Objectives:

- To explain the evolving computer model called cloud computing.
- To introduce the various levels of services that can be achieved by cloud.
- To describe the security aspects in cloud

Course Outcomes	
CO1	Students are be able to apply virtualization techniques to demonstrate cloud services efficiently
CO2	Students are able to apply map reduce framework for cloud application design
CO3	Students are able to analyze web services using python web application framework
CO4	Students are able to illustrate case studies on video streaming using big data analytics
CO5	Students are able to classify cloud security algorithms for cloud applications

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				3								3		
CO2	3		3	2	3								3	3	
CO3		3		3									3		
CO4	3		3	3		3	3		3	3	3	3	3	3	3
CO5	3		3	3	3								3	2	

Unit-1

Introduction to cloud computing: Introduction, Characteristics of cloud computing, Cloud Models, Cloud Services Examples, Cloud Based services and applications

Cloud concepts and Technologies: Virtualization, Load balancing, Scalability and Elasticity, Deployment, Replication, Monitoring, Software defined, Network function virtualization, Map Reduce, Identity and Access Management, services level Agreements, Billing.

Cloud Services and Platforms : Compute Services, Storage Services, Database Services, Application services, Content delivery services, Analytics Services, Deployment and Management Services, Identity & and Access Management services, Open Source Private Cloud software.

Unit-2

Hadoop&MapReduce: Apache Hadoop, Hadoop MapReduce Job Execution, HadoopSchedulers, Hadoop Cluster setup.

Cloud Application Design: Reference Architecture for Cloud Applications, Cloud Application Design Methodologies, Data Storage Approaches.

Python Basics : Introduction, Installing Python, Python data Types & Data Structures, Control flow, Function, Modules, Packages, File handling, Date/Time Operations, Classes.

Unit-3

Python for Cloud: Python for Amazon web services, Python for Google Cloud Platform, Python for windows Azure, Python for MapReduce, Python packages of Interest, Python web Application Frame work, Designing a RESTful web API.

Cloud Application Development in Python: Design Approaches, Image Processing APP,Document Storage App, MapReduce App, Social Media Analytics App.

Unit-4

Big Data Analytics: Introduction, Clustering Big Data, Classification of Big data, Recommendation of Systems.

Multimedia Cloud: Introduction, Case Study: Live video Streaming App, Streaming Protocols, case Study: Video Transcoding App.

Cloud Application Benchmarking and Tuning: Introduction, Workload Characteristics, Application Performance Metrics, Design Considerations for a Benchmarking Methodology, Benchmarking Tools, Deployment Prototyping, Load Testing & Bottleneck Detection case Study, Hadoop benchmarking case Study.

Unit-5

Cloud Security: Introduction, CSA Cloud Security Architecture, Authentication, Authorization, Identity & Access Management, Data Security, Key Management, Auditing.

Cloud for Industry, Healthcare & Education: Cloud Computing for Healthcare, Cloud computing for Energy Systems, Cloud Computing for Transportation Systems, Cloud Computing for Manufacturing Industry, Cloud computing for Education.

Migrating into a Cloud: Introduction, Broad Approaches to migrating into the cloud, the seven –step model of migration into a cloud.

Organizational readiness and Change Management in The Cloud Age: Introduction, Basic concepts of Organizational Readiness, Drivers for changes: A frame work to comprehend the competitive environment , common change management models, change management maturity models, Organizational readiness self – assessment.

Legal Issues in Cloud Computing: Introduction, Data Privacy and security Issues, cloud contracting models, Jurisdictional issues raised by virtualization and data location, commercial and business considerations, Special Topics

Text Books:

1. ―Cloud computing A hands-on Approach‖ By ArshdeepBahga, Vijay Madisetti, Universities Press, 2016
2.‖Cloud Computing Principles and Paradigms: By Raj kumarBuyya, James Broberg, AndrzejGoscinski, wiley, 2016

References:

1. Mastering Cloud Computing by Rajkumar Buyya, Christian Vecchiola,S Thamarai Selvi,TMH
2. Cloud computing A hands-On Approach by Arshdeep Bahga and Vijay Madisetti.
3. Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, RobertElsenpeter, TataMcGraw Hill, rp2011.
4. Enterprise Cloud Computing, GautamShroff, Cambridge University Press, 2010.
5. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud,George Reese, O'Reilly, SPD, rp2011.
6. Essentials of Cloud Computing by K. Chandrasekaran. CRC Press

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B.Tech. IV – II Sem. (C.S.E)	**L**	**P**	**C**
	4	**0**	**4**

15A05803c: Computer Graphics and Multimedia
(Elective III)

Course Objectives:

- To develop, design and implement two and three dimensional graphical structures
- To enable students to acquire knowledge Multimedia compression and animations
- To learn Creation, Management and Transmission of Multimedia objects.

Course Outcomes	
CO1	Ability to develop programs to control the content, structure and appearance of objects.
CO2	Ability to design, organize and produce multimedia projects of all kinds

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1				2		2							2		
CO2				3		3								3	

UNIT I
2D PRIMITIVES:
Elements of pictures created in computer graphics – Graphics input primitives and devices Drawing primitives in open GL and Basic open GL programming - open GL basic Graphics primitives – Output primitives – Line, Circle and Ellipse drawing algorithms – Attributes of output primitives.

UNIT II
2D GEOMETRIC TRANSFORMATIONS:
2D Viewing – Window-Viewport Transformation - Two dimensional Geometric transformations – Line, Polygon, Curve and Text clipping algorithms.

UNIT III

MULTIMEDIA BASICS

Introduction and definitions – applications – elements – Animations – Compression – Types of Compressions: Lossless – Lossy – Video compression – Image Compression – Audio compression – Data and file format standards – Multimedia data structures: KD Trees –R trees.

UNIT IV

MULTIMEDIA:

Where to use multimedia, Text: The power of meaning, About fonts and faces, Images: Before you start to create, Making still images, colour, Sound: The power of sound, Digital audio, MIDI Audio, MIDI Vs Digital audio, Multimedia system sounds, Audio File formats, Animation, Video: Using video, How video works and is displayed, Digital video containers

UNIT V

MULTIMEDIA AUTHORING AND APPLICATIONS Creating interactive multimedia – Multimedia Authoring Systems – Multimedia Authoring Software Applications – Video On demand – Virtual Reality – Augmented Reality – Content based retrieval in digital libraries.

TEXT BOOKS:

1. Donald D. Hearn, M. Pauline Baker and Warren Carithers, ―Computer Graphics with OpenGL‖, Fourth Edition, Pearson Education, 2010.
2. e-Nian Li and Mark S.Drew, ―Fundamentals of Multimedia‖, First Edition, Pearson Education, 2007
3. Multimedia: Making It Work‖, , Tay Vaughan, 8th Edition, 2011, Tata McGrawHill Edition

REFERENCE BOOKS:

1. F.S.Hill, ―Computer Graphics using OPENGL‖, Second edition, Pearson Education, 2003.
2. Prabhat K Andleigh, Kiran Thakrar, ―Multimedia systems design‖, First Edition, PHI, 2007

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B.Tech. IV – II Sem. (C.S.E)

L	P	C
4	**0**	**4**

15A05804a:Optimization Techniques
(Elective IV)

Course Objective

- To understand the theory of optimization methods and algorithms developed for solving varioustypes of optimization problems.
- To develop and promote research interest in applying optimization techniques in problems ofEngineering and Technology.
- To apply the mathematical results and numerical techniques of optimization theory to concreteEngineering problems.

Course Outcomes:

CO1 Use various optimization techniques such as Quadratic programming, Dynamic Programming and select the ones most suitable to the problem at hand.
CO2 Subdivide a complex system in to smaller disciplinary models, manage their interfaces and reintegrate them in to an overall system model.
CO3 Rationalize and quantify a system architecture or product design problem by selecting appropriate objective function, design variables, parameters and constraints.
CO4 Interpret the mathematical conditions for optimality and give physical explanation.
CO5 Make recommendations based on solutions, analysis and limitations of models

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1		2	1					1				1	
CO2		3	1	2			2			2			2	2	
CO3	1												1		
CO4	3	2		1		2			1					2	
CO5	1		1		1			2					2	1	

UNIT I

Introduction to optimization: Requirements for the Application of Optimization Methods, Applications of Optimization in Engineering, Structure of Optimization Problems, Functions of a Single Variable: Properties of Single-Variable Functions, Optimality Criteria, Region Elimination Methods, Polynomial Approximation or Point Estimation Methods.

UNIT II

Functions of a Several Variables: Optimality Criteria, Direct-Search Methods, Gradient Based Methods, Comparison of Methods and Numerical Results.

UNIT III

Linear Programming: Formulation of Linear Programming Models, Graphical Solution of Linear Programming in Two Variables, Linear Programming in Standard Form, Principles of the Simplex Method, Applications.

UNIT IV

Constrained Optimality Criteria: Equality-Constrained Problems, Lagrange Multipliers, Economic Interpretation of Lagrange Multipliers, Kuhn-Tucker Conditions, Kuhn-Tucker Theorems, Saddle point Conditions, Second-Order Optimality Conditions, Generalized Lagrange Multiplier Method, and Generalization of Convex Functions.

UNIT V

Transformation Methods: Penalty Concept, Algorithms, Codes, and Other Contributions, Method of Multipliers, Constrained Direct Search: Problem Preparation, Adaptations of Unconstrained Search Methods, Random-Search Methods.

TEXT BOOKS:

1. Engineering Optimization- Methods and Applications, A.Ravindran, K. M. Ragsdell, G.V. Reklaitis,Second Edition, Wiley India Edition.
2. Introductory Operation Research- Theory and Applications, H.S. Kasana, K.D. Kumar, SpringerInternational Edition.

REFERENCES:

1. Optimization Methods in Operations Research and Systems Analysis, K.V. Mital and C. Mohan, NewAge International (P)Limited, Publishers, Third Edition, 1996.
2. Operations Research, Dr. J.K.Sharma, Mc Millan.
3. Operations Research: An Introduction, H.A. Taha, PHI Pvt. Ltd.,

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B.Tech. IV – II Sem. (C.S.E)	L	P	C
	4	0	4

15A05804b: Embedded Systems(Elective IV)

Course Objective

- Study embedded computer system hardware
- Study Design, implement, and debug multi-threaded application software that operates underreal-time constraints on embedded computer systems
- Use and describe the implementation of a real-time operating system on an embedded computersystem
- Formulate an embedded computer system design problem including multiple constraints, create adesign that satisfies the constraints.
- Create computer software and hardware implementations that operate according to well-knownstandards

COURSE OUTCOMES	
CO1	Expected to understand the selection procedure of Processors in the Embedded domain
CO2	Design Procedure for Embedded Firmware.
CO3	Expected to visualize the role of Real time Operating Systems in Embedded Systems
CO4	Expected to evaluate the Correlation between task synchronization and latency issues

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		1											1		
CO2		3	3											2	
CO3										2				2	
CO4														2	

UNIT -I:
Introduction to Embedded Systems Definition of Embedded System, Embedded Systems Vs General Computing Systems, History ofEmbedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded

Systems.

UNIT -II:
Typical Embedded System:
Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the typeof Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators,Communication Interface: Onboard and External Communication Interfaces.

UNIT -III:
Embedded Firmware:
Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

UNIT -IV:
RTOS Based Embedded System Design:
Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

UNIT -V:
Task Communication: Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

TEXT BOOKS:
1. Introduction to Embedded Systems‖, Shibu K.V, Mc Graw Hill,2014.

REFERENCE BOOKS:
1. Embedded Systems - Raj Kamal, TMH.
2. Embedded System Design - Frank Vahid, Tony Givargis, John Wiley.
3. Embedded Systems – Lyla, Pearson, 2013
4. An Embedded Software Primer - David E. Simon, Pearson Education.

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B.Tech. IV – II Sem. (C.S.E)

L	P	C
4	0	4

15A05804c :Digital Image Processing

(Elective IV)

Course Objectives:

- Develop an overview of the field of image processing.
- Understand the Image segmentation, enhancement, compression etc., approaches andhow to implement them.
- Prepare to read the current image processing research literature.
- Gain experience in applying image processing algorithms to real problems.
- Analyze general terminology of digital image processing.

Course Outcomes	
CO1	Students are able to learn fundamental steps in image processing
CO2	Students are able apply a proper image enhancement technique for given a set of noisy images
CO3	Students are able to compare different image segmentation techniques
CO4	Students are able to develop image compression techniques
CO5	Students are able to Formulate solutions using morphological concepts and Color Image Processing models

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		1											3		
CO2	3				3						1			2	
CO3				2		2				2					
CO4			3											2	
CO5					3									3	

Unit - I :

Digital Image Fundamentals: What is Digital Image Processing, examples of fields that use digital image processing, fundamental Steps in Digital Image Processing, Components of an Image processing system, Image Sampling and Quantization, Some Basic Relationships betweenPixels, Linear and Nonlinear Operations.

Unit – II:

Image Enhancement: Image Enhancement in the spatial domain: some basic gray level transformations, histogram processing, enhancement using arithmetic and logic operations, basics of spatial filters, smoothening and sharpening spatial filters, combining spatial enhancement methods.

Unit – III :

Segmentation: Thresholding, Edge Based Segmentation: Edge Image Thresholding, Region Based Segmentation, Matching, **Representation and Description**: Representation , Boundary Descriptors, Regional Descriptors.

Unit – IV :

Image Compression: Fundamentals, image compression models, elements of information theory, error-free compression, lossy compression,Image Compression Standards.

Unit – V :

Morphological Image Processing: Preliminaries, dilation, erosion, open and closing, hit transformation, basic morphologic algorithms.

Color Image Processing: Color fundamentals, Color Models and basics of full-color imageprocessing

Text Books :

1. Digital Image Processing‖, Rafael C.Gonzalez and Richard E. Woods, Third Edition, Pearson Education, 2007
2. Digital Image Processing‖, S.Sridhar, Oxford University Press

Reference Books :

1. Fundamentals of Digital Image Processing‖ , S. Annadurai, Pearson Edun, 2001.
2. Digital Image Processing and Analysis‖, B. Chanda and D. Dutta Majumdar, PHI, 2003.
3. Image Processing‖ , Analysis and Machine Vision , Milan Sonka, Vaclav Hlavac and Roger Boyle, 2nd Edition, Thomson Learning, 2001.
4. Digital Image Processing‖ Vipula Singh, Elsevier

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING (Autonomous), ANANTHAPURAMU
B.Tech (COMPUTER SCIENCE & ENGINEERING)
2017-18
COURSE STRUCTURE

I YEAR I Semester

Sl. No	Subject Code	Subject	L	T	P	C
1	17A15501	English	3	-	-	3
2	17A15101	Mathematics –I	2	2	-	3
3	17A15201	Applied Physics	3	-	-	3
4	17A10101	Environmental Studies	3	-	-	3
5	17A10301	Engineering Drawing	1	1	3	3
6	17A10501	Problem Solving & Computer Programming	3	-	-	3
7	17A15502	English Language Communication Skills Lab	-	1	3	2
8	17A15202	Applied Physics Lab	-	1	3	2
9	17A10502	Computer Programming Lab	-	1	3	2
10	17A12451	Comprehensive Objective Type Examination	-	-	-	1
		Total	**15**	**6**	**12**	**25**

I YEAR II Semester

Sl.No	Subject Code	Subject	L	T	P	C
1	17A25501	Technical Communication and Presentation Skills	3	-	-	3
2	17A25101	Mathematics –II	2	2	-	3
3	17A25102	Mathematical Methods	2	2	-	3
4	17A25301	Applied Chemistry	3	-	-	3
5	17A20501	Data Structures	2	2	-	3
6	17A20502	Digital Logic Design	2	2	-	3
7	17A25302	Applied Chemistry Lab	-	1	3	2
8	17A23501	Engineering Workshop & IT Workshop Lab	-	1	3	2
9	17A20503	Data Structures Lab	-	1	3	2
10	17A29901	Community Service (Audit)	-	-	2	-
11	17A20505	Comprehensive Objective Type Examination	-	-	-	1
		Total	**14**	**11**	**11**	**25**

II YEAR I SEMESTER

S.No	Subject Code	Subject	L	T	P	C
1	17A35401	Managerial Economics and Financial Analysis	3	-	-	3
2	17A35104	Probability and Statistics	2	2	-	3
3	17A32401	Electrical & Electronics Engineering	3	-	-	3
4	17A30501	Object Oriented Programming	2	2	-	3
5	17A30502	Computer Organization	3	-	-	3
6	17A30503	Discrete Mathematics	2	2	-	3
7	17A32402	Electrical & Electronics Engineering Lab	-	1	3	2
8	17A30504	Object Oriented Programming Lab	-	1	3	2
9	17A30507	Comprehensive Objective Type Examination	-	-	-	1
		Total	**15**	**8**	**6**	**23**

II YEAR II SEMESTER

S.No	Subject Code	Subject	L	T	P	C
1	17A40501	Operating Systems	3	-	-	3
2	17A40502	Algorithms	2	2	-	3
3	17A40503	Database Management Systems	3	-	-	3
4	17A40504	Theory of Computation	2	2	-	3
5	17A40505	Linux Programming	3	-	-	3
6	17A45101	Human Values & Professional Ethics(Audit)	2	-	-	-
7	17A40506	Algorithms Lab	-	1	3	2
8	17A40507	Database Management Systems Lab	-	1	3	2
9	17A40508	Operating Systems Lab	-	1	3	2
10	17A40509	Comprehensive Objective Type Examination	-	-	-	1
		Total	**15**	**7**	**9**	**22**

III YEAR I SEMESTER

S.No	Subject Code	Subject	L	T	P	C
1	17A55401	Management Science	3	-	-	3
2	17A50501	Web Technologies	3	-	-	3
3	17A50502	Compiler Design	2	2	-	3
4	17A50505	**Elective I** a. Data Warehousing andMining b. Computer Graphics c. Principles of Programming Languages	3	-	-	3
5	17A50503	Software Engineering	2	2	-	3
6	17A50504	Computer Networks	2	2	-	3
7	17A50506	Software Engineering &Web Technologies	-	1	3	2
8	17A50507	Data Warehousing and Mining& Compiler Design Lab	-	1	3	2
9	17A59902	Skill Development Course	-	-	-	-
10	17A50508	Comprehensive Objective Type Examination	-	-	-	1
		Total	**15**	**8**	**6**	**23**

III YEAR II SEMESTER

S.No	Subject Code	Subject	L	T	P	C
1	17A60501	Data Analytics	2	2	-	3
2	17A60502	Object Oriented Analysis &Design	3	-	-	3
3	17A624501	Micro Processors & Micro controllers	3	-	-	3
4	17A60503	Artificial Intelligence	3	-	-	3
5	17A60504	**Open Elective*-I** a. Free and Open Source Software's b. Intellectual Property Rights c. Data Science	3	-	-	3
6	17A69901	Foreign Language (Audit)	2	-	-	-
7	17A65501	Advanced Communications Skills Lab	-	1	3	2
8	17A624502	Micro Processors & Micro controllers Lab	-	1	3	2
9	17A60505	OOAD & Data Analytics Lab	-	1	3	2
10	17A60506	Comprehensive Objective Type Examination	-	-	-	1
		Total	**16**	**5**	**9**	**22**

IV YEAR I SEMESTER

S.No	Subject Code	Subject	L	T	P	C
1	17A70501	Software Testing	3	-	-	3
2	17A70502	Mobile Application Development	2	2	-	3
3	17A70503	Design Patterns	2	2	-	3
4	17A70504	Cloud Computing	3	-	-	3
5	17A70505	**Open Elective*-II** a. Software Project Management b. Disaster Management c. Digital Marketing	3	-	-	3
6	17A70506	**Elective – II** a. Digital Forensics & Cyber Laws b. Service Oriented Architecture c. Ethical Hacking	3	-	-	3
6	17A79905	**MOOC-I (Audit)****	-	-	-	-
7	17A70507	Software Testing Lab	-	1	3	2
8	17A70508	Mobile Application Development Lab	-	1	3	2
9	17A70509	Comprehensive Objective type Examination	-	-	-	1
		Total	**13**	**6**	**6**	**23**

Note: Project Work shall initiate in IV-I Semester with a target of submission of Abstract and finalization of topic, and the evaluation of project work shall be done in IV-II Semester

*** The student should select the subject in the open elective which is not studied in previous semesters.**

****** The student can select the subject of any discipline for **MOOC-I. Edx, CourseEra, NPTEL, Swayam, Udacity.**

IV YEAR II SEMESTER

S.No	Subject Code	Subject	L	T	P	C
1	17A80501	**Elective III** **a.** Information & Cyber Security **b.** Software Architecture **c.** System Applications Product	3	-	-	3
2	17A80502	**Elective – IV** a. Internet of Things b. Image Processing c. High Performance Computin	3	-	-	3
3	17A80503	**Elective – V** a. Entrepreneurship Developme b. Natural Language Processing c. Machine Learning	3	-	-	3
4	17A89905	**MOOC-II(Audit)*** **	-	-	-	-
5	17A80504	Seminar	-	-	4	2
6	17A80505	Project Work	-	-	20	10
7	17A80506	Comprehensive Objective type Examination	-	-	-	1
		Total	**9**	**0**	**24**	**22**

*** The student should select the subject in the open elective which is not studied in previous semesters.**

******* The student should select the subject of discipline centric for **MOOC-II. Edx, CourseEra, NPTEL, Swayam, Udacity.**

Areas: Computer Networks, Artificial Intelligence, Software Engineering, Mobile Adhoc Networks, Sensor networks, Algorithms, Databases, Image Processing etc.,

Note: All End Examinations (Theory and Practical) are of three hours duration.

L – Theory T- Tutorial P – Practical/Drawing C – Credits

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS):: ANANTHAPURAMU
****** DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES ******
I B.TECH – I SEMESTER(R-17)
ENGLISH
(w.e.f Academic Year 2017-18)

Subject Code	Title of the Subject	L	T	P	C
17A15501	English	3	-	-	3

COURSE OBJECTIVES	
1	To enable the students to communicate in English for academic and social purpose
2	To enable the students to acquire structures and written expressions required for their profession.
3	To develop and practice critical and evaluative reading
4	To encourage investigating questions of the humanities through rhetorical study
5	To enhance the study skills of the students with emphasis on LSRW skills

COURSE OUTCOMES	
CO1	Develop facility in responding to a variety of situations and contexts calling for purposeful shifts in voice, tone, level of formality, design, medium, and/or structure
CO2	Become effective in the use of different modes of written communication in a professional environment
CO3	Develop capacity to apply different reading methods to evaluate a mass of data on the net and to glean the necessary information.
CO4	Learn and use key rhetorical concepts through analyzing and composing a variety of texts.
CO5	Well trained in LSRW skills and develop communicative competence

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1									2						
CO2									2	3					3
CO3									2	3		2			
CO4				3					2			2			
CO5									2	3		2			3

UNIT –I

Chapter entitled *Humour*from "Using English"

Chapter entitled "Jagadish Chandra Bose" from New Horizons

L- Listening -Techniques - Importance of phonetics
L- Meet & Greet and Leave taking, Introducing Oneself and Others (Formal and Informal situations)
R- -Reading Strategies -Skimming and Scanning

W- Writing strategies- sentence structures
G-Parts of Speech –Noun-number, pronoun-personal pronoun, verb- analysis
V-Affixes-prefix and suffix, root words, derivatives

UNIT –II

Chapter entitled *Inspiration* from "Using English"

Chapter entitled "Dhyan Chand" from <u>New Horizons</u>

L- Listening to details
S- Apologizing, Interrupting, Requesting and Making polite conversations
R-note making strategies
W- Paragraph-types- topic sentences, unity, coherence, length , linking devices
G-Auxiliary verbs and question tags
V- synonyms-antonyms, homonyms , homophones, homographs, words often confused

UNIT –III

Chapter entitled *Sustainable Development* from "Using English"
Chapter entitled "After Twenty Years" from <u>New Horizons</u>

L- Listening to themes and note taking
S- Giving instructions and Directions, making suggestions, Accepting ideas, fixing a time and Advising
R- Reading for details -1
W- Resume and cover letter
G- Tenses – Present tense, Past tense and Future tense
V-Word formation and One-Word Substitutes

UNIT –IV

Chapter entitled *Relationships* from "Using English"

Chapter entitled "The Tiger in the Tunnel" from <u>New Horizons</u>

L- Listening to news
S- Narrating stories, Expressing ideas and opinions and telephone skills
R- Reading for specific details and Information
W- Technical Report writing-strategies, formats-types-technical report writing
G- Voice and Subject – Verb Agreement
V- Idioms and prepositional Phrases

UNIT –V

Chapter entitled Science and Humanism from "Using English"
Chapter entitled a. "Daffodils" b. "Where the mind is Without Fear" from <u>New Horizons</u>
L- Listening to speeches
S- Making Presentations and Group Discussions

R- Reading for Information

W- E-mail drafting

G- Conditional clauses and conjunctions

V- Collocations and Technical Vocabulary and using words appropriately

Text Books:

1. **Using English (for detailed study)** published by Orient Black Swan, 2013
2. **New Horizons (for non detailes study) published by Pearson, 2013**

References:

1. **Raymond Murphy's English Grammar with CD,** Murphy, Cambridge University Press, 2012.
2. **Every Day Dialogues in English- Robert J.Dixson, Prentice Hall of India**
3. **Communication Skills, Sanjay Kumar &Pushpalatha** Oxford University Press, 2012.
4. **A Course in Communication Skills**- KiranmaiDutt& co. Foundation Books, 2012.
5. **Current English grammar and usage-**S M Guptha, PHI, 2013.
6. **A Course in Listening and Speaking-SasiKumar.U, U.K.Cambridge**
7. **Powerful Vocabulary Builder**- Anjana Agarwal New Age International Publishers, 2011.
8. **Writing with a Purpose, Tickoo and Sasi Kumar, OUP, 2011**
9. **Oxford Advanced Learners Dictionary, 9th edition, Oxford, 2016**

Method of Evaluation:

The distribution shall be 40 marks for Internal Evaluation and 60 marks for the External Evaluation. Each Internal examination shall consist of an objective test for 10 marks and a subjective test for 20 marks with duration of 20 and 90 minutes respectively. In addition to that 10 marks will be awarded for assignment.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS):: ANANTHAPURAMU
****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING******
I B.TECH – I SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A15101	**MATHEMATICS – I**	**2**	**2**	**0**	**3**

COURSE DESCRIPTION: First order differential equation, higher order linear differential equations; functions of several variables; applications of integration; multiple integrals, vector calculus.

COURSE OBJECTIVES	
1	To impart knowledge on the advanced concepts of linear differential equations, functions of several variables, applications of derivatives, multiple integrals and vectors calculus.
2	To develop skills in analyzing the problems, designing mathematical models, skills in differentiation, integration, and vectors calculus for the problems in engineering

COURSE OUTCOMES	
CO1	Acquire knowledge in Linear differential equations of order n, Optimum values of a given multivariable functions measuring the bending nature of the curve, Tracing of curves, Multiple integrals.
CO2	: Develop skills in problem solving of differential equations., stationary points for a given multivariable functions
CO3	Develop skills in designing mathematical models involving Electrical circuits such as L-R-C oscillatory circuits, Mechanical oscillations, Newton’s Law of cooling
CO4	Develop analytical skills in providing solutions for complex problems involving Optimum of a multivariable function, Measuring the curve lengths
CO5	Applications of differential equations, differential calculus. Integral calculus and vector calculus to solve engineering problems

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1				1			2	1			3		
CO2	1	3				1			2	2			3		
CO3	1	3	2			1			2	2			3		
CO4	1	1	1	3		1			2	1			3		
CO5	1	1	1	1		1			2	1			2		

UNIT-I:

FIRST ORDER DIFFERENTIAL EQUATIONS (6 periods)
Linear and Bernoulli type, exact equations and reducible to exact. Orthogonal trajectories (Both Cartesian and polar forms). Newton‘s law of cooling.

UNIT II:
HIGHER ORDER LINEAR DIFFERENTIALEQUATIONS(12 periods)

Method for solution of linear equations- Differential operator *D*, Solution of second order linear homogeneous equations with constant coefficients, Solution of Higher order homogeneous linear equations with constant coefficients, Solution of Non homogeneous linear equations- Operator methods for finding particular integrals- for cases – e^{ax}, sinax, cos ax, x^{n}, e^{ax} V(x), xV(x). Method of Variation of parameters. Applications of linear differential equations- Mechanical and Electrical oscillatory circuits and Deflection of Beams.

UNIT – III

Power Series Expansions &Multi-variable Calculus (8 Lectures)

Taylor series, Maclaurin series. Functions of several variables, Continuity, Partial derivatives, Total derivative, Increment theorem, Chain rule, Tangent plane and Normal line, Mixed derivative theorem, Necessary and sufficient conditions for Maxima, Minima and Saddle point, The method of Lagrange multipliers.

UNIT – IV

Multiple Integrals (6 Lectures)

Double integral, Fubini's theorem, Volumes and Areas, Change of variable in a double integral, special case: Polar coordinates, Triple integral, Applications, Change of variables in a triple integral, Surface area, Line integrals, Surface integrals.

UNIT – V

Vector Calculus (12 Lectures)

Vector functions, Continuity and Differentiability of vector functions, Arc length for space curves, Unit tangent vector, Unit normal and Curvature to plane and space curves, Gradient, Directional derivatives, Vector fields, Divergence and Curl of a vector field, vector integrations, Green's Theorem (without Proof), Stokes' Theorem(without Proof), The divergence theorem(without Proof),verifications and applications.

TEXT BOOKS:

1. Engineering Mathematics-I, E. Rukmangadachari& E. Keshava Reddy, Pearson Publisher
2. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.

REFERENCES:

1. Engineering Mathematics Volume-I, by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S.Chand publication.
2. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.
3. Higher Engineering Mathematics, by B.V.Ramana, McGraw Hill publishers.
4. Advanced Engineering Mathematics, by Alan Jeffrey, Elsevier.
5. Advanced Engineering Mathematics 3rd Edition,by R.K.Jain&S.R.K.Iyengar, Narosa publishers.

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
I B.TECH – I SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A15201	APPLIED PHYSICS	3	-	-	3

COURSE OBJECTIVES	
1	To make a bridge between the physics in school and engineering courses.
2	To evoke interest on applications of superposition effects like interference and diffraction, the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications, study of propagation of light through transparent dielectric waveguides along with engineering applications.
3	To enlighten the concepts regarding the bulk response of materials to the EM fields and their analytical study in the back-drop of basic Quantum Mechanics and to provide fundamentals of de'Broglie waves, quantum mechanical wave equation and its applications
4	To get an insight into the microscopic meaning of conductivity, classical and quantum free electron models, the effect of periodic potential on electron motion, evolution of band theory to distinguish materials, basic concepts and transport phenomenon of charge carriers in semiconductors.
5	To open new avenues of knowledge in dielectric and magnetic materials which find potential in the emerging micro device applications.
6.	To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications. Considering the significance of micro miniaturization of electronic devices and significance of low dimensional materials, the basic concepts of nano and smart materials, their properties and applications in modern emerging technologies are to be elicited.
COURSE OUTCOMES	
CO1	The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fiber optics.
CO2	Basics of Electromagnetic fields are focused along with the understanding of quantum mechanical picture of subatomic world.
CO3	The discrepancies between the classical estimates and laboratory observations of electron transportation phenomena are successfully explained by free electron theory and band theory. The physical properties exhibited by materials would be lifted through the understanding of properties of semiconductors.
CO4	The dielectric and magnetic response of materials are focused.

CO5	The importance of superconducting materials, nanomaterials and smart materials along with their engineering applications are well elucidated.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		2		2	2		2		1		2		
CO2	3	2		2		2	2		2		1		2		
CO3	3	3		2		2	2		2		1		2		
CO4	3	2		2		2	2		2		1		2		
CO5	3	2		2		2	2		2		1		2		

UNIT 1:PHYSICALOPTICS, LASERS AND FIBRE OPTICS

***Physical Optics**:* Introduction to interference – Colours in thin films – Newton‘s Rings – Michelson interferometer – Fraunhofer diffraction due to single slit, double slit – Diffraction grating(Qualitative).

***Lasers**:* Introduction – Characteristics of laser – Spontaneous and stimulated emission of radiation – Einstein‘s coefficients – Population inversion – Pumping mechanisms – Nd:YAG laser – He-Ne laser – Applications of lasers.

Fiber optics: Introduction–Principle of optical fiber –Numerical aperture and acceptance angle – V-Number - Types of optical fibers – Optical fiber communication system – Attenuation and losses in optical fibers – Applications of optical fibers.

UNIT 2:ELECTOMAGNETIC FIELDS AND QUANTUM MECHANICS

Electromagnetic Fields: Scalar and Vector Fields – Electric Potential – Gradient, Divergence of fields - Gauss and Stokes theorems - Derivations of Maxwell‘s equations.

***QuantumMechanics**:* Black Body radiation – Dual nature of radiation – Schrodinger‘s time independent wave equation – Significance of wave function – Particle in a one dimensional infinite potential well.

UNIT 3: FREE ELECTRON THEORY AND SEMICONDUCTORS

Freeelectrontheory: Classical free electron theory – Sources of electrical resistance – Equation for electrical conductivity – Quantum free electron theory – Fermi-Dirac distribution – Kronig-Penny model (qualitative) – Origin of bands in solids – Effective mass.

***Semiconductorphysics**:* Introduction –Direct and Indirect band gap semiconductors – Drift & diffusion currents – Einstein‘s equation – Continuity equation – Hall Effect.

UNIT 4: DIELECTRICSAND MAGNETIC MATERIALS

***Dielectrics**:* Introduction – Dielectric Polarization – Types of Polarization – Lorentz field – Clausius-Mosotti equation – Piezoelectricity – Ferro electricity – Dielectric strength, loss and breakdown.

***Magneticmaterials**:* Introduction – Basic definitions – Origin of magnetic moment – Classification of magnetic materials – Hysteresis – Soft and hard magnetic materials – Applications of magnetic materials.

UNIT 5: **ADVANCED MATERIALS**

***Superconductors**:* Introduction – Properties of superconductors – Meissner effect– Type I and type II superconductors – ac and dc Josephson effects – BCS theory (qualitative) – High T_c superconductors – Applications of superconductors.

Nanomaterials: Introduction – Surface area and quantum confinement – Physical properties: optical, thermal, mechanical and magnetic – Applications of nanomaterials.

SmartMaterials: Shape Memory Alloys: Definition – Two phases – One way and two way memory effect – Pseudo elasticity – Applications of shape memory alloys.

Prescribed Text books:

1. Engineering physics – D.K. Battacharya and PoonamTandon, Oxford University press.
2. Engineering physics – M.N. Avadhanulu and P.G. KrshiSagar, Chand and Co.

Reference Books:

1. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley &Sons
2. Introduction to modern optics – Grant R Fowles
3. A text book on Optics – Brijlal&Subramanyam
4. Semiconductor physics and devices- Basic principle – Donald A, Neamen, McGraw Hill
5. Introduction to Nanotechnology – C P Poole and F J Owens, Wiley
6. Shape Memory Alloys-Modeling and Engg. Applications – C Lagoudas, Springer
7. Engineering Physics – V. Rajendran, K.Thyagarajan Tata MacGraw Hill Publishers
8. Engineering Physics – S.O.Pillai, New Age Publications
9. Engineering Physics - Sanjay D. Jain, D. Sahasrambudhe and Girish, University Press
10. Engineering Physics – D K Pandey, S. Chaturvedi, Cengage Learning
11. Engineering Physics – M. Arumugam, Anuradha Publications

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
I B.TECH – I SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A10101	Environmental Studies	3	-	-	3

COURSE OBJECTIVES	
1	To make the students to get awareness on environment, to understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life to save earth from the inventions by the engineers.

COURSE OUTCOMES	
CO1	Critical Thinking: demonstrate critical thinking skills in relation to environmental affairs.
CO2	Communication: demonstrate knowledge and application of communication skills and the ability to write effectively in a variety of contexts.
CO3	Interdisciplinary Synthesis: demonstrate an ability to integrate the many disciplines and fields that intersect with environmental concerns
CO4	Ecological Literacy: demonstrate an awareness, knowledge, and appreciation of the intrinsic values of ecological processes and communities
CO5	Sustainability: demonstrate an integrative approach to environmental issues with a focus on sustainability

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3					2		2			2	3	2		
CO2	3		3		2							3	2		
CO3	3		3		2		1		2	1			2		
CO4		1		1				2			2		2		
CO5	3		3			2			2			3	2		

UNIT – I

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES: – Definition, Scope and Importance – Need for Public Awareness.

NATURAL RESOURCES : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources

UNIT – II

ECOSYSTEMS : Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological sucession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem.
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

BIODIVERSITY AND ITS CONSERVATION : Introduction 0 Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-soports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – III

ENVIRONMENTAL POLLUTION : Definition, Cause, effects and control measures of :

a. Air Pollution.
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

SOLID WASTE MANAGEMENT : Causes**,** effects and control measures of urban and industrial wates – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT – IV

SOCIAL ISSUES AND THE ENVIRONMENT : From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT – V

HUMAN POPULATION AND THE ENVIRONMENT : Population growth, variation among nations. Population explosion – Family Welfare Proggramme. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

FIELD WORK : Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, birds – river, hill slopes, etc..

TEXT BOOKS :

(1) Text book of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission, Universities Press.
(2) Environmental Studies by Kaushik, New Age Pubilishers.
(3) Environmental Studies by Benny Joseph, TMHPubilishers

REFERENCES :

(1) Environmental Studies by Dr.S.AzeemUnnisa, Academic Publishing Company
(2) Textbook of Environmental Science by Deeksha Dave and E.Sai Baba Reddy, CengagePubilications.
(3) Text book of Environmental Sciences and Technology by M.Anji Reddy, BS Publication.
(4) Comprehensive Environmental studies byJ.P.Sharma, Laxmi publications.
(5) Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Printice hall of India Private limited.
(6) Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Printice hall of India Private limited.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS):: ANANTHAPURAMU
****** DEPARTMENT OF ELECTRICAL ENGINEERING ******
I B.TECH – I SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A10301	Engineering Drawing	1	1	3	3

COURSE OBJECTIVES	
1	To draw and understand the practical importance of geometrical constructions.
2	To understand the representation of the regular planes and solids in first angle of projections

COURSE OUTCOMES	
CO1	Student will be familiar with the BIS conventions and dimensions
CO2	Student will be familiar with the positions of points and straight lines under different cases
CO3	Student will be able to represent regular planes and solids on the drawing sheet for various cases
CO4	Student can draw the development for regular solids
CO5	Student will familiarize with the 2D and 3D projections of various figure

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2														
CO2		2								1					
CO3					1				1						
CO4															
CO5	2	2										1			

SYLLABUS
(Common to EEE, ECE and CSE).

Unit-I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their significance Drawing Instruments and their Use – BIS Conventions in drawing and Lettering.
Curves used in practice:

a) Conic sections including the Rectangular Hyperbola
b) Cycloid, Epicycloid and Hypocycloid –Normals and Tangents
c) Involute of a circle –Normals and Tangents

Principles of orthographic projection, I and III angle projections –Conventions –Projections of points.

Unit –II

Projection of lines inclined to both planes –traces, Projection of plane figures inclined to both planes.

Unit –III

Projection of simple solids inclined to both planes.

Unit –IV

Sections and Developments: Sections and Sectional views of Regular solids –Prism, Cylinder, Pyramid, Cone – True shapes.

Unit –V

Isometric projections: Principles of pictorial representations-Isometric projection- Isometric scale-Isometric views- conventions- Isometric views of plane figures, solids-Isometric projection of objects with non isometric lines-Isometric projection of spherical parts.

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhat, Charotar Publishers
2. Engineering Drawing, K.L. Narayana& P. Kannaih, Scitech Publishers, Chennai.

REFERENCES:

1. Engineering Drawing, Johle, Tata McGraw-Hill Publishers.
2. Engineering Drawing, Shah and Rana,2/e, Pearson Education
3. Engineering Drawing and Graphics, Venugopal/New age Publishers
4. Engineering Graphics, John&john.

Method of Evaluation:

The distribution shall be 40 marks for Internal Evaluation and 60 marks for the External Evaluation.

Internal mid examination for 30 marks and internal assessment for 10 marks shall be awarded for internal evaluation.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS):: ANANTHAPURAMU
****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
I B.TECH – I SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A10501	**Problem Solving and Computer Programming**	3	-	-	3

COURSE OBJECTIVES	
1	To understand the various steps in Program development.
2	To understand the basic concepts in C Programming Language.
3	To learn how to write modular and readable C Programs
4	To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
5	To understand the notations used to analyze the Performance of algorithms.

COURSE OUTCOMES	
CO1	Develop flowcharts, algorithms for given complex problems.
CO2	Analyze basic programming constructs.
CO3	Write C programs for real world problems.
CO4	Implement C programming by using various control structures.
CO5	Appreciate coding standards and best practices for program development.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3									2			3	
CO2	3	3	3											3	
CO3	3		3		2				2	1			1		
CO4	3	3	3	1											
CO5	3		3		2				2		2			3	

UNIT - I

Introduction: Programs and Programming, Programming Languages, Compiler, Interpreter, Loader and Linker, Program Execution, Classification of Programming, Structured Programming Concept, Algorithms, Flowcharts, System Developments.

Fundamentals Algorithms: Exchange the Values between two variables, Counting, Summation of set of numbers, Factorial Computation, Generation of the Fibonacci sequence, Reversing the digits of a integer.

Basics Of C: Introduction**,** Developing Programs in C, A Simple C program, Parts of C Program Revisited.

UNIT – II
Structure of C: Structure of a C Program, Concept of a Variable, Data Types in C, Program Statements, Declaration, Tokens, Operators and Expressions, Type conversion in C.
Input and Output: Introduction, Basic Screen and Keyboard I/O in C, Non-Formatted Input and Output, Formatted Input and Output Function.
Control Statements: Introduction, Specifying Test Condition for Selection and Iteration, Writing Test Expression, Conditional Execution and Selection, Iteration and Repetitive Execution. Nested Loops.

UNIT – III
Arrays And Strings: Introduction, One-Dimensional Array, Strings, Multidimensional Arrays, Arrays of Strings.
Function: Introduction, Concept of Functions, Using Functions, Call by Value Mechanism, Working with Functions, Passing Arrays to Functions, Scope and Extent, Inline Function, Recursion.

UNIT - IV
Factoring Methods: Finding Square root of a Number, The Smallest Deviser of an Interger, The GCD of Two Integers, Generating Prime Numbers.
Pointers – Introduction, Understanding Memory, Address Operator, Pointer, Void Pointer, Null Pointer, Use of pointer, Arrays and Pointers, Pointers and string, Pointers and string, Pointers to pointers, Array of pointers, Pointers to Function, Dynamic Memory Allocation.
Introduction to Data Structures, Single Linked List.

UNIT – V

User-Defined Data Types and Variables: Introduction, User-defined Data Types, Structures, Union, Enumeration Types.
Files in C: Introduction, Using Files in C, Working with text Files, Working with Binary Fields, Direct File Input and Output, Files of Records, Random Access to Files of Records.

TEXT BOOKS:

1. Programming in C, PradipDey, Manas Ghosh, Second Edition, OXFORD,
2. How to Slove it by Computer by R.G. Dromey, Pearson.

REFERENCES:

1. Programming in C and Data Structures, Jeri R. Hanly, Elliot B. Koffman, Ashok Kamthane and A.Ananda Rao, Pearson Education.
2. Value Range analysis of C programs by simon, Axel by New Age International Publishers.
3. C Programming with problem solving, J.A. Jones & K. Harrow, dreamtech Press
4. Programming in C – Stephen G. Kochan, III Edition, PearsonEductaion.
5. C for Engineers and Scientists, H.Cheng, Mc.Graw-Hill International Edition Education / PHI
6. C Programming & Data Structures,E.Balagurusamy,TMH.
7. Complete Reference – C, Herbert Schildt,TMH.

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
I B.TECH – I SEMESTER(R-17)
English Language Communication Skills Lab
(w.e.f Academic Year 2017-18)

Subject Code	Title of the Lab	L	T	P	C
17A15502	English Language Communication Skills Lab	-	1	3	2

COURSE OBJECTIVES	
1	To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
2	To sensitise the students to the nuances of English speech sounds, word accent, intonation and rhythm
3	To provide opportunities for practice in using English inday to day situations
4	To improve the fluency in spoken English and neutralize mother tongue influence
5	To train students to use language appropriately for debate, group discussion and public speaking

COURSE OUTCOMES	
CO1	Better Understanding of nuances of language through audio- visual experience and be independent learners
CO2	The significance of paralinguistic features will be understood by the students and they will try to be intelligible.
CO3	Become good at Inter-personal skills
CO4	Achieve neutral accent and be free from mother tongue influence
CO5	Being an active participant in debates and group discussion, showing ability to express agreement, argument to summarize ideas to elicit the views of others and present own ideas.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1												3			
CO2								2		3					3
CO3										3					
CO4										3					
CO5								2		3		2			3

UNIT- I

Phonetics – Introduction to Sounds of Speech – Vowels – Consonants – Phonetic Transcription & Orthographic Transcription

UNIT – II

Syllabification – Word Stress – Rules of word stress – Intonation – Falling tone and Rising tone

UNIT – III

Situational Dialogues – Role-play – Expressions in various situations – Self Introduction – Introducing others – Greetings – Apologies – Requests – Giving directions -Social and Professional etiquettes – Telephone Etiquettes

UNIT – IV

JAM – Describing Pictures, Photographs, Products, and Process – Talking about Wishes-Information Transfer.

UNIT – V

Debates - Group Discussions-1

MINIMUM REQUIREMENT FOR ELCS LAB:

The English Language Lab shall have two parts:

1. Computer Assisted Language Learning (CALL) Lab:
   The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.

2. The Communication Skills Lab with movable chairs and audio-visual aids with a P.A. system, Projector, a digital stereo-audio & video system and camcorder etc.

System Requirement (Hardware component):
Computer network with LAN with minimum 60 multimedia systems with the following specifications:

i) P – IV Processor
   a) Speed – 2.8 GHZ
   b) RAM – 512 MB Minimum
   c) Hard Disk – 80 GB

ii) Headphones of High quality

SUGGESTED SOFTWARE:

1. Walden Infotech English Language Communication Skills.
2. Clarity Pronunciation Power – Part I (Sky Pronunciation)
3. Clarity Pronunciation Power – part II
4. LES by British council
5. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
6. *DELTA's key to the Next Generation TOEFL Test: Advanced Skills Practice.*
7. Lingua TOEFL CBT Insider, by Dreamtech
8. English Pronunciation in Use (Elementary, Intermediate, Advanced) CUP
9. Cambridge Advanced Learners‘ English Dictionary with CD.

REFERENCE BOOKS:

1. **A Textbook of English Phonetics for Indian Students** 2nd Ed T. Balasubramanian. (Macmillian), 2012.
2. **A Course in Phonetics and Spoken English**, DhamijaSethi, Prentice-Hall of India Pvt.Ltd
3. **Speaking English Effectively**, 2nd Edition Krishna Mohan & NP Singh, 2011. (Mcmillan).
4. **A Hand book for English Laboratories**, E.Sureshkumar, P.Sreehari, Foundation Books,2011
5. **English Pronunciation in Use. Intermediate & Advanced**, Hancock, M. 2009. CUP
6. **Basics of Communication in English**, Soundararaj, Francis. 2012.. *New Delhi: Macmillan*
7. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.
8. **English Pronouncing Dictionary**, Daniel Jones Current Edition with CD.Cambridge, 17th edition, 2011.

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
I B.TECH – I SEMESTER

Subject Code	Title of the Lab	L	T	P	C
17A15202	Applied Physics Laboratory	-	1	3	2

COURSE OBJECTIVES	
1	The Objective of this course is to make the students gain practical knowledge to correlate with the theoretical studies.
2	To develop practical applications of engineering materials and use of principle in the right way to implement the modern technology.
3	To train engineering students on basis of measurements and the instruments
4	To equip the students with practical knowledge in electronic, optics, and heat experiments

COURSE OUTCOMES	
CO1	On Completion of this course, students are able to – Develop skills to impart practical knowledge in real time solution.
CO2	Understand principle, concept, working and application of new technology and comparison of results with theoretical calculations.
CO3	Understand measurement technology, usage of new instruments and real time applications in engineering studies.
CO4	The student will be able to analyze the physical principle involved in the various instruments, also relate the principle to new application.
CO5	The various experiments in the areas of optics, mechanics and thermal physics will nurture the students in all branches of Engineering.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		2		2	2		2		1		2		
CO2	3	2		2		2	2		2		1		2		
CO3	3	3		2		2	2		2		1		2		
CO4	3	2		2		2	2		2		1		2		
	3	2		2		2	2		2		1		2		

LIST OF EXPERIMENTS

Any TEN of the following experiments have to be performed during the SEMESTER

1. Determination of wavelengths of variouscolours of mercury spectrum using diffraction grating in normal incidence method.

2. Determination of dispersive power of the prism
3. Determination of thickness of thin object by wedge method.
4. Determination of radius of curvature of lens by Newton‘s rings.
5. Laser : Diffraction due to single slit
6. Laser : Diffraction due to double slit
7. Laser: Determination of wavelength using diffraction grating
8. Determination of Numerical aperture of an optical fiber.
9. Meldes experiment: Determination of the frequency of tuning fork
10. Sonometer: Verification of the three laws of stretched strings
11. Energy gap of a material using p-n junction diode
12. Electrical conductivity by four probe method
13. Hall effect : Determination of mobility of charge carriers in semiconductor
14. B-H curve
15. Magnetic field along the axis of a current carrying coil – Stewart and Gee‘s method.
16. Determination of dielectric constant and Curie temperature of a ferroelectric material.

Note: Out of 10 experiments, two experiments will be performed using virtual laboratory

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS):: ANANTHAPURAMU

****** DEPARTMENT OF COMPUTER SCIENCE &ENGINEERING ******

I B.TECH – I SEMESTER

(LAB)

Subject Code	Title of the Lab	L	T	P	C
17A10502	**Computer Programming Lab**	-	1	3	2

COURSE OBJECTIVES	
1	To work with the compound data types
2	To explore dynamic memory allocation concepts
3	Able to design the flowchart and algorithm for real world problems
4	Able to write C programs for real world problems using simple and compound data types
5	Employee good programming style, standards and practices during program development

COURSE OUTCOMES	
CO1	Translate algorithms in to programs
CO2	Code and debug programs in C program language using various constructs.
CO3	Formulate problems and implement algorithms in C.
CO4	Able to use different data types in a computer program
CO5	Implement C programming by using various control structures.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1				3				1			3		3		
CO2		3	3		2									2	
CO3		3	3	3	2		1		2	1			3		
CO4		3									3				
CO5		3	3	3		2			2		3		3	2	

LIST OF EXPERIMENTS

Week-1

1) Write a C program to make the following exchange between the variables a-> b -> c->d - > a
2) Write a C program to carry out the arithmetic operations addition, subtraction, multiplication, and division between two variables
3) Write a C program for printing prime numbers between 1 and n.

Week-2

1) Write a C program to construct a multiplication table for a given number.
2) Write a program to reverse the digit of a given integer.
3) Write a C program to find the sum of individual digits of a positive integer.
4) Write a C program to calculate the factorial of a given number

Week-3

1) Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the

sequence. Write a C program to generate the first n terms of the sequence.

2) Write a program to calculate tax, given the following conditions:

a) If income is less than 1,50,000 then no tax.
b) If taxable income is in the range 1,50,001 – 300,000 then charge 10% tax
c) If taxable income is in the range 3,00,001 – 500,000 then charge 20% tax
d) If taxable income is above 5,00,001 then charge 30% tax

Week-4

1) Write a program to print the calendar for a month given the first Week- day of the month.
Input the first day of the month (Sun=0,Mon=1,Tue=2,Wed=3,.....) :: 3

Total number of days in the month : 31

Expected output

Sun	*Mon*	*Tue*	*Wed*	*Thu*	*Fri*	*Sat*
-	-	-	*1*	*2*	*3*	*4*
5	*6*	*7*	*8*	*9*	*10*	*11*
12	*13*	*14*	*15*	*16*	*17*	*18*
19	*20*	*21*	*22*	*23*	*24*	*25*
25	*26*	*27*	*28*	*29*	*30*	*31*

2) Write a C program to find the roots of a quadratic equation

Week-5

1) Write a program to print the Pascal triangle for a given number
2) Write a C program to find the GCD (greatest common divisor) of two given integers
3) Write a C program to construct a pyramid of numbers.
4) Write C code to define a function cash_dispense, which takes an amount as its input, and returns the number of 1000, 500, 100, 50, 20, 10, 5, 2, 1 rupee denomination that make up the given amount

Week-6

1) Write C code to reverse the contents of the array. For example, [1,2,3,4,5] should become [5,4,3,2,1]
2) Write a C program that uses functions to perform the following:
i) Addition of Two Matrices

ii) Multiplication of Two Matrices

3) Write a program that will search and find out the position where the given key element exist in a user chosen array and print it as output.

Week-7

1) Write C code to compute the frequency table of survey responses given by 20 users. The survey responses range from 1 to 5 and are stored in an array. For example, 10 responses are stored in the array [1,1,5,2,3,3,5,5,2,2]. The frequency table will be as

shown below:

a. 1 = 2
b. 2 = 3
c. 3 = 2
d. 4 = 0
e. 5 = 3

2) Write a program to define a function to sort an array of integers in ascending order by using exchange sort.

Week-8
1) Write a C program to check whether a given string is a palindrome or not, without using any built-in functions.
2) Write a C program to determine if the given string is a palindrome or not by using string functions.
3) Write a function that accepts a string and delete the first character.
4) Write a function that accepts a string and delete all the leading spaces.

Week-9 Write a program to accept a string from user and display number of vowels, consonants, digits and special characters present in each of the words of the given string.

Week-10
1) Write a C program to define a union and structure both having exactly the same numbers using the sizeof operators print the sizeof structure variables as well as union variable
2) Declare a structure *time* that has three fields *hr, min, secs.* Create two variables,*start_time*and*end_time.* Input there values from the user. Then while *start_time* is not equal to *end_time* display GOOD DAY on screen.

Week-11
1) Write a program to read in an array of names and to sort them in alphabetical order. Use sort function that receives pointers to the functions strcmp, and swap, sort in turn should call these functions via the pointers.
2) Write a program to read and display values of an integer array. Allocate space dynamically for the array using the *malloc()*.
3) Write a program to calculate area of a triangle using function that has the input parameters as pointers as sides of the triangle.

Week-12
1) Two text files are given with the names text1 and text2. These files have several lines of text. Write a program to merge (first line of text1 followed by first line of text2 and so on until both the files reach the end of the file) the lines of text1 and text2 and write the merged text to a new file text3.
2) Write a program to split a given text file into n parts. Name each part as the name of the original file followed by .part<**n**> where n is the sequence number of the part file.

Reference Books:

1. Computer Science, A Structured Programming Approach Using C by Behrouz A. Forouzan& Richard F. Gilberg, Third Edition, Cengage Learning
2. C Programming A Problem-Solving Approach, Behrouz A. Forouzan& E.V. Prasad, F. Gilberg, Third Edition, Cengage Learning
3. Programming with C RemaTheraja, Oxford
4. C Test Your Skillsǁ, Kamthane, Pearson Education
5. Programming in C: A Practical Approach, Ajay Mittal, Pearson

6. Problem solving with C, M.T.Somasekhara, PHI
7. C Programming with problem solving, J.A. Jones & K. Harrow,Dreamtech Press
8. Programming withc, Byron S Gottfried, Jitender Kumar Chhabra, TMH, 2011

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
I B.TECH – II SEMESTER(R-17)
Technical Communication and Presentation Skills
(w.e.f Academic Year 2017-18)

Subject Code	Title of the Subject	L	T	P	C
17A25501	Technical Communication and Presentation Skills	3	0	0	3

COURSE OBJECTIVES	
1	To develop awareness in students of the relevance and importance of technical communication and presentation skills.
2	To prepare the students for placements
3	sensitize the students to the appropriate use of non-verbal communication
4	train students to use language appropriately for presentations and interviews
5	To enhance the documentation skills of the students with emphasis on formal and informal writing

COURSE OUTCOMES	
CO1	Become effective technical communicators
CO2	Be job-ready and able to face interviews confidently
CO3	Sensitive use of non-verbal language suitable to different situations in professional life
CO4	Learn and use keys words, phrases and sentence structures making a mark in interviews and presentation skills
CO5	Effective writing skills with the ability to use different styles for different situations

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		1							2	3		2			
CO2										3					
CO3										3					
CO4										3					2
CO5										3					2

UNIT 1: Basics of Technical Communication – Introduction – Objectives & Characteristics of Technical Communication – Importance and need for Technical communication - LSRW Skills – Barriers to effective communication

UNIT II

Informal and Formal Conversation - Verbal and Non-verbal communication –Kinesics, Proxemics, Chronemics, Haptics, Paralanguage

UNIT III

Written communication – Differences between spoken and written communication – Features of effective writing –Advantages and disadvantages of spoken and written communication- Art of condensation- summarizing and paraphrasing

UNIT IV

Presentation Skills – Nature and importance of oral presentation – Defining the purpose – Analyzing the audience - Planning and preparing the presentation, organizing and rehearsing the presentation –Individual and group presentations - Handling stage fright

UNIT V

Interview Skills – The Interview process –Characteristics of the job interview – Pre-interview preparation techniques – Projecting the positive image – Answering Strategies

Text Books:

1. **Effective Technical Communication,** Ashrif Rizvi, TataMcGrahill, 2011
2. **Technical Communication** by Meenakshi Raman &Sangeeta Sharma,3rd Edition, O U Press 2015

References:

1.Communication Skills by Pushpalatha& Sanjay Kumar, Oxford Univsesity Press

2.Books on **TOEFL/GRE/GMAT/CAT/IELTS** by Barron's/DELTA/Cambridge University Press.2012.

3. Soft Skills for Everyone, Butterfield Jeff, Cengage Publications, 2011.

4. Management Shapers Series by Universities Press (India) Pvt Ltd., Himayatnagar, Hyderabad 2008.

5. Successful Presentations by John Hughes & Andrew Mallett, Oxford.

6. Winning at Interviews by Edgar Thorpe and Showick Thorpe, Pearson

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I B.TECH – II SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A25101	**MATHEMATICS – II**	2	2	-	3

COURSE DESCRIPTION: Fourier series; Fourier integrals and transforms; Laplace transforms; z – transforms;partial differential equations.

COURSE OBJECTIVES:

CEO 1: To impart basic knowledge on Fourier series, Fourier transforms, Laplace Transforms, z-transforms and partial differential equations.

CEO 2: To develop skills in analyzing the problems, designing mathematical models, Fourier series, Fourier transforms, Laplace transforms, z-transforms and partial differential equations for the problems in engineering.

COURSE OUTCOMES	
CO1	Acquire basic knowledge in Laplace transforms , Fourier series and Fourier transforms ,z- transforms
CO2	Develop skills in problem solving of Fourier series for a given function, transformations such as Laplace , Fourier and z .Partial differential equations through different evaluation methods, Difference equations through z – transforms and Engineering systems and processes involving wave forms and heat transfer
CO3	Develop skills in designing mathematical models involving Electrical circuits such as L-R-C oscillatory circuits, Mechanical oscillations, Newton's Law of cooling
CO4	Develop analytical skills in providing solutions for complex problems involving Laplace transforms, Fourier series , Fourier transforms. ,Z-transforms and difference equations and Heat transfer and wave motion
CO5	Applications of transformation methods and partial differential equations to solve engineering problems

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1				1			2	1			3		
CO2	1	3				1			2	2			3		
CO3	1	3	2			1			2	2			3		
CO4	1	1	1	3		1			2	1			3		
CO5	1	1	1	1		1			2	1			2		

UNIT- I :

FOURIER SERIES (7 periods)

Fourier series: Determination of Fourier coefficients (Euler‘s formulae),Fourier series of even and odd functions, convergence of Fourier series (Dirichlet conditions), Half-range Fourier sine and cosine expansions, Parseval‘s formula, Complex form of Fourier series.

UNIT- II:

FOURIER INTEGRALS AND FOURIER TRANSFORMS(8 periods)

Fourier integral theorem (statement only), Fourier sine and cosine integrals, Fourier transform, Fourier sine and cosine transforms –properties, Inverse transform and finite Fourier transforms.

UNIT-III:

LAPLACE TRANSFORMS (12 periods)

Laplace transforms of standard functions. Properties of Laplace transform. First and second shifting Theorems. Laplace transforms of derivatives and integrals. Inverse transforms. Convolution theorem, inverse Laplace transforms by convolution theorem. Laplace transform of periodic functions, Step and Impulse functions, Applications of Laplace transforms to ordinary differential equations of first and second order with constant coefficients.

UNIT-IV :

Z- TRANSFORMS (9 periods)

Z – transforms, inverse Z– transforms, damping rule, shifting rule, initial and final value theorems. Convolution theorem, Solution of difference equations by Z– transforms.

UNIT – V :

PARTIAL DIFFERENTIAL EQUATIONS (9 periods)

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions ,Method of separation of variables , Solutions of one dimensional wave equation, heat equation and two-dimensional Laplace‘s equation under initial and boundary conditions.

TEXT BOOKS:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Engineering Mathematics, Volume - II, E. Rukmangadachari Pearson Publisher.

REFERENCES:

1. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad S. Chand publication.
2. Higher Engineering Mathematics, by B.V.Ramana, McGraw Hill publishers.
3. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.
4. Advanced Engineering Mathematics 3rd Edition,by R.K.Jain&S.R.K.Iyengar, Narosa publishers

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I B.TECH – II SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A25102	**Mathematical Methods**	2	2	-	3

COURSE DESCRIPTION:
Fundamentals of matrix theory; numerical solutions of equations curve fitting; interpolation; numerical differentiation and integration; numerical solutions of ordinary differential equations.

COURSE OBJECTIVES:

CEO 1:To impart basic knowledge on ranks of matrices, systems of linear equations,numerical methods to solve algebraic and transcendental equations, differential equations, numerical differentiation and integration.

CEO 2:To develop skills in analyzing various numerical techniques, designing mathematical models, numerical techniques for engineering problems and
fitting of curves to experimental data.

COURSE OUTCOMES	
CO1	Acquire basic knowledge in matrices , solving given system of equation, fitting curves to the experimental data , finding solution of the given differential equation using numerical methods
CO2	Develop skills in problem solving of interpolation, Algebraic and transcendental equations , finding solution of differentiation and integration numerically
CO3	Develop skills in designing mathematical models involving Fitting geometrical curves to the given data, Solving differential equations, Constructing polynomials to the given data and drawing inferences.
CO4	Develop analytical skills in providing solutions for complex problems involving Systems of linear equations, Derivatives and integrals, Ordinary differential equations
CO5	Applications of linear algebra and numerical methods to solve engineering problems

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1				1			2	1			3		
CO2	1	3				1			2	2			3		
CO3	1	3	2			1			2	2			3		
CO4	1	1	1	3		1			2	1			3		
CO5	1	1	1	1		1			2	1			2		

UNIT–I :

MATRIX THEORY
Rank of a matrix, echelon form, normal form, inverse of a matrix by elementary row operations. Solutions of linear system of equations. Eigen values, Eigen vectors and properties,Diagonalization.Quadratic form, reductions to canonical form using orthogonal transformation method and nature of Quadratic forms.

UNIT-II

NUMERICAL SOLUTIONS OF EQUATIONS AND CURVE FITTING

Solutions of Algebraic and Transcendental equations by Regulafalsi method, Newton – Raphson‘s method. Solution of linear simultaneous equation: Crout‘striangularisation method, Gauss - Seidal iteration method.Curve fitting by the principle of least squares, fitting of a straight line, parabola and exponential curves.

UNIT- III

INTERPOLATION

Interpolation, difference operators and their relationships, Newton‘s forward and backward interpolation formulae, Lagrange‘s interpolation formula. Gauss forward and backward formula, Stirling‘s formula, Bessel‘s formula.

UNIT-IV

NUMERICAL DIFFERENTIATION AND INTEGRATION

Numerical differentiation using Newton‘s forward and backward formulae. Numerical integration using Trapezoidal rule, Simpsons $1/3^{rd}$ rule and $3/8^{th}$ rule.

UNIT- V

NUMERICAL SOLUTIONS OF DIFFERENTIAL EQUATIONS

Numerical solutions of first order Initial value problems using Taylor series method, Euler‘s, modified Euler‘s, Runge – Kutta method (4 thorder only) and Milne‘s predictor – corrector method. Numerical solutions of Laplace equation using finite difference approximation.

TEXT BOOKS:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Introductory Methods of Numerical Analysis, S.S. Sastry, PHI publisher.

REFERENCES:

1. Engineering Mathematics, Volume - II, E. Rukmangadachari Pearson Publisher.
2. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S. Chand publication.
3. Higher Engineering Mathematics, by B.V.Ramana, McGraw Hill publishers.
4. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.
5. Advanced Engineering Mathematics 3rdEdition,by R.K.Jain&S.R.K.Iyengar, Naros a publishers

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
I B.TECH – II SEMESTER((THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A25301	Applied Chemistry	3	-	-	3

COURSE OBJECTIVES	
1	The Applied Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial/engineering applications.
2	The main aim of the course is to impart in-depth knowledge of the subject and highlight the role of chemistry in the field of engineering.
3	The lucid explanation of the topics will help students to understand the fundamental concepts and apply them to design engineering materials and solve problems related to them. An attempt has been made to logically correlate the topic with its application.
4	The extension of fundamentals of electrochemistry to energy storage devices such as commercial batteries and fuel cells is one such example.

COURSE OUTCOMES	
CO1	After the completion of the course, the student would understand about the concepts of chemistry in respect of Electrochemical cells, fuel cells, mechanism of corrosion and factors to influence, polymers, nanomaterials with their applications and engineering materials.
CO2	Understand industrially based polymers, various engineering materials
CO3	Understand industrially based fuels preparations and applications.
CO4	Differentiation and uses of different kindsof engineering materials.
CO5	After completion of course students would able to demonstrate and apply basic concepts of nano science and nano technology

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		2		2	2		2		1		2		
CO2	3	2		2		2	2		2		1		2		
CO3	3	3		2		2	2		2		1		2		
CO4	3	2		2		2	2		2		1		2		
CO5	3	2		2		2	2		2		1		2		

SYLLABUS

UNIT 1 :ELECTROCHEMISTRY

i) Review of electrochemical cells, Numerical calculations.

Batteries: Rechargeable batteries: Lead acid, Ni-Cd, Lithium Ion Batteries, Super capacitors Fuels cells: Fuel cell working principle, classification of fuel cells-Hydrogen-Oxygen and Methanol-Oxygen.

ii) Electrochemical sensors: Potentiometric Sensors and voltammetric sensors. Examples : analysis of Glucose and urea

iii) Corrosion: Definition, types of corrosion, Electrochemical Theory of corrosion, Factors affecting the corrosion. Prevention: Anodic and catholic protection and electro and electroless plating. (10h)

UNIT 2: POLYMERS

i) Introduction to polymers, Polymerization process, mechanism: cationic, anionic, free radical and coordination covalent.

Elastomers: Natural Rubber, process of natural rubber, vulcanization, Compounding of Rubber

Synthetic Rubber: Preparation, properties and engineering applications of Buna-S, Buna-N, Polyurethene, Polysulfide (Thiokol) rubbers

Plastomers: Thermosetting and Thermoplatics, Preparation, properties and Engineering applications, PVC, Bakelite, nylons. Polydispersive index

ii)Conducting polymers: Mechanism, synthesis and applications of polyacetyline, polyaniline.

iii) Liquid Crystals: Introduction, classification and applications

iii)Inorganic Polymers: Basic Introduction, Silicones, Polyphospazins (-(R)2-P=N-) applications.(12h)

UNIT 3: FUEL TECHNOLOGY

i) Classifications of Fuels – Characteristics of Fuels- Calorific Value – Units, Numerical Problems.

Solid Fuels–Coal, Coke : Manufacture of Metallurgical Coke by Beehive oven and Otto Hoffmann‘s by product ovenprocesses.

ii) Liquid Fuels:Petroleum: Refining of Petroleum, Gasoline: Octane and cetane number, Synthetic Petrol: Bergius Processes, Fischer Troph‘s synthesis

Power Alcohol: Manufacture, Advantages and Disadvantages of Power Alcohol

iii) Gaseous Fuels:Origin, Production and uses of Natural gas, Producer gas, Water gas, Coal gas and Biogas. Flue Gas analysis by Orsat‘s apparatus.

Combustion: reaction of combustion and related problems.

iv) Nuclear Fuels: Controlled and uncontrolled reactions. Breeder reactor and Power reactors. (12h)

UNIT 4: CHEMISTRY OF ENGINEERING MATERIALS

i) Electrical Insulators or Dielectric materials: Definition and classification, Characteristics of electrical insulators. Applications of electrical insulating materials (Gaseous, liquid and solid insulators)

ii) Semiconducting and Super Conducting materials-Principles and some examples

iii) Magnetic materials – Principles and types of magnetic materials-examples (9h)

UNIT5 :NANOCHEMISTRY& COMPOSITE MATERIALS

i) Nanochemistry Introduction, nanomaterials, nanoparticles, nanostructure, supramolecular systems, nanotechnology applications, future perspective.

ii) Composite Materials: Classification of Composites materials, Constituents of Composite materials. Disperse Phase composite materials.

Glass fibre reinforced polymer composite and Carbon fibre reinforced polymer composite materials. Advantages and applications of Composites.

Text Books:

1. Engineering Chemistry by KNJayaveera, GVSubba Reddy and C. Ramachandraiah, McGraw Hill Higher Education, Foruth Edition, New Delhi.
2. A Text Book of Enigneering Chemistry, Jain and Jain, DhanapathiRai Publications, New Delhi

References:

1. A Text book of Engineering Chemistry by SS Dhara, S. Chand Publications, New Delhi
2. Engineering Chemistry by K.B.ChandraSekhar, UN.Das and Sujatha Mishra, SCITECH Pubblications India Pvt Limited.
3. Concepts of Engineering Chemistry- AshimaSrivastavaf and N.N. Janhavi
4. Text Book of Engineering Chemistry – C. Parameswara Murthy, C.V.Agarwal and Andra Naidu
5. Chemistry of Engineering Materials, C.V.Agarwal, C.Parameswaramurthy and Andranaidu
6. Text Book of Engineering Chemistry, Shashichawla, Dhanapathirai Publications.

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
I B.TECH – II SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A20501	**Data Structure**	2	2	-	3

COURSE OBJECTIVES	
1	To design and implementation of various basic and advanced data structures
2	To introduce various techniques for representation of the data in the real world
3	To teach efficient storage mechanisms of data for an easy access.

COURSE OUTCOMES	
CO1	Analyze and compare algorithms for efficiency using Big-O notation. able to implement 1D array and multi-dimensional array and the concept of Linked list.
CO2	Able to use Hash tables and understanding the operations and applications of stacks and Queues.
CO3	Formulating new solutions to programming problems using concept of Trees and graphs.
CO4	Evaluating the given problem using the efficient sorting techniques.
CO5	Finding the solution and understanding the concept of search and types of searching techniques.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3											2		
CO2	2												2		
CO3		3	3							3	3			3	
CO4		3	3			2					3			3	
CO5		3	3			2			2	3	3			3	

Unit-1

Introduction and overview: Definition- Terminology- One Dimensional array- Multi Dimensional array- pointer arrays.

Linked lists: Definition- Singly linked list- - Doubly linked list -Circular linked list - Circular Double linked list- Applications of linked lists.

Unit-2

Stacks: Introduction- Definition- Operations on Stacks-Applications of Stacks.

Queues: Introduction, Definition-Representations of Queues- Various Queue Structures-

Applications of Queues, Difference between the Stack and Queue .**Tables**: Hash tables.

Unit-3

Trees: Basic Terminologies- Definition and Concepts- Representations of Binary Tree-Operations on Binary Tree-Types of Binary Trees-Binary Search Tree, Heap Trees, Height Balanced Trees, AVL Trees, Red Black Trees.

Graphs: Introduction- Graph terminologies- Representation of graphs- Operations on Graphs-Applications of Graph Structures: Shortest path problem- topological sorting.

Unit-4

Sorting : Sorting Techniques- Sorting by Insertion: Straight Insertion sort- List insertion sort-Binary insertion sort- Sorting by selection: Straight selection sort- Heap Sort- Selection Sort Efficiency- Insertion Sorts: Straight Insertion Sort- Shell Sort- Insertion Sort Efficiency. Exchange Sort: Bubble Sort- Quick Sort- Exchange Sort Efficiency. External Sorts: Merging Order Files-Merging Unorder Files- Sorting Process.

Unit-5

Searching: List Searches- Sequential Search- Variations on Sequential Searches- Binary Search-Analyzing Search Algorithm- Hashed List Searches- Basic Concepts- Hashing Methods-Collision Resolutions- Open Addressing- Linked List Collision Resolution- Bucket Hashing- -B-Trees-Operations on a B Tree.

Text Books:

1. –Classic Data Structures‖, Second Edition by DebasisSamanta, PHI. (Units 1,2,3)
2. –Data Structures A Pseudo code Approach with C‖, Second Edition by Richard F. Gilberg, Behrouz A. Forouzan, Cengage Learning. (Units 4,5)

Reference Books:

1. Fundamentals of Data Structures in C – Horowitz, Sahni, Anderson-Freed, Universities Press, Second Edition.
2. Schaum' Outlines – Data Structures – Seymour Lipschutz – McGrawHill- Revised First Edition

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS):: ANANTHAPURAMU
****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
I B.TECH – II SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A20502	**Digital Logic Design**	2	2	-	3

COURSE OBJECTIVES	
1	Acquire the skills to manipulate and examine Boolean algebraic expressions, logical operations, Boolean functions and their simplifications.
2	Understand the fundamental principles of digital design.
3	Acquaint with classical hardware design for both combinational and sequential logic circuits

COURSE OUTCOMES	
CO1	Able to interpret, convert and represent different number systems and binary arithmetic.
CO2	Able to design sequential and combinational circuits.
CO3	Able to design different units of a digital computer
CO4	Analyze and design modular combinatorial logic circuits containing decoders, multiplexers, demultiplexers, 7-segments display decoders and adders.
CO5	Use the functionality of flip-flops for analysis and design of sequential circuits.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2										2	3	3		
CO2			3									3		3	
CO3	2		3								2		3	3	
CO4		3	3		2								3	3	
CO5		3	3			1						3		3	

Unit - I :

Binary Systems: Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Compliments, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, Binary Logic.
Boolean Algebra And Logic Gates: Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates, Integrated Circuits

Unit – II:

Gate – Level Minimization: The Map Method, Four Variable Map, Five-Variable Map, Product of Sums Simplification, Don‘t-Care Conditions, NAND and NOR Implementation, Other Two Level Implementations, EX-OR Function, Other Minimization Methods

Unit – III :

Combinational Logic: Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers

Unit – IV :

Synchronous Sequential Logic: Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Design Procedure, Registers, Shift Registers, Ripple Counters, Synchronous Counters, Other counters

Unit – V :

Memory And Programmable Logic: Random access memory, memory decoding, Error Detection and Correction, Read-only Memory, Programmable Logic Array, Programmable Array Logic.
Digital Logic Circuits: RTL and DTL Circuits,Transistor-Transistor Logic (TTL), Emitter-Coupled Logic (ECL), MOS, CMOS Logic, Comparisons of Logic Families

Text Books :

1. –Digital Design‖, M.Morris Mano, Micheal D. Ciletti, Pearson, 5th Edition, 2015.

References :

1. –Digital Principles and applications‖, Donald P Leach, Albert Paul Malvino, GoutamSaha. McGrawHill , 8th Edition,2015.
2. Digital Logic & State Machine Design, David J. Comer, Oxford University Press, 3rd Reprinted Indian Edition, 2012
3. Digital Logic Design, R.D. Sudhakar Samuel, Elsevier

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I B.TECH – II SEMESTER

Subject Code	Title of the Lab	L	T	P	C
17A25302	Applied Chemistry lab	-	1	3	2

COURSE OBJECTIVES	
1	Will learn practical understanding of the redox reaction
2	Will able to understand the function of fuel cells, batteries and extend the knowledge to the processes of corrosion and its prevention
3	Will learn the preparation and properties of synthetic polymers and other material that would provide sufficient impetus toengineer these to suit diverse applications
4	Will also learn the hygiene aspects of water would be in a position to design methods to
	produce potable water using modern technology

COURSE OUTCOMES	
CO1	Would be confident in handling energy storage systems and would be able combat chemical corrosion
CO2	Would have acquired the practical skill to handle the analytical methods with confidence.
CO3	Would feel comfortable to think of design materials with the requisite properties
CO4	Would be in a postion to technically address the water related problems.
CO5	Would be able to carryout scientific experiments as well as accurately record and analyze the results of such experiments

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		2		2	2		2		1		2		
CO2	3	2		2		2	2		2		1		2		
CO3	3	3		2		2	2		2		1		2		
CO4	3	2		2		2	2		2		1		2		
CO5	3	2		2		2	2		2		1		2		

LIST OF EXPERIMENTS

1. Determination of total hardness of water by EDTA method.
2. Determination of Copper by EDTA method.
3. Estimation of Dissolved Oxygen by Winkler‘s method
4. Determination of Copper by Iodometry
5. Estimation of Iron (II) using diphenylamine indicator (Dichrometry – Internal indicator method).
6. Determination of Acidity and Alkalinity of Water
7. Determination of pH of various water samples.

8. Preparation of Phenol-Formaldehyde (Bakelite)
9. Determination of Viscosity of oils using Redwood Viscometer I
10. Determination of Viscosity of oils using Redwood Viscometer II
11. Conductometric titration of strong acid Vs strong base (Neutralization titration).
12. Conductometric titration of Barium Chloride vs Sodium Sulphate (Precipitation Titration)
13. Determination of Corrosion rate and inhibition efficiency of an inhibitor for mild steel in hydrochloric acid medium.
14. Estimation of Chloride ion using potassium Chromite indicator (Mohrs method)

TEXT BOOKS:

1. Vogel's Text book of Quantitative Chemical Analysis, Sixth Edition – J. Mendham et al, Pearson Education.
2. Chemistry Practical – SM Enterprises Lab Manual by Chandra Sekhar, GV Subba Reddy and Jayaveera.

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I B.TECH – II SEMESTER

Subject Code	Title of the Lab	L	T	P	C
17A23501	Engineering & IT Workshop	-	1	3	2

COURSE OBJECTIVES	
1	To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations
2	To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system
3	To learn about Networking of computers and use Internet facility for Browsing and Searching

COURSE OUTCOMES	
CO1	Disassemble and Assemble a Personal Computer and prepare the computer ready to use.
CO2	Prepare the Documents using Word processors and Prepare spread sheets for calculations using excel
CO3	Prepare Slide presentations using the presentation tool
CO4	Interconnect two or more computers for information sharing
CO5	Access the Internet and Browse it to obtain the required information

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3		3		3		3		3				
CO2	3		3		3		3		3		3				
CO3	3		3		3		3		3		3	2			
CO4	3				3		3				3				
CO5		1		1		1						2			

Preparing your Computer

Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2: Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and trouble shooting a computer.

Task 3: Install Operating system: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Task 4: **Operating system features**: Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

Networking and Internet

Task 5: Networking: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc should be done by the student. The entire process has to be documented.

Task 6: Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail account and send email. They should get acquaintance with applications like Facebook, skype etc.

If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, and search process using different natural languages, and creating e-mail account.

Task 7: Antivirus: Students should download freely available Antivirus software, install it and use it to check for threats to the computer being used. Students should submit information about the features of the antivirus used, installation process, about virus definitions, virus engine etc.

Productivity tools

Task 8: Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

Task 9: Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement.Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet application considered.

Task 10: Presentations: creating, opening, saving and running the presentations, Selecting the style for slides, formatting the slides with different fonts, colours, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show.

Students should submit a user manual of the Presentation tool considered.

References:

1. Introduction to Computers, Peter Norton, McGraw Hill
2. MOS study guide for word, Excel, Powerpoint& Outlook Exams‖, Joan Lambert, Joyce Cox, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Networking your computers and devices, Rusen, PHI
5. Trouble shooting, Maintaining & Repairing PCs‖, Bigelows, TMH

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****** DEPARTMENT OF COMPUTER SCIENCE &ENGINEERING ******
I B.TECH – II SEMESTER
(LAB)

Subject Code	Title of the Lab	L	T	P	C
17A20503	**Data Structures Lab**	-	1	3	2

COURSE OBJECTIVES	
1	To write and execute programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables and search trees.
2	To write and execute write programs in C to implement various sorting and searching Methods Exemplify and implement how abstract data types such as stack, queue and linked list can be implemented to manage the memory using static and dynamic allocations
3	Understand and distinguish the conceptual and applicative differences in trees, binary trees, and binary search trees
4	Examine and analyze why self-balancing trees are necessary in real world dynamic applications
5	Develop and compare the comparison-based search algorithms and sorting algorithms

COURSE OUTCOMES	
CO1	Be able to design and analyze the time and space efficiency of the data structure ·
CO2	Be capable to identity the appropriate data structure for given problem
CO3	Ability to summarize searching and sorting techniques
CO4	Ability to describe stack, queue and linked list operation.
CO5	Ability to have knowledge of tree and graphs concepts.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3				3		3		3	2			
CO2	3		3		3		3		3		3				
CO3			3		3		3		3		3	2			
CO4	3		3		3		3		3		3				
CO5	3		3		3		3		3		3				

Week 1

a) Write a Program to Implement Stack Operations by using Array and Linked Lists.
b) Write a Program to implement the operations of Singly Linked Lists.
c) Write a Program to implement the operations of doubly Linked Lists.
d) Write a Program to implement the operations of Circular Linked Lists.

Week 2

a) Write a C program that uses stack operations to convert a given infix expression into ItsPostfix
b) Write a Program to Implement Queue Operations by using Array and Linked Lists.
c) Write a Program to implement factorial of n using stack.

Week 3

Write a Program to Implement Circular Queue operations by using array and linked list. Structures.

Week 4

a) Write a Program to Sort the set of elements: (i.e., numbers or strings)
   i). Quick Sort ii). Heap Sort. iii). Merge Sort
b) Write a Program to Sort the set of elements by usingExternal sorting algorithms
   i). Shell Sort ii). Linear Sort. iii). Binary Sort iv) Fibonacci sort

Week 5

Write a Program to Implement the Binary Search Tree Operations.

Week 6

Write a Program to Perform the Tree Traversal Techniques by using the Iterative Method

Week 7

Write C programs for implementing the following graph traversal algorithms:
a)Depth first traversal b)Breadth first traversal

.

Week 8

Write a Program to implement all functions of a Dictionary by using Hashing

Week 9

Write a Program to Implement Skip List Operations.

Week 10

Write a Program to Implement Insertion, Deletion and Search Operations on SPLAY Trees.

Week 11

Write a program to Implement Insertion and Deletion Operations on AVL Trees

Week 12

a) Write a Program to Implement Insertion and Deletion Operations on B – Trees.
b) Write a Program to Implement Hashing methods, collision resolution techniques.
c) Write a Program to implement string operations using Stack/Queue.

Note: Use Classes and Objects to implement the above programs.

Reference Books:

1. Object Oriented Programming with ANSI & Turbo C++, Ashok N.Kamthane, Pearson Education

2. Data Structures using C++, D.S.Malik, 2nd Edition, Cengage Learning
3. Data Structures through C++, YashavantP.Kanetkar, BPB Publication
4. Data Structures using C and C++, YedidyahLangsam.MosheJ.Augenstein Aaron M.Tenenbaum, 2nd Edition,PHI
5. Data Structures using C & C++, Rajesh K.Shukla, Wiley-India
6. ADTs, Data Structures and Problem Solving with C++, Larry Nyhoff, Pearson

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
II B.TECH – I SEMESTER (R17)
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(w.e.f academic year 2017-18)

Subject Code	Title of the Subject	L	T	P	C
17A35401	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	3	0	0	3

COURSE OBJECTIVES	
1	The objective of this course is to inculcate the basic knowledge to the students with the concepts of Economics & Demand to make them effective business decision makers.
2	To understand fundamentals of Production & Cost Concepts which is an important subject helps to the Technocrats to take certain business decisions in the processes of optimum utilization of resources.
3	To know the various types of Market Structures & pricing methods and its strategies & Trade Blocks.
4	To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
5	To provide fundamental skills about accounting and to explain the process of preparing accounting statements & analysis for effective business decisions.

COURSE OUTCOMES	
CO1	Capable of analyzing fundamentals of Economics such as Demand, Elasticity & Forecasting methods
CO2	To apply production, pricing & supply concepts for effective business administration
CO3	Students can able to identify the influence of various markets, the forms of business organization and its International Economic Environment.
CO4	Analyze how to invest adequate amount of capital in order to get maximum return from selected business activity.
CO5	Prepare and analyze accounting statements like income & expenditure statement, balance sheet apart from the fundamental knowledge, to understand financial performance of the business and to initiate the appropriate decisions to run the business profitably.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1							1								
CO2								1							
CO3										1					
CO4											2				
CO5											2				

UNIT I: **INTRODUCTION TO MANAGERIAL ECONOMICS&DEMAND**

Managerial Economics – Definition- Nature- Scope - Contemporary importance of Managerial Economics - Demand Analysis: Concept of Demand-Demand Function - Law of Demand - Elasticity of

Demand- Significance - Types of Elasticity - Measurement of Elasticity of Demand - Demand Forecasting- Factors governing Demand Forecasting- Methods of Demand Forecasting -Relationship of Managerial Economics with Financial Accounting and Management.

UNIT II: **THEORY OF PRODUCTION AND COST ANALYSIS**

Production Function- Least cost combination- Short-run and Long- run Production Function- Isoquants and Isocosts, MRTS - Cobb-Douglas Production Function - Laws of returns - Internal and External Economies of scale – **Cost& Break Even Analysis**: Cost concepts and Cost behavior- Break-Even Analysis (BEA) -Determination of Break Even Point (Simple Problems)-Managerial significance and limitations of Break- Even Analysis.

UNIT III: **INTRODUCTION TO MARKETS AND NEW ECONOMIC ENVIRONMENT**

Market structures: Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition- Monopoly-Monopolistic Competition-Oligopoly-Price-Output Determination - Pricing

Methods and Strategies-Forms of Business Organizations- Sole Proprietorship- Partnership – Joint Stock Companies - Public Sector Enterprises – New Economic Environment- Economic Liberalization – Privatization - Globalization- Trade Blocks (SAARC,EU,NAFTA,BRICS)-EXIM Policy-International Economic Environment.

UNIT IV: **CAPITAL AND CAPITAL BUDGETING**

Concept of Capital - Significance, Types of Capital- Components of Working Capital -Sources of Shot term and Long term Capital - Estimating Working Capital Requirements – Cash Budget- **Capital Budgeting** – Features of Capital Budgeting Proposals – Methods and Evaluation of Capital Budgeting Projects – Pay Back Method – Accounting Rate of Return (ARR) – Net Present Value (NPV) – Internal Rate Return (IRR) Method (simple problems)

UNIT V: **INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS**

Accounting Concepts and Conventions-Introduction Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).***Financial Analysis*:** Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios-Du Pont Chart.

Text Books:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2013.
2. Ahuja H.L Managerial economics. S.Chand, 3/e, 2013

References:

1. Aryasri: Managerial Economics and Financial Analysis, 4/e, TMH, 2013
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International,. 2013.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage, 2013.

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II B.TECH – I SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A35104	**PROBABILITY AND STATISTICS**	2	2	-	3

COURSE DESCRIPTION: Random variables; mathematical expectations; probability distributions; correlation and regressions; statistical quality control; sampling distributions; tests for small and large samples and their significances.

COURSE OBJECTIVES:

CEO 1 :To impart knowledge on random variables, probability distributions, sampling theory,statistical quality control and Queing models.

CEO 2 : To develop skills in analyzing the data designing of statistical models, skills‘ in mathematical expectations, probability distributions, testing of hypothesis, significance, statistical quality control for problems in engineering.

COURSE OUTCOMES	
CO1	Acquire basic knowledge in Probability distributions, continuous and discrete ,Statistical quality control and testing of hypotheses,Tests of significance for small and large samples and Queuing system
CO2	Develop skills in problem solving of Probability distributions for practical situations, Control charts of statistical quality control, Suitable tests of significance for practical situations.
CO3	Develop skills in designing mathematical models involving Probability distributions discrete and continuous statistical quality control charts
CO4	Develop analytical skills in providing solutions for complex problems involving Probability distributions, statistics and paramet, Statistical techniques employed for quality , Sampling techniques for decision making
CO5	Applications of probability theory , quality control and queuing theory to solve engineering problems

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1				1			2	1			3		
CO2	1	3				1			2	2			3		
CO3	1	3	2			1			2	2			3		
CO4	1	1	1	3		1			2	1			3		
CO5	1	1	1	1		1			2	1			2		

UNIT - I:

Random variable and Distributions(9 periods)

Random Variables: Discrete and Continuous random variables, Distribution function of random variable, Properties, Probability mass function, Probability density function, Mathematical Expectation- Mean and Variance. Distribution functions. Binomial and poison distributions Normal distribution – correlation and linear regressions- Related properties.

UNIT – II

Testing of Hypothesis and Large Samples(9 periods)

Test of Hypothesis: Population and Sample - Statistical hypothesis - Null and Alternative Hypothesis, Type I and II errors, Level of Significance, Critical region, Degrees of freedom.Test of significance - Test of Significance for Single Proportion, Difference of Proportions, Single Mean, Difference of Means.

UNIT – III

Small Sample Tests(9 periods)

Small samples - t- test for one sample and two sample problem and paired t-test, F-test and Chi-square test for testing of goodness of fit. Contingency table, Chi-Square Test for Independence of Attributes.

UNIT – IV

Statistical quality control (9 periods)

Statistical Quality Control: Concept of quality of a manufactured product -Defects and Defectives - Causes of variations - Random and assignable - The principle of Shewhart Control Chart-Charts for attribute and variable quality characteristics- Constructions and operation of $\overline{X}$ - Chart, R-Chart,

p - Chart and C-Chart.

UNIT – V

Queuing Theory (9 periods)

Queuing Theory: Pure Birth and Death process, M/M/1 & M/M/S & their related simple problems.

TEXT BOOKS:

1. Probability & Statistics by E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.
2. Probability & Statistics for engineers by Dr. J. Ravichandran WILEY-INDIA publishers.

REFERENCES:

1. Probability & Statistics by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S.Chand publications.
2. Statistical methods by S.P. Gupta, S.Chand publications.
3. Probability & Statistics for Science and Engineering by G.Shanker Rao, Universities Press.
4. Probability and Statistics for Engineering and Sciences by Jay L.Devore, CENGAGE.
5. Probability and Statistics by R.A. Jhonson and Gupta C.B.
6. Fundamentals of Statistics. 7th Revived Edition by S.C Gupta, Himalaya Publishing House.

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II B.TECH – I SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A32401	**Electrical & Electronics Engineering**	3	-	-	3

PART – A

ELECTRICAL ENGINEERING

Course Objectives:

To make the students learn about:

1	The basics of AC & DC Circuits, DC generators &motors.
2	The construction and operation of Transformers, Induction motors and their performance aspects will be studied.

Course Outcomes:

After completing the course, the student should be able to :

CO1	Analyze the basics of AC & DC Circuits and know the performance characteristics of DC generators &motors.
CO2	Gets a thorough knowledge on Transformers, Induction motors & Alternators with which he/she can able to apply the above conceptual things to real-world problems and applications.
CO3	Apply the concept of science and mathematics to explain the working of diodes and its applications, working of transistor and its characteristics.
CO4	Design and analyze small signal amplifier circuits applying the biasing techniques.
CO5	Design simple amplifier circuits. Analyze the small signal equivalent circuits of transistors.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3				2				1		2	2		
CO2	2	3			1	2				1		2			
CO3			1				2				1				
CO4		3		1									2		
CO5		3					2								

The course outcomes of each core course are mapped to the program outcomes with a level of emphasis being either strongly correlated (2) and moderately correlated (1).

Syllabus:

UNIT – I Introduction to DC & AC Circuits

Ohm's Law, Basic Circuit Components, Kirchhoff's Laws, Types of Sources, Resistive Networks, Series Parallel Circuits, Star Delta and Delta Star Transformation. Principle of AC Voltages, Waveforms and Basic Definitions, Root Mean Square and Average Values of Alternating Currents and Voltage, Form Factor and Peak Factor, Phasor Representation of Alternating Quantities, The J Operator and Phasor Algebra, Analysis of Ac Circuits With Single Basic Network Element, Single Phase Series.

UNIT-II DC Machines

D.C Generators: Principle of Operation of Dc Machines, Types of D.C Generators, E.M.F Equation in D.C Generator, O.C.C. of a D.C. Shunt Generator

D.C Motors:Principle of Operation of Dc Motors, Types of D.C Motors, Torque Equation, Losses and Efficiency Calculation in D.C Motor- Swinburne's Test

UNIT-III AC Machines

Transformers: Principles of Operation, Constructional Details, Losses and Efficiency, Regulation of Transformer, Testing: OC & SC Tests.

Three Phase Induction Motors: Principle of Operation, Slip and Rotor Frequency, Torque (Simple Problems).

Alternators: Principle of Operation-Constructional Details-EMF Equation-Voltage Regulation by Synchronous Impedance Method.

TEXT BOOKS:

1. Basic Electrical Engineering - By M.S.Naidu and S. Kamakshiah – TMH.
2. Basic Electrical Engineering –By T.K.Nagasarkar and M.S. Sukhija Oxford University Press.
3. Electrical and Electronic Technology-By Hughes – Pearson Education.

REFERENCES:

1. Theory and Problems of Basic Electrical Engineering by D.P.Kothari & I.J. Nagrath PHI.
2. Principles of Electrical Engineering by V.K Mehta, S.Chand Publications.
3. Fundamentals of Electrical Electronics Engineering by T.Thyagarajan, SCITECH Publications 5th Edition-2007

PART – B

Electronics Engineering

COURSE OBJECTIVES	
The students will be able to	
1	Understand principles and terminology of electronics.
2	familiar with the theory, construction, and operation of electronic devices.
3	Learn about biasing of BJTs and MOSFETs.
4	Design and construct amplifiers

COURSE OUTCOMES	
At the end of this course the student will be able to,	
CO1	Explain the theory, construction, and operation of electronic devices.
CO2	Apply the concept of science and mathematics to explain the working of diodes and its applications, working of transistor and its characteristics.
CO3	Design and analyze small signal amplifier circuits applying the biasing techniques.
CO4	Design simple amplifier circuits. Analyze the small signal equivalent circuits of transistors.
CO5	Correlate the fundamental concepts to various Real life applications of today.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3													
CO2	2	3	3										3		
CO3		3	3												
CO4		3	3	1											
CO5		3	3	1											

UNIT- I

P-N Junction Diode: Diode equation, Energy Band diagram, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Load line analysis, Diffusion and Transition Capacitances.

Rectifiers and Filters: P-N junction as a rectifier – Half Wave Rectifier, Ripple Factor – Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L- section Filters, π- section Filters.

UNIT- II

Bipolar Junction Transistor (BJT): Construction, Principle of Operation, Symbol, Amplifying Action, Common Emitter, Common Base and Common Collector configurations. Transistor Biasing And Stabilization – Operating point, DC and AC load lines, Biasing – Fixed Bias, Emitter Feedback Bias, Collector to Emitter feedback bias, Voltage divider bias, Bias stability, Stabilization against variations in VBE and β, Bias Compensation using Diodes and Transistors.

BJT Amplifiers: Classification of Amplifiers, Analysis of CE, CC, and CB Amplifiers and CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors, Design of single stage RC coupled amplifier.

UNIT- III

Junction Field Effect Transistor: JFET/MOSFET Construction, Principle of Operation, Symbol, Volt-Ampere Characteristic, Comparison of BJT and FET, Small Signal Model, Biasing FET/MOSFET.

Special Purpose Devices: Breakdown Mechanisms in Semi-Conductor Diodes, Zener diode characteristics, Use of Zener diode as simple regulator, Principle of operation and Characteristics of Tunnel Diode (With help of Energy band diagram) and Varactor Diode, Principle of Operation of SCR.

TEXT BOOKS:

1. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.
2. Millman‘s Electronic Devices and Circuits – J.Millman and C.C.Halkias, Satyabratajit, TMH, 2/e, 1998.

REFERENCES:

1. Introduction to Electronic Devices and Circuits-Rober T. Paynter, Pearson Education.
2. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal – Wiley India Pvt. Ltd. 1/e 2009.
3. Electronic Devices and Circuits – 2nd Edition by Muhammad H.Rashid, Cengage Learning.

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
II B.TECH – I SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A30501	**Object Oriented Programming**	3	-	-	3

COURSE OBJECTIVES	
1	Study the syntax, semantics and features of Java Programming Language
2	Learn Java features to create GUI applications & perform event handling
3	Learn the method of creating Multi-threaded programs and handle exceptions

COURSE OUTCOMES	
CO1	Able to solve problems using object oriented approach and implement them
CO2	Able to analyze behavior of classes and methods using encapsulation
CO3	Able to demonstrate message passing concepts for the given case study
CO4	Able to design subclasses and understand the static and dynamic behavior of classes
CO5	Develop applications using different types of multiple inheritance, polymorphism, overloading and overriding

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2		2	3	3	2							3	2	
CO2		3		3									3		
CO3	2				3						3		3		
CO4	2		3	3	2					2	2		2	2	
CO5	3			3	3	3			3		3	3		3	

UNIT-1

Thinking Object-Oriented- Why Is OOP Popular, Language and Thought, New Paradigm, Way of Viewing the World, Computation as Simulation.
Abstraction- Layers of Abstraction, Other Forms of Abstraction, Short History of abstraction Mechanisms.

UNIT-II

Object-Oriented Design- Responsibility Implies Non interference, Programming in the Small and in the Large, Why Begin with behaviour, Case Study in RDD, CRC Cards, Components and Behavior, Software Components, Formalize the Interface, Designing the Representation, Implementing Components, Integration of Components, Maintenance and Evolution.

Classes and Methods- Encapsulation, Class Definitions, Methods, Variations on Class themes.

UNIT-III

Messages, Instances, and Initialization- Message-Passing Syntax, Statically and Dynamically Typed Languages, Accessing the Receiver from Within a Method, Object Creation, Pointers and Memory Allocation, Constructors, Destructors and Finalizers, Meta classes in Smalltalk.

Case Study: The Eight Queens Puzzle- The Eight-Queens Puzzle, Using Generators, The Eight-Queens Puzzle in Several Languages.

Inheritance and Substitution- An Intuitive Description of Inheritance, Inheritance in Various Languages, Subclass, Subtype, and Substitution, Overriding and Virtual Methods Interfaces and Abstract Classes, Forms of Inheritance, Variations on Inheritance, The Benefits of Inheritance, The Costs of Inheritance.

UNIT-IV

Subclasses and Subtypes- Substitutability, Subtypes, The Substitutability Paradox, Sub classing for Construction, Dynamically Typed Languages, Pre and Post conditions, Refinement Semantics.

Static and Dynamic Behaviour- Static versus Dynamic Typing, Static and Dynamic Classes, Static versus Dynamic Method Binding.

Implications of Substitution- Memory Layout, Assignment, Copies and Clones, Equality.

UNIT-IV

Multiple Inheritance- Inheritance as Categorization, Problems Arising from Multiple Inheritance, Multiple Inheritance of Interfaces, Inheritance from Common Ancestors, Inner Classes.

Polymorphism and Software Reuse- Polymorphism in Programming Languages, Mechanisms for Software Reuse, Efficiency and Polymorphism, Will Widespread Software Reuse Become Reality.

Overloading- Type Signatures and Scopes, Overloading Based on Scopes, Overloading Based on Type Signatures, Redefinition, Polyadicity, Multi-Methods.

Overriding- Overriding in Smalltalk Class Magnitude, Notating Overriding, Replacement versus Refinement, Deferred Methods, Overriding versus Shadowing, Covariance and Contravariance, Variations on Overriding.

Text books:

1) An Introduction to Object-Oriented Programming (3rd Ed)- Timothy A. Budd, Oregon State University Corvallis, Oregon.

REFENCE BOOKS:

1) Programming with Java‖ T.V.Suresh Kumar, B.Eswara Reddy, P.Raghavan Pearson Edition.
2) Java Fundamentals - A Comprehensive Introduction‖, Herbert Schildt and Dale Skrien, Special Indian Edition, McGrawHill, 2013.
3) Java – How to Program‖, Paul Deitel, Harvey Deitel, PHI.
4) Core Java‖, NageswarRao, Wiley Publishers.
5) Thinking in Java‖, Bruce Eckel, Pearson Education.
6) A Programmers Guide to Java SCJP‖, Third Edition, Mughal, Rasmussen, Pearson.
7) Head First Java‖, Kathy Sierra, Bert Bates, O'Reilly –SCJP – Sun Certified Programmer for Java Study guide‖ – Kathy Sierra, Bert Bates, McGrawHill

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
II B.TECH – I SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A30502	**Computer Organization**	3	-	-	3

COURSE OBJECTIVES	
1	To learn the fundamentals of computer organization and its relevance to classical and modern problems of computer design
2	To make the students understand the structure and behavior of various functional modules of a computer.
3	To understand the techniques that computers use to communicate with I/O devices
4	To study the concepts of pipelining and the way it can speed up processing.
5	To understand the basic characteristics of multiprocessors

COURSE OUTCOMES	
CO1	Demonstrate computer architecture concepts related to design of modern processors, memories and I/Os
CO2	Able to explore the hardware requirements for cache memory and virtual memory
CO3	Ability to design algorithms to exploit pipelining and multiprocessors
CO4	Ability to use memory and I/O devices effectively
CO5	Detect pipeline hazards and identify possible solutions to those hazards

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2		3								1		3		
CO2	2											2			
CO3		3	3									2	3	3	
CO4		3											3		
CO5		3	3			2								3	

Unit I:

Basic Structure of Computer:Computer Types, Functional Units, Basic operational Concepts, Bus Structure, Software, Performance, Multiprocessors and Multicomputer.

Machine Instructions and Programs:Numbers, Arithmetic Operations and Programs, Instructions and Instruction Sequencing, Addressing Modes, Basic Input/output Operations, Stacks and Queues, Subroutines, Additional Instructions.

Unit II:

Arithmetic: Addition and Subtraction of Signed Numbers, Design and Fast Adders, Multiplication of Positive Numbers, Signed-operand Multiplication, Fast Multiplication, Integer Division, Floating-Point Numbers and Operations.

Basic Processing Unit: Fundamental Concepts, Execution of a Complete Instruction, Multiple-Bus

Organization, Hardwired Control, Multiprogrammed Control.

Unit III:

The Memory System: Basic Concepts, Semiconductor RAM Memories, Read-Only Memories, Speed, Size and Cost, Cache Memories, Performance Considerations, Virtual Memories, Memory Management Requirements, Secondary Storage.

Unit IV:

Input/output Organization: Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces.

Unit V:

Pipelining: Basic Concepts, Data Hazards, Instruction Hazards, Influence on Instruction Sets.

Large Computer Systems: Forms of Parallel Processing, Array Processors, The Structure of General-Purpose, Interconnection Networks.

Textbook:

1.–Computer Organization‖, Carl Hamacher, Zvonko Vranesic, Safwat Zaky, McGraw Hill Education, 5th Edition, 2013**.**

Reference Textbooks:

1. Computer System Architecture, M.Morris Mano, Pearson Education, 3rd Edition.
2. Computer Organization and Architecture, Themes and Variations, Alan Clements, CENGAGE Learning.
3. Computer Organization and Architecture, Smruti Ranjan Sarangi, McGraw Hill Education.
4. Computer Architecture and Organization, John P.Hayes, McGraw Hill Education.

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II B.TECH – I SEMESTER

(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A30503	**Discrete Mathematics**	3	-	-	3

COURSE OBJECTIVES	
1	Apply logical reasoning to solve a variety of problems.
2	Understand and apply methods of discrete mathematics such as proofs, counting principles, number theory, logic and set theory to mathematical problems in a creative way.
3	To apply the abstract concepts of graph theory in modelling and solving non-trivial problems in different fields of study

COURSE OUTCOMES	
CO1	Able to apply mathematical concepts and logical reasoning to solve problems in different fields of Computer science and information technology.
CO2	Able to apply the concepts in courses like Computer Organization, DBMS, Analysis of Algorithms, Theoretical Computer Science, Cryptography, Artificial Intelligence
CO3	Demonstrate different traversal methods for trees and graphs.
	Apply counting principles to determine probabilities.
CO4	Demonstrate different traversal methods for trees and graphs.
CO5	Demonstrate and understanding of relations and functions and be able to determine their properties.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3								2		3		
CO2	3		3								2	1	3		
CO3	3	2	3			1							3	3	
CO4	3	2	3										3		
CO5	3		3							1			3	3	

Unit - I :

The Language of Logic: Propositions, Logical Equivalences, Quantifiers, Arguments, Proof Methods.
The Language of Sets: The Concepts of a Set, Operations with Sets, Computer Operations with Sets, The Cardinality of a Set, Recursively Defined Sets.
Functions: The concept of Functions, Special Functions, Properties of Functions, The Pigeonhole principle, Composite Functions, Sequences and the Summation Notation.

Unit – II:

Relations: Boolean Matrices, Relations and Digraphs, Computer Representations of Relations, Properties of Relations, Operations on Relations, Transitive Closure, Equivalence Relations, Partial and Total Ordering.

Lattices & Boolean Algebra: Lattices as Partially Ordered Sets, Properties of Lattices, Lattices as Algebraic Systems, Sub lattices, Direct Product and Homomorphism, Boolean Algebra, Boolean Functions

Unit – III :

Algebraic Structures: Algebraic Systems, Semi groups and Monoids, Groups, Subgroups and Homomorphism‘s, Normal Subgroups.

Combinatorics: The Fundamental Counting Principles, Permutations, Derangements, Combinations, Permutations and Combinations with Repetitions, The Binomial Theorem, The Generalized Inclusion-Exclusion Principle.

Unit – IV :

Induction and Algorithms: The Division Algorithm, Divisibility Properties, Nondecimal Bases, Mathematical Induction, Algorithm Correctness, The Growth Functions, Complexity of Algorithms.

Recursion: Recursively Defined Functions, Solving Recurrence Relations, Generating Functions, Recursive Algorithms, Correctness of Recursive Algorithms, Complexities of Recursive Algorithms.

Unit – V :

Graphs: Computer Representation of Graphs, Isomorphic Graphs, Paths, Cycles, and Circuits, Eulerian and Hamiltonial Graphs, Planar Graphs, Graph Coloring, Digraphs, Dags, Weighted Digraphs, DFS and BFS Algorithms.

Trees: Trees, Spanning Trees, Minimal Spanning Trees,Kruskal‘s and Prim‘s Algorithm, Rooted Trees, Binary Trees, and Binary Search Trees.

Text Books :

1. Discrete Mathematics with Applications, Thomas Koshy, Elsevier Academic Press.
2. Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblay and R. Manohar, TMH

Reference Books :

1. *Discrete and Combinatorial Mathematics, Fifth Edition, R. P. Grimaldi, B.V. Ramana, Pearson*
2. *Discrete Mathematics Theory and Applications, D.S Malik and M.K. Sen, Cengage Learning*
3. *J .L.Mott, A.Kandel, T.P .Baker, Discrete Mathematics for Computer Scientists and Mathematicians, second edition 1986, Prentice Hall of India*
4. *C.L.Liu, Elements of Discrete Mathematics, Second Edition 1985, McGraw-Hill Book Company. Reprinted 2000*
5. *Discrete Mathematics, Norman L. Biggs, Second Edition, OXFORD Indian Edition.*
6. *K.H.Rosen, Discrete Mathematics and applications, 5th Edition 2003, TataMcGrawHillpublishing Company*

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DEPARTMENT OF CSE
II B.TECH – I SEMESTER (LAB)

Subject Code	Title of the Lab	L	T	P	C
17A32402	Electrical & Electronics Engineering Lab	-	1	3	2

COURSE OBJECTIVES	
The students will be able to	
1	Understand the characteristics of PN junction diode and zener diode.
2	Understand the characteristics of BJT in CE and CB configurations and FET in CS configuration.
3	Understand the application of diode as rectifier.
4	Learn the fundamental principles of amplifier circuits and need of Bias in Amplifier circuits.

Course Outcomes: At the end of the course, students will able to do

COURSE OUTCOMES	
At the end of this course the student will be able to,	
CO1	Experimental verification of theorems.
CO2	Experiments and know their characteristics of DC motors, DC Generators and Transformers.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3								2				
CO2	3		3								2	1			

PART- A : ELECTRICAL LAB

Practical implementation of active and reactive power measurement techniques

1. Verification of Superposition Theorem.
2. Verification of Thevenin's Theorem.
3. Open Circuit Characteristics of D.C.Shunt Generator.
4. Swinburne's Test on DC Shunt Machine (Predetermination of Efficiency of a Given DC Shunt Machine Working as Motor and Generator).
5. Brake Test on DC Shunt Motor. Determination of Performance Characteristics.
6. OC & SC Tests on Single-Phase Transformer (Predetermination of Efficiency and Regulation at Given Power Factors).

PART B :Electronics Engineering Lab

COURSE OUTCOMES	
At the end of this course the student will be able to,	
CO1	Learn and plot the characteristics of electronic devices Like PN junction diode, Zener diode and SCR.
CO2	Design and analyze the application of diode as rectifiers.

CO3	Learn and plot the characteristics of BJT & FET in Various configurations.
CO4	Measure the h-parameters experimentally.
CO5	Design and construct BJT & FET amplifiers and plot frequency response.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3								2		3		
CO2		3	3							2	2			2	
CO3	3		3			1					2			3	
CO4				3					1		1				
CO5	3		3		2					2				3	

LIST OF EXPERIMENTS:

1. PN Junction diode characteristics A) Forward bias B) Reverse bias.
2. Zener diode characteristics and Zener as voltage Regulator
3. Full Wave Rectifier with & without filter
4. Input & Output characteristics of Transistor in CB / CE configuration.
5. Input and Output characteristics of FET in CS configuration.
6. Measurement of h-parameters of transistor in CB, CE, CC configurations
7. SCR Characteristics.
8. Frequency response of CE amplifier.
9. Frequency response of CS amplifier.

LAB REQUIREMENTS:

Cathode Ray Oscilloscopes (30MHz)
Signal Generator /Function Generators (3 MHz)
Dual Regulated Power Supplies (0 – 30V)
Bread Boards
Electronic Components

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******

II B.TECH – I SEMESTER

(LAB)

Subject Code	Title of the Lab	L	T	P	C
17A30504	**Object Oriented Programming Lab**	-	1	3	2

COURSE OBJECTIVES	
1	Learn to use object orientation to solve problems and use java language to implement them.
2	To experiment with the syntax and semantics of java language and gain experience with java programming

COURSE OUTCOMES	
CO1	Develop portable programs which work in all environments
CO2	Design & develop web/user interfaces‘
CO3	Implement various control statements
CO4	Differentiate overloading and overriding
CO5	Design and develop GUI programs

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		2	2			2		1			1		
CO2		2									2				
CO3	3		2	2			1					2		2	
CO4	3										2			2	
CO5	3		2		2			2				2			1

List of Experiments

1) Preparing and practice – Installation of Java software, study of any Integrated development environment, sample programs on operator precedence and associativity, class and package concept, scope concept, control structures, constructors and destructors. Learn to compile, debug and execute java programs.
2) Write Java program(s) on use of inheritance, preventing inheritance using final, abstract classes.
3) Write Java program(s) on dynamic binding, differentiating method overloading and

overriding.

4) Write Java program(s) on ways of implementing interface.
5) Write a program for the following
    - Develop an applet that displays a simple message.
    - Develop an applet for waving a Flag using Applets and Threads.
6) Write Java program(s) which uses the exception handling features of the language, creates exceptions and handles them properly, uses the predefined exceptions, and create own exceptions
7) Write java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it's not a duplicate of any number already read. Display the complete set of unique values input after the user enters each new value.
8) Write Java program(s) on creating multiple threads, assigning priority to threads, synchronizing threads, suspend and resume threads

10) Write a java program to split a given text file into n parts. Name each part as the name of the original file followed by .part<n> where n is the sequence number of the part file.

11) Write a java program to create a super class called Figure that receives the dimensions of two dimensional objects. It also defines a method called area that computes the area of an object. The program derives two subclasses from Figure. The first is Rectangle and second is Triangle. Each of the sub classes override area() so that it returns the area of a rectangle and triangle respectively.

12) Write a Java program that creates three threads. First thread displays –Good Morning‖ every one second, the second thread displays –Hello‖ every two seconds and the third thread displays ―Welcome‖ every three seconds

13) Design a simple calculator which performs all arithmetic operations. The interface should look like the calculator application of the operating system. Handle the exceptions if any.

14) Write a java program to handle mouse events

15) Write a java program to handle keyboard events

16) Write a java program that allows conduction of object type examination containing multiple choice questions, and true/false questions. At the end of the examination when the user clicks a button the total marks have to be displayed in the form of the message.

17) Write a java program that creates menu which appears similar to the menu of notepad application of the Microsoft windows or any editor of your choice.

18) Write a java program that creates dialog box which is similar to the save dialog box of the Microsoft windows or any word processor of your choice.

19) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication

20) Write a java program to find and replace pattern in a given file.

21) Use inheritance to create an exception super class called ExceptionA and exception sub classes ExceptionB and ExceptionC, where ExceptionB inherits from ExceptionA and ExceptionC inherits from ExceptionB. Write a java program to demonstrate that the catch block for type ExceptionA catches exception of type ExceptionB and ExceptionC.

22) Write a Java program which opens a connection to standard port on well known server, sends the data using socket and prints the returned data.

23) Write a Java program to create a URLConnection and use it to examine the documents properties and content.

24) Write a Java program which uses TCP/IP and Datagrams to communicate client and server.

25) Create an interface for stack with push and pop operations. Implement the stack in two ways: fixed size stack and Dynamic stack (stack size is increased when stack is full).

26) Create multiple threads to access the contents of a stack. Synchronize thread to prevent simultaneous access to push and pop operations.

References:

1. ―Java: How to Program‖, P.J.Deitel and H.M.Deitel, PHI.
2. ―Object Oriented Programming through Java‖, P.Radha Krishna, Universities Press.
3. ―Thinking in Java‖, Bruce Eckel, Pearson Education
4. ―Programming in Java‖, S.Malhotra and S.Choudhary, Oxford Univ. Press.

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
II B.TECH – II SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A40501	**Operating Systems**	3	-	-	3

COURSE OBJECTIVES	
1	To make the students understand the basic operating system concepts such as processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection.
2	To get acquaintance with the class of abstractions afford by general purpose operating systems that aid the development of user applications.

COURSE OUTCOMES	
CO1	Students can illustrate the functions of operating systems and its applications.
CO2	Student must be able to Apply appropriate memory and file management schemes
CO3	Student must be able to analyze connection of application programs and hardware devices through system calls.
CO4	Student must be able to design solutions for various disk scheduling problems
CO5	Student should be able to Investigate and illustrate various process scheduling algorithms

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3									3		2		
CO2					3								3		
CO3		3		3							3		2		
CO4			3	3	3				3	3				3	
CO5	2	2	2	2	3	2			3		2		2	3	

UNIT I

Operating Systems Overview: Operating system functions, Operating system structure, operating systems Operations, protection and security, Computing Environments, Open- Source Operating Systems

System Structures: Operating System Services, User and Operating-System Interface, systems calls, Types of System Calls, system programs, operating system structure, operating system debugging, System Boot.

Processes: Process concept, process Scheduling, Operations on processes, Inter process Communication, Examples of IPC systems.

UNIT II

Threads: overview, Multicore Programming, Multithreading Models, Thread Libraries, Implicit Threading, Threading Issues.

Process Synchronization: The critical-section problem, Peterson_s Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic problems of synchronization, Monitors, Synchronization examples, Alternative approaches.

CPU Scheduling: Scheduling-Criteria, Scheduling Algorithms, Thread Scheduling, Multiple-Processor Scheduling, Real-Time CPU Scheduling, Algorithm Evaluation.

UNIT III

Memory Management: Swapping, contiguous memory allocation, segmentation, paging, structure of the page table.

Virtual memory: demand paging, page-replacement, Allocation of frames, Thrashing, Memory-Mapped Files, Allocating Kernel Memory

Deadlocks: System Model, deadlock characterization, Methods of handling Deadlocks, Deadlock prevention, Detection and Avoidance, Recovery from deadlock.

UNIT IV

Mass-storage structure: Overview of Mass-storage structure, Disk structure, Disk attachment, Disk scheduling, Swap-space management, RAID structure, Stable-storage implementation.

File system Interface: The concept of a file, Access Methods, Directory and Disk structure, File system mounting, File sharing, Protection.

File system Implementation: File-system structure, File-system Implementation, Directory Implementation, Allocation Methods, Free-Space management.

UNIT V

I/O systems: I/O Hardware, Application I/O interface, Kernel I/O subsystem, Transforming I/O requests to Hardware operations.

Protection: Goals of Protection, Principles of Protection, Domain of protection, Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability-Based systems, Language – Based Protection

Security: The Security problem, Program threats, System and Network threats, Cryptography as a security tool, User authentication, Implementing security defenses, Firewalling to protect systems and networks, Computer–security classifications.

Text Books:

1. Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Wiley , 9th Edition, 2014.

Reference Books:

1. Operating systems by A K Sharma, Universities Press,
2. Operating Systems, S.Haldar, A.A.Aravind, Pearson Education.
3. Modern Operating Systems, Andrew S Tanenbaum, Second Edition, PHI.
4. Operating Systems, A.S.Godbole, Second Edition, TMH.
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
6. Operating Systems, G.Nutt, N.Chaki and S.Neogy, Third Edition, Pearson Education.
7. Operating Systems, R.Elmasri, A,G.Carrick and D.Levine, Mc Graw Hill.
8. Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.

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II B.TECH – II SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A40502	**Algorithms**	3	-	-	3

COURSE OBJECTIVES	
1	To know the importance of the complexity of a given algorithm.
2	To study various algorithmic design techniques.
3	To utilize data structures and/or algorithmic design techniques in solving new problems.
4	To know and understand basic computability concepts and the complexity classes P, NP, and NP-Complete.
5	To study some techniques for solving hard problems

COURSE OUTCOMES	
CO1	Analyze the complexity of the algorithms
CO2	Use techniques divide and conquer, greedy, dynamic programming, backtracking, branch and bound to solve the problems
CO3	Identify and analyze criteria and specifications appropriate to new problems, and choose the appropriate algorithmic design technique for their solution.
CO4	Able to prove that a certain problem is NP-Complete
CO5	Ability to apply and implement learned algorithm design techniques and data structures to solve problems

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3				2					2				3
CO2	3				3		1			2			3		3
CO3		3		2	3			3					3	2	
CO4								3	2		2	1			3
CO5	3	3		2	3	2		3	2	2			3	2	

Unit - I :

The Role of Algorithms in Computing, Algorithms, Algorithms as a technology, Getting Started, Insertion sort , Analyzing algorithms, Designing algorithms , Growth of Functions , Asymptotic notation, Standard notations and common functions , Divide-and-Conquer , The maximum-sub-array problem, Strassen‘s algorithm for matrix multiplication , The substitution method for solving recurrences, The recursion-tree method for solving recurrences , The master method for solving recurrences.

Unit – II:

Heap sort, Heaps, Maintaining the heap property , Building a heap, The heap sort algorithm, Priority queues, Quick sort, Description of quick sort, Performance of quick sort , A randomized version of quick sort , Analysis of quick sort, Sorting in Linear Time, Lower bounds for sorting , Counting sort , Radix sort, Bucket sort.

Unit – III :

Dynamic Programming, Rod cutting, Matrix-chain multiplication, Elements of dynamic programming, Longest common subsequence, Optimal binary search trees, Greedy Algorithms, An activity-selection problem, Elements of the greedy strategy, Huffman codes, Matroids and greedy methods, task-scheduling problem as a matroid,

Unit-IV

Amortized Analysis, Aggregate analysis, The accounting method, The potential method, Dynamic tables, Elementary Graph Algorithms, Representations of graphs, Breadth-first search, Depth-first search, Topological sort, Strongly connected components.

Unit – V :

Backtracking: General method, 8-Queens Problem, Graph Coloring, Knapsack problem.

Minimum Spanning Trees, Growing a minimum spanning tree, The algorithms of Kruskal and Prim, All-Pairs Shortest Paths, Shortest paths and matrix multiplication, The Floyd-Warshall algorithm, Johnson's algorithm for sparse graphs.

NP-Completeness, Polynomial time, Polynomial-time verification, NP-completeness and reducibility, NP-completeness proofs, NP-complete problems.

Text Books :

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, Clofford Stein‖ Introduction to Algorithms‖ 3rd Edition, The MIT Press Cambridge, Massachusetts London, England.
2. Ellis Horowitz,Sanguthevar Rajasekaran,Sartaj Sahni –Fundamentals of Computer Algorithms (Second Edition)‖ Universities Press.

References :

1. –Fundamentals of Computer Algorithms‖, Ellis Horowitz, S. Satraj Sahani and Rajasekhran, 2nd edition, 2012, University Press.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS):: ANANTHAPURAMU
****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
II B.TECH – II SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A40503	**Data Base Management Systems**	3	-	-	3

COURSE OBJECTIVES	
1	To understand the basic concepts and the applications of database systems.
2	To master the basics of SQL and construct queries using SQL.
3	To understand the relational database design principles.
4	To become familiar with the basic issues of transaction processing and concurrency control.
5	To become familiar with database storage structures and access techniques

COURSE OUTCOMES	
CO1	Demonstrate the basic elements of a relational database management system,
CO2	Ability to identify the data models for relevant problems.
CO3	Ability to design entity relationship and convert entity relationship diagrams
	into RDBMS and formulate SQL queries on the respect data.
CO4	Apply normalization for the development of application software.
CO5	Ability to design basic database storage structures and access techniques: file and page organizations, indexing methods including B-tree, and hashing.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3		3		3			3			3		
CO2		2					3		3		2		3	3	3
CO3	3		3	2				1	3	3	2	3		3	3
CO4					3	1	3					3			3
CO5	3	2	3	2	3				3	3		3	3	3	

UNIT-I

Introduction-Database System Applications, Purpose of Database Systems, View of Data - Data Abstraction, Instances and Schemas, Data Models, Database Languages - DDL, DML, Database Architecture, Database Users and Administrators, History of Data base Systems.

Introduction to Data base design , ER diagrams, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises. Relational Model: Introduction to the Relational Model - Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views Destroying/ altering Tables and Views.

UNIT-II

Relational Algebra and Calculus: Relational Algebra - Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational calculus - Tuple relational Calculus - Domain relational calculus - Expressive Power of Algebra and calculus.

Form of Basic SQL Query - Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries, Set - Comparison Operators, Aggregate Operators, NULL values - Comparison using Null values - Logical connectives - AND, OR and NOT - Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and Active Data bases.

UNIT-III

Introduction to Schema Refinement - Problems Caused by redundancy, Decompositions - Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms - FIRST, SECOND, THIRD Normal forms - BCNF - Properties of Decompositions - Loss less join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design - Multi valued Dependencies - FOURTH Normal Form, Join Dependencies, FIFTH Normal form, Inclusion Dependencies.

UNIT-IV

Transaction Management - Transaction Concept - Transaction State - Implementation of Atomicity and Durability - Concurrent - Executions - Serializability - Recoverability - Implementation of Isolation - Testing for serializability.

Concurrency Control - Lock - Based Protocols - Timestamp Based Protocols - Validation - Based Protocols - Multiple Granularity.

Recovery System-Failure Classification-Storage Structure-Recovery and Atomicity - Log - Based Recovery - Recovery with Concurrent Transactions - Buffer Management - Failure with loss of nonvolatile storage - Advance Recovery systems - Remote Backup systems.

UNIT-V

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing - Clustered Indexes, Primary and Secondary Indexes, Index data Structures - Hash Based Indexing, Tree based Indexing, Comparison of File Organizations.

Tree Structured Indexing: Intuitions for tree indexes, Indexed Sequential Access Methods(ISAM) B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendible vs. Linear Hashing.

TEXT BOOKS:

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, McGrawHill Education, 3rd Edition, 2003.

2. Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw Hill, VI edition, 2006.

REFERENCES: 1.Database Systems, 6th edition, Ramez Elmasri, Shamkat B. Navathe, Pearson Education, 2013.

2. Database Systems Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.

3.Introduction to Database Systems, C.J. Date, Pearson Education.

4.Database Management Systems, G.K. Gupta, McGrawHill Education.

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
II B.TECH – II SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A40504	**Theory of Computation**	3	-	-	3

COURSE OBJECTIVES	
1	Understand formal definitions of machine models.
2	Classify machines by their power to recognize languages.
3	Understanding of formal grammars, analysis
4	Understanding of hierarchical organization of problems depending on their complexity
5	Understanding of the logical limits to computational capacity
6	Understanding of undecidable problems

COURSE OUTCOMES	
CO1	Construct finite state diagrams while solving problems of computer science
CO2	Ability to relate practical problems to languages, automata, and computability
CO3	Design of new grammar and language
CO4	Find solutions to the problems using Turing machines
CO5	Ability to apply mathematical and formal techniques for solving problems

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2				3				2					
CO2						3			2						
CO3		2		2										1	
CO4				2		3			2	2					
CO5	1		1		3								1		

UNIT-I

Preliminaries: Sets, Relations and functions, Methods of proof, Graphs, Languages: Basic Concepts.

Grammars: Definitions and classifications of grammar, Ambiguity, Simplification of CFGs, Normal forms.

Unit – II:

Finite State Automata: DFSA, NFSA, Regular Expressions
Finite State Automata: Characterization, Properties and decidability: FSA Regular Grammars, Pumping lemma for regular sets, Closure Properties, Decidability theorems.
Finite State Automata with Output and Minimization: Myhill-Nerode theorem, Finite Automata with output.
Variants of Finite Automata: Two way finite automata, Multi head Finite Automata.

Unit – III :
Pushdown Automata: The Pushdown Automation, Equivalence between acceptance by empty store and acceptance by Final State, Equivalence of CFG and PDA.
CFG-Properties and Parsing: Pumping Lemma for CFL, Closure Properties for CFL, Decidability results for CFL, Sub families of CFL.

Unit – IV :
Turing Machines: Turing Machine as a acceptor, Turing Machine as a computing device, Techniques for Turing Machine Construction.
Variations of Turing Machine: Generalized Versions, Restricted Turing Machines, Turing Machines as Enumerated, Equivalence between Turing Machines and Type Zero Languages, Linear Bounded Automata.
Unit – V :
Universal Turing Machine and Decidability: Encoding and Enumeration of Turing Machines, Recursive and Recursively Enumerable Sets, Universal Turing Machines, Problems, Instances and Languages, Rice‘s Theorem, Reduction of Problems to show undecidability, Post‘s correspondence problem, Computable functions.
Time and Space Complexity: The RAM model, Time and Tape Complexity of Turing Machines.
New Models of Computations: DNA Computing, Membrane Computing

Text Books :

1. ―Introduction to Formal Languages, Automata Theory and Computation‖, Kamala Krithivasan, Rama R, PEARSON.

References

1 Introduction to Automata Theory, Languages, and Computation‖, Third Edition, John E.Hopcroft, Rajeev Motwani, Jeffery D. Ullman, PEARSON.
2 ―Introduction To Languages And The Theory of Computation‖, John C Martin, The McGraw-Hill Companies, Third Edition. (TATA McGRAW HILL)
3 ―Introduction to Automata Theory, Formal Languages and Computation‖, Shyamalendu kandar, PEARSON.
4 ―Theory of Computation‖, Vivek Kulkarni, OXFORD.
5 ―Theory of computer Science Automata, Languages and Computation‖, K.L.P. Mishra, N. Chandrasekaran, PHI, Third Edition.
6 ―Formal Languages and Automata Theory‖, C.K. Nagpal, OXFORD.
7. ―Fundamentals of the Theory of Computation, Principles and Practice‖, Raymond Greenlaw, H. James Hoover, MK(MORGAN KAUFMANN)

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B.Tech. II – II SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A40505	Linux Programming	3	-	-	3

COURSE OBJECTIVES	
1	To study the commands according to user requirements.
2	To utilize Shell scripts to perform the given task.
3	To enable writing own programs in UNIX.
4	To know AWK programs

COURSE OUTCOMES	
CO1	Develop text data processing applications using Unix commands and filters.
CO2	Design and develop text based user interface components
CO3	Understand user management, network management and backup utilities
CO4	Use the system calls for file management
CO5	Understands the Concept of Process Threads and File Structure.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1				3						3	2		2	3	
CO2		2	2	3					3	3				3	
CO3	3		2		1	1		1	3						1
CO4	3								3			1			
CO5	3	2		3						3	2		2	3	

Unit I

Introduction: Operating System, History of UNIX, Overview and Features of Unix System, Structure of Unix System, Unix Environment. **Unix File System**: Introduction of Files, Organization of File Systems, Accessing File Systems, Structure of File Systems. **Unix Commands**: Basic Commands, Advanced Unix Commands: File Access Permissions, Pipe Operator, cut, paste, wc, sort, head, tail, diff, cmp, uniq, comm, time, Conversions between DOS and Unix, man.

Unit II

File management and Compression Techniques: Managing and Compressing Files, Computer Devices, Disk related Commands, Compression and Uncompressing Files, Important Unix System Files, Shell Variables, Export of Local and Global Shell Variables. **Manipulating Processes and Signals**: Process Basics, Processes States and Transitions, Zombie Process, Context switching, Threads, ps-status of Process.

Unit III

System calls: Introduction, File-related System calls (open, create, read, write, lseek, close, mknod, link and unlink, access, and chown, chmod), Directory Handling System calls (mkdir, rmdir, chdir, opendir, readdir, telldir, closedir). Porcess related System calls (exec, fork, wait,exit).
Editors in Unix: introduction, Stream editor, Emacs Editor.

Unit IV

AWK Script: AWK Command, print, printf, Displaying Content of Specified Patterns, Comparison Operators, Compound Expressions, Arithmetic Operators, Begin and end Sections, User-defined Variables, if else Statement, Built-in Variables, Changing Input Filed Separator, Functions, Loops, Getting Input from User, Search and Substitute Functins, Copying results into Another file. **Bourne Shell**: Introduction, beginning Bourne Shell Scripting, Writing Shell Scripts, Command Line Parameters, read, for Loop, While Loop, if Statement, Bourne Shell Commands.

Unit V

Interprocess Communications: Interprocess Communication, Synchronization, Filters.
Unix System Administration and Networking: Unix Booting Procedure, Mounting Unix File System, Unmounting Unix File System, Managing User Accounts, Networking Tools, mail Command, Distributed File System, Firewalls, Backup and Restore.

Text Books:

1. UNIX and SHELL Programming‖, B.M. HARWANI, OXFORD UNIVERSITY PRESS.

References:

1. UNIX and Linux System Administration Handbook‖, Evi Nemeth, Garth Snyder, Trent R. Hein and Ben Whaley, PHI
2. Essential Linux Administration: A Comprehensive Guide for Beginners‖, Chuck Easttom, Cengage Learning
3. The Linux Programming Interface: A Linux and UNIX System Programming Handbook‖, Michael Kerrisk, No Starch Press
4. A Practical Guide to Linux Commands, Editors, and Shell Programming‖, 3rd Edition, Mark G. Sobell, PHI
5. UNIX Network Programming‖, W. Richard Stevens, PHI
6. Unix: *The Ultimate Guide",* Sumitabha Das, Tat Mcgraw-Hill Edition, Indian reprint 2012

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS):: ANANTHAPURAMU
****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
II B.TECH – IISEMESTER(R17)
HUMAN VALUES AND PROFESSIONAL ETHICS(Audit course)

(w.e.f academic year 2017-18)

Subject Code	Title of the Subject	L	T	P	C
17A45101	HUMAN VALUES AND PROFESSIONAL ETHICS	2		0	0

COURSE OBJECTIVES	
1	To bring awareness among engineering graduates on ethics, human values & obligations.
2	To understand the ethical theories and their application to work ethics.
3	To understand the risk and safety measurements to be taken in various engineering areas.
4	To know various codes of ethics used by professional bodies & to learn about professional responsibility as an engineer.
5	To identify the global issues & measures to control adversity.

COURSE OUTCOMES	
CO1	Develop awareness on ethics, human values & obligations related to Self, Family, Society and State.
CO2	Become morally and socially responsible.
CO3	As a social experimentalist they can ensure less hazards & can find out engineering solutions from the ethical platform.
CO4	Students Can know how to ensure safety by minimizing risk through detailed analysis & can plan to get Intellectual property Rights(IPR).
CO5	Able to identify various global issues, moral & social responsibilities.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2					1	3	2							3
CO2	2						3								3
CO3							3	2					1		3
CO4							3		1		1				3
CO5							3			1		1			3

Unit I: HUMAN VALUES

Morals, Values and Ethics-Integrity-Work Ethic-Service learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty - Courage- Co-operation& Commitment – Empathy – Self Confidence Character – Spirituality- Obligations to Self, Family, Society and the State.

Unit II: ENGINEERING ETHICS

Senses of _Engineering Ethics- Variety of Moral Issues – Types of Inquiry – Moral dilemmas – Moral Autonomy –Kohlberg‘s Theory- Gilligan‘s Theory- Consensus and Controversy – Models of Professional Roles- Theories about Right Action- Self interest - Customs and Religion –Uses of Ethical Theories.

Unit III: **ENGINEERING AS SOCIAL EXPERIMENTATION**

Engineering As Social Experimentation – Framing the Problem – Determining the Facts – Codes of Ethics – Clarifying Concepts – Application Issues – Common Ground - General Principles – Utilitarian Thinking -Respect for Human beings.

UNIT IV: ENGINEERS RESPONSIBILITY FOR SAFETY AND RISK

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk- Safety and the Engineer- Designing for the Safety- Intellectual Property rights (IPR).

UINIT V: GLOBAL ISSUES

Globalization – Cross Culture Issues- Environmental Ethics – Computer Ethics – Computers as The Instrument of Unethical Behavior – Computers as the Object of Unethical Acts – Autonomous Computers- Computer Codes of Ethics – Weapons Development - Ethics and Research- Moral & Social Responsibility- Code of Conduct.

Text Books:

1. Engineering Ethics includes Human Values‖ by M.Govindarajan, S.Natarajan and V.S.Senthil Kumar-PHI Learning Pvt. Ltd-2009,Rs.129.

References:

1. Human Values & Ethics‖, SK Chakraborty &D.Chakraborty, Himalaya Publishing House, Mumbai,2014,Rs.398.
2. 2006Human Values & Professional Ethics –, B.S.Raghava and Jayashree Suresh, S.Chand &co., New Delhi, 2012.Rs.175
3. Human Values & Ethics in the Workplace‖, Glenn Martin, GP Martin Publishing, Australia, 2007.

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
II B.TECH – II SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A40506	**Algorithms Lab**	3	-	-	3

COURSE OBJECTIVES	
1	To know the importance of the complexity of a given algorithm.
2	To study various algorithmic design techniques.
3	To utilize data structures and/or algorithmic design techniques in solving new problems.
4	To know and understand basic computability concepts and the complexity classes P, NP, and NP-Complete.
5	To study some techniques for solving hard problems

COURSE OUTCOMES	
CO1	Students should be able to analyze the complexity of the algorithms
CO2	Students should be able to use techniques divide and conquer, greedy, dynamic programming, backtracking, branch and bound to solve the problems.
CO3	Students should be able to Identify and analyze criteria and specifications appropriate to new problems, and choose the appropriate algorithmic design technique for their solution.
CO4	Students should be able to design problem in NP-Complete.
CO5	Students should be able to apply and implement learned algorithm design techniques and data structures to solve problems.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3			3				3	3			3		
CO2	3				2				3	3			3		
CO3	3	3			3				3	3			3		
CO4			3	3	3				3	3			3	3	
CO5	3				2			3	3	3			3		

Note: You may develop programs using java or C++

1. Write a program that implements Prim‘s algorithm to generate minimum cost spanning tree.
2. Write a program that implements Kruskal‘s algorithm to generate minimum cost spanning tree.
3. Write a program to implement Huffman‘s algorithm for text compression.
4. Write a program to implement Dijkstra‘s algorithm for Single source shortest path problem.
5. Write a program to implement Floyd‘s algorithm for the All pairs shortest path problem.
6. Write a program to implement greedy algorithm for job sequencing with deadlines.

7. Write programs for the implementation of bfs and dfs for a given graph.
8. Write a program to find Minimum Cost Binary Search Tree.
9. Write a program to implement Dynamic Programming algorithm for 0/1 Knapsack problem.
10. Write a program to implement the Backtracking algorithm for the sum of subsets problem.
11. Write programs to implement backtracking algorithms for
    a) N-queens problem
    b) The Hamiltaonian cycles problem
    c) The m-colourings graph problem

TEXT BOOKS

1. Data structures and Algorithms in java,3rd edition,A.Drozdek,Cengage Learning.
2. Data structures with Java,J.R.Hubbard,2nd edition,Schaum‘s Outlines,TMH.
3. Data structures and algorithms in Java, 2nd Edition, R.Lafore, Pearson Education.
4. Data Structures using Java, D.S.Malik and P.S. Nair, Cengage Learning.
5. Data structures, Algorithms and Applications in java, 2nd Edition, S.Sahani, Universities Press.
6. Data structures, Algorithms and Applications in C++, 2nd Edition, S.Sahani, Universities Press.
7. Data structures and Algorithm Analysis in C++,2nd Edition,M.A.Weiss,Pearson education.
8. Design and Analysis of Algorithms, P.H.Dave and H.B.Dave, Pearson education.
9. Data structures and java collections frame work,W.J.Collins,Mc Graw Hill.
10. A Practical guide to Data structures and Algorithms using Java,Goldman&Goldman, Chapman and Hall/CRC,Taylor and Francis Group.

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
II B.TECH – II SEMESTER
(LAB)

Subject Code	Title of the Lab	L	T	P	C
17A40507	**Database management systems Lab**	-	1	3	2

COURSE OBJECTIVES	
1	To create a database and query it using SQL, design forms and generate reports.
2	Understand the significance of integrity constraints, referential integrity constraints, triggers, assertions.

COURSE OUTCOMES	
CO1	Design databases
CO2	Retrieve information from data bases
CO3	Use procedures to program the data access and manipulation
CO4	Normalize a database
CO5	Create user interfaces and generate reports

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3		2					2				3	
CO2	3	1		1							1		1	3	
CO3	3		3			1			2					3	
CO4	3		3		2				2	2				3	
CO5	3											1		3	1

List of Experiments:

1. Practice session: Students should be allowed to choose appropriate DBMS software, install it, configure it and start working on it. Create sample tables, execute some queries, use SQLPLUS features, use PL/SQL features like cursors on sample database. Students should be permitted to practice appropriate User interface creation tool and Report generation tool.

- A college consists of number of employees working in different departments. In this context, create two tables **employee** and **department**. Employee consists of columns empno, empname, basic, hra, da, deductions, gross, net, date-of-birth. The calculation of hra,da are as per the rules of the college. Initially only empno, empname, basic have valid values. Other values are to be computed and updated later. Department contains deptno, deptname, and description columns. Deptno is the primary key in department table and referential integrity constraint exists between employee and department tables. Perform the following operations on the the database:

a Create tables department and employee with required constraints.

- Initially only the few columns (essential) are to be added. Add the remaining columns separately by using appropriate SQL command
- Basic column should not be null
- Add constraint that basic should not be less than 5000.
- Calculate hra,da,gross and net by using PL/SQL program.
- Whenever salary is updated and its value becomes less than 5000 a trigger has to be raised preventing the operation.
- The assertions are: hra should not be less than 10% of basic and da should not be less than 50% of basic.
- The percentage of hra and da are to be stored separately.
- When the da becomes more than 100%, a message has to be generated and with user permission da has to be merged with basic.
- Empno should be unique and has to be generated automatically.
- If the employee is going to retire in a particular month, automatically a message has to be generated.
- The default value for date-of-birth is 1 jan, 1970.
- When the employees called daily-wagers are to be added the constraint that salary should be greater than or equal to 5000 should be dropped.
- Display the information of the employees and departments with description of the fields.
- Display the average salary of all the departments.
- Display the average salary department wise.
- Display the maximum salary of each department and also all departments put together.
- Commit the changes whenever required and rollback if necessary.
- Use substitution variables to insert values repeatedly.
- Assume some of the employees have given wrong information about date-of-birth. Update the corresponding tables to change the value.
- Find the employees whose salary is between 5000 and 10000 but not exactly 7500.
- Find the employees whose name contains _en‘.
- Try to delete a particular deptno. What happens if there are employees in it and if there are no employees.
- Create alias for columns and use them in queries.
- List the employees according to ascending order of salary.
- List the employees according to ascending order of salary in each department.
- Use _&&‘ wherever necessary
- Amount 6000 has to be deducted as CM relief fund in a particular month which has to be accepted as input from the user. Whenever the salary becomes negative it has to be maintained as 1000 and the deduction amount for those employees is reduced appropriately.
- The retirement age is 60 years. Display the retirement day of all the employees.

- If salary of all the employees is increased by 10% every year, what is the salary of all the employees at retirement time.
- Find the employees who are born in leap year.
- Find the employees who are born on feb 29.
- Find the departments where the salary of atleast one employee is more than 20000.
- Find the departments where the salary of all the employees is less than 20000.
- On first January of every year a bonus of 10% has to be given to all the employees. The amount has to be deducted equally in the next 5 months. Write procedures for it.
- As a designer identify the views that may have to be supported and create views.
- As a designer identify the PL/SQL procedures necessary and create them using cursors.

Use appropriate Visual programming tools like oracle forms and reports, visual basic etc tocreate user interface screens and generate reports.

Note: As a designer identify other operations that may be required and add to the above list. The above operations are not in order. Order them appropriately. Use SQL or PL/SQL depending on the requirement.

2. Students may be divided into batches and the following experiments may be given to them to better understand the DBMS concepts. Students should gather the required information, draw ER diagrams, map them to tables, normalize, create tables, triggers, procedures, execute queries, create user interfaces, and generate reports.

    - Student information system
    - APSRTC reservation system
    - Hostel management
    - Library management
    - Indian Railways reservation
    - Super market management
    - Postal system
    - Banking system
    - Courier system
    - Publishing house system

References:

1. Oracle Database 11g PL/SQL Programming‖, M.Mc Laughlin,TMH.
2. Learning Oracle SQL and PL/SQL‖, Rajeeb C. Chatterjee, PHI.
3. Introduction to SQL‖, Rick F.Vander Lans, Pearson education.
4. Oracle PL/SQL‖, B.Rosenzweig and E.Silvestrova, Pearson education.

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II B.TECH – II SEMESTER
(LAB)

Subject Code	Title of the Lab	L	T	P	C
17A40508	**Operating systems Lab**	-	1	3	2

COURSE OBJECTIVES	
1	To understand the design aspects of operating system
2	To solve various synchronization problems

COURSE OUTCOMES	
CO1	Ensure the development of applied skills in operating systems related areas.
CO2	Able to write software routines modules or implementing various concepts of operating system.
CO3	Understand process life cycle and able to tell process status.
CO4	Understand the concepts of process scheduling, synchronization and its implementation
CO5	Determine the prevention, avoidance, detection, recovery mechanism of deadlock

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3		1		1		1	2				3	
CO2	3	2									2			3	
CO3	3		3	2						2	2		1	3	
CO4	3	2	3	2						2				3	1
CO5	3		3			1		1				1		3	

1. Simulate the following CPU scheduling algorithms
a) Round Robin b) SJF c) FCFS d) Priority
2. Simulate all file allocation strategies
a) Sequential b) Indexed c) Linked
3. Simulate MVT and MFT
4. Simulate all File Organization Techniques
a) Single level directory b) Two level c) Hierarchical d) DAG
5. Simulate Bankers Algorithm for Dead Lock Avoidance
6. Simulate Bankers Algorithm for Dead Lock Prevention
7. Simulate all page replacement algorithms
a) FIFO b) LRU c) LFU Etc. …
8. Simulate Paging Technique of memory management
9. Control the number of ports opened by the operating system with
   a) Semaphore b) monitors
10. Simulate how parent and child processes use shared memory and address space

11. Simulate sleeping barber problem
12. Simulate dining philosopher‘s problem
13. Simulate producer and consumer problem using threads (use java)
14. Simulate little‘s formula to predict next burst time of a process for SJF scheduling algorithm.
15. Develop a code to detect a cycle in wait-for graph
16. Develop a code to convert virtual address to physical address
17. Simulate how operating system allocates frame to process
18. Simulate the prediction of deadlock in operating system when all the processes announce their resource requirement in advance.

Reference Books :

1 ―Operating System Concepts‖, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth edition, John Wiley.

2 ―Operating Systems: Internals and Design Principles‖, Stallings, Sixth Edition–2009, PearsonEducation

3 ―Modern Operating Systems‖, Andrew S Tanenbaum, Second Edition, PHI.

4 ―Operating Systems‖, S.Haldar, A.A.Aravind, Pearson Education.

5 ―Principles of Operating Systems‖, B.L.Stuart, Cengage learning, India Edition. 2013-2014

6 ―Operating Systems‖, A.S.Godbole, Second Edition, TMH.

7. ―An Introduction to Operating Systems‖, P.C.P. Bhatt, PHI.

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III B.TECH – I SEMESTER(R17)

Subject Code	Title of the Subject	L	T	P	C
17A55401	MANAGEMENT SCIENCE	3	-	-	3

COURSE OBJECTIVES	
1	To provide fundamental knowledge on Management, Administration, Organization & its concepts.
2	To understand the role of management in Production
3	To study Materials/Purchases/Stores/Inventory/Marketing Management and Quality control
4	To study HRM in order to have an idea on Recruitment, Selection, Training &Development, job evaluation and Merit rating concepts.
5	To identify Strategic Management areas & to Study the PERT/CPM for better Project Management.

COURSE OUTCOMES	
CO1	To apply the concepts & principles of management & designs of organization in a practical world.
CO2	To design good plant layout and apply Work-study principles, Quality Control techniques, in real life industry & To maintain & control the Inventory & students can able to identify the importance of marketing in emerging world.
CO3	To apply the concepts of HRM in Recruitment, Selection, Training & Development.
CO4	To develop PERT/CPM Charts for projects of an enterprise and estimate time & cost of project & to analyse the business through SWOT .
CO5	They can aware of the latest and contemporary issues of management science.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1							1								
CO2									1						
CO3								1							
CO4										1					
CO5											1				

UNIT I: INTRODUCTION TO MANAGEMENT:
Management-Concept and meaning-Nature-Functions-Management as a Science and Art and both. Schools of Management Thought-Taylor‘s Scientific Theory-Henry Fayol‘s principles-Eltan Mayo‘s Human relations-Systems Theory- **Organizational Structure and Design**: Features of Organizational Structure-Work Specialization-Departmentation-Span of Control-Centralization and Decentralization. **Organisational Designs**-Line organization-Line & Staff Organization-Functional Organization-Matrix Organization-Project Organization-Committee form of Organization-Social responsibilities of Management.

UNIT II:OPERATIONS MANAGEMENT:
Principles and Types of Plant Layout-Methods of Production (Job, batch and Mass Production), Work Study- Statistical Quality Control**:***C* chart, *P* chart, (simple Problems) Deming_s contribution to Quality. **Material Management:** Objectives-Inventory-Functions, Types, Inventory Techniques-EOQ-ABC Analysis-Purchase Procedure and Stores Management-Just-In-Time (JIT). **Marketing Management:**

Concept- Meaning - Nature-Functions of Marketing- Marketing Mix- Channels of Distribution - Advertisement and Sales Promotion- Marketing Strategies based on Product Life Cycle.

UNIT III:HUMAN RESOURCES MANAGEMENT (HRM):
HRM- Definition and Meaning – Nature-Managerial and Operative functions-Evolution of HRM-Job Analysis -Human Resource Planning(HRP)-Employee Recruitment-Sources of Recruitment-Employee Selection- Process and Tests in Employee Selection- Employee Training and Development-On- the- job & Off- the- job training methods-Performance Appraisal Concept-Methods of Performance Appraisal-Placement-Employee Induction-Wage and Salary Administration-Objectives-Essentials of Wage and Salary Administration-Job Evaluation-Employee Grievances-Techniques of handling Grievances.

UNIT IV:STRATEGIC& PROJECT MANAGEMENT:
Definition& Meaning-Setting of Vision- Mission- Goals- Corporate Planning Process- Environmental Scanning-Steps in Strategy Formulation and Implementation-SWOT Analysis. **Project Management:**Network Analysis- Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying Critical Path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing. (Simple problems).

UNIT V:CONTEMPORARY ISSUES IN MANAGEMENT:
The concept of Management Information System(MIS)- Materials Requirement Planning (MRP)-Customer Relations Management(CRM)- Total Quality Management (TQM)- Six Sigma Concept- Supply Chain Management(SCM)- Enterprise Resource Planning (ERP)- Performance Management- Business Process Outsourcing (BPO), Business Process Re-engineering and Bench Marking -Balanced Score Card-Knowledge Management.

Text Books:

1. A.R Aryasri: Management Science, TMH, 2013
2. Stoner, Freeman, Gilbert, Management, Pearson Education,New Delhi, 2012.

References:

1. Koontz & Weihrich: Essentials of Management, 6/e, TMH, 2005.
2. Thomas N.Duening& John M.Ivancevich ManagementPrinciples and Guidelines,Biztantra.
3. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2004.
4. Memoria & S.V.Gauker, Personnel Management, Himalaya, 25/e, 2005
5. Samuel C.Certo: Modern Management, 9/e, PHI, 2005
6. Schermerhorn, Capling, Poole & Wiesner: Management, Wiley, 2002.
7. Parnell: Strategic Management, Biztantra, 2003.
8. Lawrence R Jauch, R.Gupta &William F.Glueck: Business Policy and Strategic Management, Frank Bros., 2005.

Method of Evaluation:

The distribution shall be 40 marks for Internal Evaluation and 60 marks for the External Evaluation. Each Internal examination shall consist of an objective test for 10 marks and a subjective test for 20 marks with duration of 20 and 90 minutes respectively. In addition to that 10 marks will be awarded for assignment.

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III B.TECH – ISEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A50501	**Web technologies**	3	-	-	3

COURSE OBJECTIVES	
1	Learn to build and access databases using java.
2	Learn to communicate over a network using java.
3	Learn to design server side programs and access them from client side.

COURSE OUTCOMES	
CO1	Upon completion of this course, students will receive: **Familiarity with WWW technical concepts:** IP addressing, routing, client-server interaction, and basic HTTP server functionality.
CO2	**Exposure to basic web programming:** including Html programming (manual and tool assisted), JavaScript programming of reactive web pages elements.
CO3	**Exposure to** database programming using java
CO4	The necessary skills to write serverside programs A solid foundation for further exploration of more advanced web programming technologies.
CO5	Ability to develop dynamic web page by the use of java script.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2				1	1				2		2	3	
CO2	3													3	
CO3	3		2								2			3	
CO4	3	2		2				1		2				3	2
CO5	3		2	2					2	2			2	3	2

UNIT I

Fundamentals: Introduction to the web, Web servers and clients, Resources, URL and its anatomy, message format, persistent and non persistent connections, Web caching, proxy, java and the net, java network classes and interfaces, looking up internet address, client/server programs, socket programming, e-mail client, POP3 programs, remote method invocation, example

Selectors

UNIT II

HTML: HTML and its flavors, HTML basics, Elements, Attributes and tags, Basic tags, Advanced Tags, Frames, Images, Meta tag, Planning of webpage, Model and structure for a website, designing web pages, Multimedia content.

Cascading Style Sheets: Advantages, Adding CSS, Browser, compatibility, CSS and Page layout, Selectors

UNIT III

Java Script: Introduction, Variables, Literals, Operators, Control structure, Conditional statements, Arrays,Functions, Objects, Predefined objects, Object hierarchy, Accessing objects, Events, Event handlers, Multiple windows and Frames, Form object and Element, Advanced JavaScript and HTML, Data entry and Validation, Tables and Forms, DHTML with JavaScript

UNIT IV

Server side programming: Internet programming paradigm, Server-side programming, Languages for CGI,Applications, Server environment, Environment variables, CGI building blocks, CGI scripting using C, Shell script, Writing CGI program, CGI security, Alternatives and Enhancement to CGI, Server-side Java, Advantages over applets, Servlet alternatives, Servlet strengths, Servlet Architecture, Servlet Life cycle, Generic and HTTP Servlet, First servlet, passing parameters to servlets, retrieving parameters, Server-side include, cookies, filters, Problems with servlet, Security issues, JSP and HTTP, JSP Engines, How JSP works, JSP and Servlet, Anatomy of a JSP Page, JSP syntax, JSP components.

UNIT V

Sever side programming continued: Beans, Session tracking, Users passing control and data betweenpages, Sharing session and Application data, Database connectivity, JDBC drivers, Basic steps, Loading a driver, Making a connection, Execute and SQL statement, SQL statements, Retrieving the result, Getting database information, Scrollable and updatable result set, Result set metadata, Introduction to JavaBeans, Bean builder, Advantages of Java Beans, BDK introspection, Properties, Bean Info interface, Persistence, Customizer, JavaBeans API, EJB, Introduction to Struts Framework.

Text Books:

1. Web Technologies: HTML, JavaScript, PHP, Java, JSP, XML, And AJAX, Black Book, KOGENT LEARNING SOLUTIONS INC.
2. Web Technologies, Uttam K. Roy, 1st edition 7th impression, 2012, Oxford Higher Education

Reference Books:

1. Java How to program, Paul deitel, Harvey deital, PHI
   Introduction to Java Programming, Y.Daniel Liang, 6th Edition, Pearson Education,
2. 2007
3. The J2EE Tutorial, Stephanie Bodoff et al, 2nd Edition, Pearson Education, 2004.
4. Web Technologies, Roy, Oxford University Press
5. Web Technologies, Srinivasan, Pearson Education, 2012

Java EE 5 for Beginners, Ivan Bayross, Sharanam Shah, Cynthia Bayrossand Vaishali Shai, SPD.
Programming the Worldwide Web, Robert W.Sebesta, 7th edition, 2009, Pearson Education example

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III B.TECH – I SEMESTER

(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A50502	**Compiler Design**	2	2	-	3

COURSE OBJECTIVES	
1	This course is a *de facto* capstone course in Computer Science, as it combines skills in software design, programming, data structures and algorithms, theory of computing, documentation, and machine architecture to produce a functional compiler.
2	Realize that computing science theory can be used as the basis for real applications
3	Introduce the major concept areas of language translation and compiler design. Learn how a compiler works
4	Know about the powerful compiler generation tools and techniques, which are useful to the other non-compiler applications
5	Know the importance of optimization and learn how to write programs that execute faster

COURSE OUTCOMES	
CO1	Able to design a compiler for a simple programming language
CO2	Able to use the tools related to compiler design effectively and efficiently
CO3	Able to write an optimized code
CO4	Use the knowledge of patterns, tokens & regular expressions for solving a problem in the field of data mining.
CO5	To develop program to solve complex problems in compiler

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				3				1	2			1	3	
CO2	3	2		1	3						2			3	
CO3	3				3					1				3	
CO4	3	2	2		3									3	
CO5	3	2	2		3	1								3	

UNIT-I

Introduction: Language processors, Phases of a compiler, Pass and phase, Bootstrapping, Compiler construction tools, Applications of compiler technology.

Lexical Analysis: Role and Responsibility, Input buffering, Specification of tokens, Recognition of tokens, LEX tool, Design of a Lexical Analyzer generator

UNIT-II

Syntax Analysis: Role of the parser, Context Free Grammars : Definition, Derivations, Parse trees, Ambiguity, Eliminating ambiguity, Left recursion, Left factoring.

TOP Down Parsing: Recursive descent parsing, Non-recursive predictive parsing, LL(1) grammars, Error recovery in predictive parsing.

Bottom Up Parsing: Handle pruning, Shift-Reduce parsing, Conflicts during shifts- reduce parsing, SLR Parsing, Canonical LR(1) parsers, LALR parsers, Using ambiguous grammars, YACC tool.

UNIT-III

Syntax Directed Translation: Syntax Directed Definitions, Evaluation orders for SDD‘s, Application of SDT, SDT schemes.

Intermediate Code Generation: Need for intermediate code, Types of intermediate code, Three address code, Quadruples, Triples, Type expressions, Type equivalence, Type checking, Translation of expressions, control flow statements, switch statement, procedures, back patching.

UNIT-IV

Run Time Storage Organization: Storage Organization, Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management.

Code Generation: Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code, A Simple Code Generator.

UNIT-V

Code Optimization: Principle source of Optimization, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, Introduction to Data-Flow Analysis, Constant Propagation, Partial-Redundancy Elimination, Loops in Flow Graphs.

Region- Based Analysis: Regions, Region Hierarchies for Reducible Flow Graphs, Overview of a Region -Based Analysis.

Text Books:

1. –Compilers Principles, Techniques and Tools‖, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman., Pearson.

Reference Books :

1.Compiler Construction‖, K.V.N Sunitha, Pearson, 2013

2.Engineering A Compiler‖, Second Edition, Keith D. Cooper & Linda Torczon., MK(Morgan Kaufmann) (ELSEVIER)

3.Compilers Principles and Practice‖, Parag H. Dave, Himanshu B. Dave.,PEARSON
4.Compiler Design‖, SandeepSaxena, Rajkumar Singh Rathore., S.Chand publications
5.Compiler Design‖, SantanuChattopadhyay., PHI
6.Principals of Compiler Design‖, Nadhni Prasad, Elsevier

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III B.TECH – I SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A50503	**Software Engineering**	2	2	-	3

COURSE OBJECTIVES	
1	To understand the software life cycle models.
2	To understand the software requirements and SRS document.
3	To understand the importance of modeling and modeling languages.
4	To design and develop correct and robust software products.
5	To understand the quality control and how to ensure good quality software.
6	To understand the planning and estimation of software projects.
7	To understand the implementation issues, validation and verification procedures.
8	To understand the maintenance of software
COURSE OUTCOMES	
CO1	Define and develop a software project from requirement gathering to implementation.
CO2	Obtain knowledge about principles and practices of software engineering.
CO3	Focus on the fundamentals of modeling a software project.
CO4	Obtain knowledge about estimation and maintenance of software systems
CO5	Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3		2		2	1		2			2	3	
CO2	3			1							2				
CO3	3	2	3			2						1	2	3	
CO4	3		3		2		2		1					3	
CO5	3	2				2				2	2			3	1

Unit - I :

Software and Software Engineering: The Nature of Software, The Unique Nature of WebApps, Software Engineering, Software Process, Software Engineering Practice, Software Myths.

Process Models: A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Terminology, Product and Process.

Agile Development: Agility, Agility and the Cost of Change, Agile Process, Extreme Programming, Other Agile Process Models

Unit – II:

Requirements Analysis And Specification: Requirements Gathering and Analysis, Software Requirement Specification (SRS), Formal System Specification.

Software Design: Overview of the Design Process, How to Characterise of a Design?, Cohesion and Coupling, Layered Arrangement of Modules, Approaches to Software Design.

Unit – III :

Function-Oriented Software Design: Overview of SA/SD Methodology, Structured Analysis, Developing the DFD Model of a System, Structured Design, Detailed Design, Design Review, Over view of Object Oriented design.

User Interface Design: Characteristics of Good User Interface, Basic Concepts, Types of User Interfaces, Fundamentals of Component-based GUI Development, A User Interface Design Methodology.

Unit – IV :

Coding And Testing: Coding, Code Review, Software Documentation, Testing, Unit Testing, Black-Box Testing, White-Box Testing, Debugging, Program Analysis Tool, Integration Testing, Testing Object-Oriented Programs, System Testing, Some General Issues Associated with Testing.

Unit – V :

Software Reliability And Quality Management: Software Reliability, Statistical Testing, Software Quality, Software Quality Management System, ISO 9000, SEI Capability Maturity Model.

Computer Aided Software Engineering: Case and its Scope, Case Environment, Case Support in Software Life Cycle, Other Characteristics of Case Tools, Towards Second Generation CASE Tool, Architecture of a Case Environment.

Software Maintenance: Characteristics of Software Maintenance.

Software Reuse: what can be Reused? Why almost No Reuse So Far?, Basic Issues in Reuse Approach, Reuse at Organisation Level.

Text Books :

1. Software Engineering A practitioner‘s Approach, Roger S. Pressman, Seventh Edition McGrawHill International Edition.
2. Fundamentals of Software Engineering, Rajib Mall, Third Edition, PHI.

Reference Books :

1. Software Engineering, Ian Sommerville, Ninth edition, Pearson education.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Software Engineering, A Precise Approach, PankajJalote, Wiley India,2010.
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.

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III B.TECH – I SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A50504	**Computer Networks**	2	2	-	3

COURSE OBJECTIVES	
1	Study the evolution of computer networks and future directions.
2	Study the concepts of computer networks from layered perspective.
3	Study the issues open for research in computer networks

COURSE OUTCOMES	
CO1	Ability to choose the transmission media depending on the requirements.
CO2	Ability to design new protocols for computer network.
CO3	Ability to configure a computer network logically.
CO4	Classify the routing protocols and analyze how to assign the IP addresses for the given network.
CO5	Ability to explain the types of transmission media with real time applications

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				1		1	1	3	2	3			3	
CO2	3		2	1							3			3	
CO3	3	2				2			3				2	3	
CO4	3	2	2			2			3		3	2		3	2
CO5	3					2			3		3	2	2	3	2

Unit I

Introduction: Networks, Network Types, Internet History, Standards and Administration, Network Models: Protocol Layering, TCP/IP Protocol Suite, The ISO Model.

The Physical layer: Data and Signals, Transmission impairment, Data rate limits, Performance, Transmission media: Introduction, Guided Media, Unguided Media, Switching: Introduction, Circuit Switched Networks, Packet switching.

Unit II

The Data Link Layer: Introduction, Link layer addressing, Error detection and Correction: Cyclic codes, Checksum, Forward error correction, Data link control: DLC Services, Data link layer protocols, HDLC, Point to Point Protocol, Media Access control: Random Access, Controlled Access, Channelization, Connecting devices and virtual LANs: Connecting Devices.

Unit III

The Network Layer: Network layer design issues, Routing algorithms, Congestion control algorithms, Quality of service, Internetworking, The network layer in the Internet: IPV4 Addresses, IPV6, Internet Control protocol, OSPF, BGP, IP, ICMPv4, IGMP.

Unit IV

The Transport Layer: The Transport Service, Elements of Transport Protocols, Congestion Control, The internet transport protocols: UDP, TCP, Performance problems in computer networks, Network performance measurement.

Unit V

The Application Layer: Introduction, Client Server Programming, WWW and HTTP, FTP, e-mail, TELNET, Secure Shell, Domain Name System, SNMP.

Text Books:

1. –Data communications and networking‖, Behrouz A. Forouzan, Mc Graw Hill Education,5th edition, 2012.
2. –Computer Networks‖, Andrew S. Tanenbaum, Wetherall, Pearson,5th edition, 2010.

References:

1. Data Communication and Networks, Bhushan Trivedi, Oxford
2. Internetworking with TCP/IP – Principles, protocols, and architecture- Volume 1, Douglas E. Comer, 5th edition, PHI
3. Computer Networks‖, 5E, Peterson, Davie, Elsevier.
4. Introduction to Computer Networks and Cyber Security‖, Chawan- Hwa Wu, Irwin, CRC Publications.
5. Computer Networks and Internets with Internet Applications‖, Comer.

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III B.TECH – I SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A50505a.	**Data Warehousing and Mining**	3	-	-	3

COURSE OBJECTIVES	
1	To know the basic concepts and principles of data warehousing and data mining
2	Learn pre-processing techniques and data mining functionalities
3	Learn and create multidimensional models for data warehousing
4	Study and evaluate performance of Frequent Item sets and Association Rules
5	Understand and Compare different types of classification and clustering algorithms
COURSE OUTCOMES	
CO1	Understand the basic concepts of data warehouse and data Mining
CO2	Apply pre-processing techniques for data cleansing
CO3	Analyze and evaluate performance of algorithms for Association Rules
CO4	Analyze Classification and Clustering algorithms
CO5	Understand methods for outlier analysis.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				1		2		3					3	
CO2	3	2		2							1			3	2
CO3			2			1			3				1		
CO4	3		2				2		3	2				3	2
CO5	3	2		2					3	2				3	

UNIT-I

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Major issues in Data Mining.

Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT-II

Data Warehouse and OLAP Technology for Data Mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining.

Data Cube Computation and Data Generalization: Efficient Methods for Data Cube Computation, Further Development of Data Cube and OLAP Technology, Attribute-Oriented Induction.

UNIT-III

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Efficient and Scalable Frequent Itemset Mining Methods, Mining various kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation, Support Vector Machines, Associative Classification, Lazy Learners, Other Classification Methods, Prediction, Accuracy and Error measures, Evaluating the accuracy of a Classifier or a Predictor, Ensemble Methods.

UNIT-IV

Cluster Analysis: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Clustering HighDimensional Data, Constraint-Based Cluster Analysis, Outlier Analysis.

UNIT-V

Mining Streams, Time Series and Sequence Data: Mining Data Streams, Mining Time-Series Data, Mining Sequence Patterns in Transactional Databases, Mining Sequence Patterns in Biological Data, Graph Mining, Social Network Analysis and Multi relational Data Mining, Mining Object, Spatial, Multimedia, Text and Web Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web.

TEXT BOOKS:

1. Data Mining: Concepts and Techniques, Jiawei Han and Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, Second Edition, 2006.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson Education.

REFERENCES:

1. Data Mining Techniques, Arun KPujari, Second Edition, Universities Press.
2. Data Warehousing in the Real World, Sam Aanhory& Dennis Murray Pearson EdnAsia.
3. Insight into Data Mining, K.P.Soman, S.Diwakar,V.Ajay, PHI,2008.

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III B.TECH – I SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A50505b.	**COMPUTER GRAPHICS**	3	-	-	3

COURSE OBJECTIVES	
1	To develop, design and implement two and three dimensional graphical structures
2	To enable students to acquire knowledge Multimedia compression and animations
3	To learn Creation, Management and Transmission of Multimedia objects

COURSE OUTCOMES	
CO1	Ability to develop programs to control the content, structure and appearance of objects
CO2	Ability to implement various 2D objects transformation techniques and clipping algorithms.
CO3	Ability to apply 3D viewing technologies into the real world applications
CO4	Ability to understand the various computer graphics hardware, compressions and display technologies
CO5	Ability to design, organize and produce multimedia projects

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			2					1							
CO2			2		2										
CO3				1		2			1	1			1	2	
CO4	1														
CO5		1	2		2	2								2	

UNIT-I: 2D PRIMITIVES

Elements of pictures created in computer graphics – Graphics input primitives and devicesDrawing primitives in open GL and Basic open GL programming - open GL basic Graphicsprimitives – Output primitives – Line, Circle and Ellipse drawing algorithms – Attributes ofoutput primitives

UNIT-II :- 2D GEOMETRIC TRANSFORMATIONS

2D Viewing – Window-Viewport Transformation - Two dimensional Geometric transformations

– Line, Polygon, Curve and Text clipping algorithms.

UNIT-III:3D CONCEPTS

Requirements to Design –Design Patterns – Logical Architecture – Package diagram – Designpatterns – Model, View, Control pattern – Detailed design – Object design with GRASP pattern– Detailed class diagram with Visibility

UNIT-IV :MULTIMEDIA BASICS

Introduction and definitions – applications – elements – Animations – Compression – Types of Compressions: Lossless – Lossy – Video compression – Image Compression – Audio compression – Data and file format standards – Multimedia data structures: KD Trees –R trees.

UNIT-V: MULTIMEDIA AUTHORING AND APPLICATIONS

Creating interactive multimedia – Multimedia Authoring Systems – Multimedia Authoring Software Applications – Video On demand – Virtual Reality – Augmented Reality – Content based retrieval in digital libraries.

.**Text Books**:

1. Donald D. Hearn, M. Pauline Baker and Warren Carithers, ―Computer Graphics with OpenGL‖, Fourth Edition, Pearson Education, 2010.
2. Ze-Nian Li and Mark S.Drew, ―Fundamentals of Multimedia‖, First Edition, Pearson Education, 2007.

REFERENCES:

1. F.S.Hill, ―Computer Graphics using OPENGL‖, Second edition, Pearson Education, 2003.
2. Prabhat K Andleigh, Kiran Thakrar, ―Multimedia systems design‖, First Edition, PHI, 2007.

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
III B.TECH – I SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A50505c	**Principles of Programming Language**	3	-	-	3

COURSE OBJECTIVES	
1	To study various programming paradigms.
2	To provide conceptual understanding of High level language design and implementation.
3	To introduce the power of scripting languages

COURSE OUTCOMES	
CO1	Ability to select appropriate programming language for problem solving
CO2	Ability to design new programming language.
CO3	Describe the main principles of imperative, functional, object oriented and logic oriented programming languages.
CO4	Compare and contrast factors and commands that affect the programming state
CO5	Identify the basic objects and constructs in Object-Oriented Programming.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1					2				2					2	
CO2															
CO3				1									1		
CO4															
CO5					2	1			2	1				2	

Unit I:
Introduction: Software Development Process, Language and Software Development Environments, Language and Software Design Models, Language and Computer Architecture, Programming Language Qualities, A brief Historical Perspective.
Syntax and Semantics: Language Definition, Language Processing, Variables, Routines, Aliasing and Overloading, Run-time Structure.

Unit II:
Structuring the data: Built-in types and primitive types, Data aggregates and type constructors, User-defined types and abstract data types, Type Systems, The type Structure of representative languages, Implementation Models

Unit III:

Structuring the Computation: Expressions and Statements, Conditional Execution and Iteration, Routines, Exceptions, Pattern Matching, Nondeterminism and Backtracking, Event-driven computations, Concurrent Computations

Structuring the Program: Software Design Methods, Concepts in Support of Modularity, Language Features for Programming in the Large, Generic Units

Unit IV:

Object-Oriented Languages: Concepts of Object-oriented Programming, Inheritances and the type system, Object-oriented features in programming languages

Unit V:

Functional Programming Languages: Characteristics of imperative languages, Mathematical and programming functions, Principles of Functional Programming, Representative Functional Languages, Functional Programming in C++

Logic and Rule-based Languages: –What‖ versus –how‖: Specification versus implementation, Principles of Logic Programming, PROLOG, Functional Programming versus Logic Programming, Rule-based Languages

Textbook:

1. Programming Language Concepts‖, Carlo Ghezzi, Mehdi Jazayeri, WILEY Publications.Third Edition, 2014

Reference Textbooks:

1. Concepts of Programming Languages, Tenth Edition, Robert W. Sebesta, Pearson Education.
2. Programming Languages Principles and Paradigms, Second Edition, Allen B. Tucker, Robert E. Noonan, McGraw Hill Education.
3. Introduction to Programming Languages, Aravind Kumar Bansal, CRC Press.

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
III B.TECH – I SEMESTER
(LAB)

Subject Code	Title of the Lab	L	T	P	C
17A50506	Software Engineering &Web Technologies Lab	-	1	3	2

COURSE OBJECTIVES	
1	The main objective is to learn group work and to gain practical experience with some
	software engineering methodologies, methods and supporting tools.
2	To create a fully functional website with MVC architecture. To develop an online Book store using we can sell books (Ex: amazon .com).

COURSE OUTCOMES	
CO1	Prepare Software Requirement Specification document.Analyze and translate a specification into a design.
CO2	Realize design practically, using an appropriate software engineering methodology.
CO3	Able to use modern engineering tools for specification, design, implementation, and testing.
CO4	Ability to apply object oriented concepts for programming and its use.
CO5	Practical WEB Development using java by using JDBC and ODBC connectivity.Implementation of servlets and PHP connectivity by using MYSQL applications

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	3	3	3		2		1				2	3	
CO2					3						1		2	3	
CO3			3	3	3	1						1		3	
CO4				3	3		2							3	3
CO5			3							1				3	3

Part A

List of Experiments:.

1. To Identify Project scope, Objectives and Infrastructure.

2. Develop a SRS Document using Rational Requisite Pro Tool. (This Lab is for mastering the software requirements in this regard the documents like Vision Document- Use Case Document – SRS Documents must be submitted for the Problem given to you)

3. Introduction to UML, To Develop Data Dictionary and Use case Diagram

4. To Develop Activity diagram and Class diagram
5. To Develop Sequence diagrams and Collaboration Diagram
6. To add interface to class diagram
7. To Develop Deployment diagram
8. Implement the design by coding
9. Writing a programs for the following : Quality Metrics and OO Metrics, Finding the coupling and cohesion intensity in java code, Reverse Engineering Problems
10. To Prepare test plan and perform validation testing
11. To perform Coverage analysis
12. To develop test case hierarchy
13. Web site Testing, Security Testing, System Testing.

References:

1. Rational Online Documentation
2. Booch, Jackobson and Rambaugh, UML Guide , Pearson Edu, 1999
3. IEEE Standards for SRS Documents, IEEE Std. 830.
4. Fenton NE, Software Metrics: ARigorous Approach, Chapman and Hall, 1991

Part B

Hardware and Software required:

1. A working computer system with either Windows or Linux
2. A web browser either IE or Firefox
3. Apache web server or IIS Webserver
4. XML editor like Altova Xml-spy [www.Altova.com/**XML**Spy – free], Stylus studio, etc.,
5. A database either MySQL or Oracle
6. JVM (Java virtual machine) must be installed on your system
7. BDK(Bean development kit) must be also be installed

Week-1:

Design the following static web pages required for an online book store web site.
1) HOME PAGE:
The static home page must contain three **frames**.

Top frame : Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description ofthese pages will be given below).
Left frame : At least four links for navigation, which will display the catalogue ofrespective links.
For e.g.: When you click the link **"CSE"** the catalogue for **CSE** Books should be displayed in the Right frame.
Right frame: The *pages to the links in the left frame must be loaded here*. Initially this page contains description ofthe web site.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Description ofthe Web Site			

Fig 1.1

2) LOGIN PAGE:

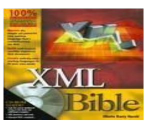
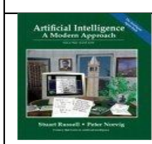
This page looks like below:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Login : Passwor Submit Reset			

3) CATALOGUE PAGE:

The catalogue page should contain the details ofall the books available in the web site in a table. The details should contain the following:

1.Snap shot ofCover Page.
2.Author Name.
3.Publisher.
4.Price.
5.Add to cart button.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL		Book : XML Bible Author : Winston Publication : Wiely	$ 40.5	Add to cart
		Book : AI Author : S.Russel Publication : Princeton hall	$ 63	Add to cart
		Book : Java 2 Author : Watson Publication : BPB publications	$ 35.5	Add to cart
		Book : HTML in 24 hours Author : Sam Peter Publication : Sam publication	$ 50	Add to cart

Note: Week 2 contains the remaining pages and their description.

<u>Week-2</u>:

4) CART PAGE:
The cart page contains the details about the books which are added to the cart.

The cart page should look like this:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	**Book name** Java 2 XML bible	**Price** $35.5 $40.5	**Quantity** 2 1 **Total amount -**	**Amount** $70 $40.5 $130.5

5) REGISTRATION PAGE:

Create a –*registration form* –with the following fields
1) Name (Text field)
2) Password (password field)
3) E-mail id (text field)
4) Phone number (text field)
5) Sex (radio button)
6) Date ofbirth (3 select boxes)
7) Languages known (check boxes – English, Telugu, Hindi, Tamil)
8) Address (text area)

WEEK 3:

VALIDATION:
Write *JavaScript* to validate the following fields ofthe above registration page.

6. Name (Name should contains alphabets and the length should not be less than 6 characters).
7. Password (Password should not be less than 6 characters length).
8. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)

4. Phone number (Phone number should contain 10 digits only).

Note : You can also validate the login page with these parameters.

Week-4:
Design a web page using **CSS (C**ascading **S**tyle **S**heets**)** which includes the following:
1) Use different font, styles:
In the style definition you define how each selector should work (font, color etc.). Then, in the body ofyour pages, you refer to these selectors to activate the styles.

For example: [redacted]

[redacted]

2) Set a background image for both the page and single elements on the page. You can define the background image for the page like this:

[redacted]

3) Control the repetition ofthe image with the background-repeat property. As background-repeat: repeat Tiles the image until the entire page is filled, just like an ordinary background image in plain HTML.

4) Define styles for links as

A:link
A:visited
A:active
A:hover

Example:

<style type="text/css">
A:link {text-decoration: none}
A:visited {text-decoration: none}
A:active {text-decoration: none}
A:hover {text-decoration: underline, color: red,}
</style>

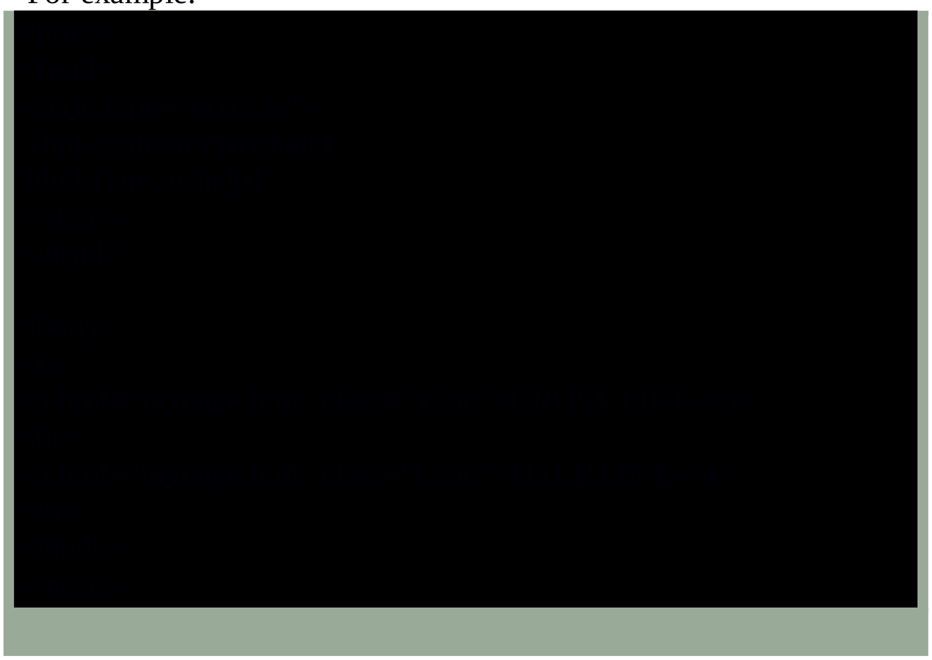
5) Work with layers:
For example:
LAYER 1 ON TOP:
<div style="position:relative, font-size:50px, z-index:2,">LAYER 1</div><div style="position:relative, top:-50, left:5, color:red, font-size:80px, z-

index:1">LAYER 2</div>

LAYER 2 ON TOP:
<div style="position:relative, font-size:50px, z-index:3,">LAYER 1</div><div style="position:relative, top:-50, left:5, color:red, font-size:80px, z-

index:4">LAYER 2</div>

6) Add a customized cursor:
Selector {cursor:value}
For example:



Week-5:

Write an XML file which will display the Book information which includes the following:

1) Title ofthe book
2) Author Name
3) ISBN number
4) Publisher name
5) Edition
6) Price

Write a Document Type Definition (DTD) to validate the above XML file.
Display the XML file as follows.
The contents should be displayed in a table. The header ofthe table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns.
Use XML schemas XSL and CSS for the above purpose.

Note: Give at least for 4 books. It should be valid syntactically.
Hint: You can use some xml editors like XML-spy

Week-6:
VISUAL BEANS:
Create a simple visual bean with a area filled with a color.

The shape ofthe area depends on the property shape. If it is set to true then the shape ofthe area is Square and it is Circle, if it is false.
The color ofthe area should be changed dynamically for every mouse click. The color should also be changed if we change the color in the –property window –.

Week-7:

1) Install IIS web server and APACHE.

While installation assign port number 4040 to IIS and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port.

2) Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root.

Access the pages by using the urls : http://localhost:4040/rama/books.html (for tomcat)
http://localhost:8080/books.html (for Apache)

Week-8:

User Authentication :
Assume four users user1,user2,user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a PHP for doing the following.
1. Create a Cookie and add these four user id's and passwords to this Cookie.
2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.
If he is a valid user(i.e., user-name and password match) you should welcome him by name(user-name) else you should display ― You are not an authenticated user ''.
Use init-parameters to do this.

Week-9: Install a database(Mysql or Oracle).
Create a table which should contain at least the following fields: name, password, email-id, phone number(these should hold the data from the registration form).

Write a PHP program to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.
Insert the details ofthe users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).
Week-10:
Write a PHP which does the following job:
Insert the details ofthe 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).

Week-11:
Create tables in the database which contain the details of items (books in our case like Book name , Price, Quantity, Amount) ofeach category. Modify your catalogue page (week 2)in such

a way that you should connect to the database and extract data from the tables and display them in the catalogue page using PHP

Week-12:

HTTP is a stateless protocol. Session is required to maintain the state.

The user may add some items to cart from the catalog page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time(i.e., from different systems in the LAN using the ip-address instead oflocalhost). This can be achieved through the use ofsessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated (by using the method session.invalidate()).

Modify your catalogue and cart PHP pages to achieve the above mentioned functionality using sessions.

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III B.TECH – I SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A50507	**Data Warehousing and Mining &Compiler Design Laboratory**	-	1	3	2

COURSE OBJECTIVES	
1	Learn how to build a data warehouse and query it (using open source tools like Pentaho Data Integration and Pentaho Business Analytics)
2	Learn to perform data mining tasks using a data mining toolkit (such as open source WEKA).Understand the data sets and data preprocessing
3	Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering and regression
4	To implement some of the functionality of the compiler
5	To do programming using compiler related tools

COURSE OUTCOMES	
CO1	Ability to build Data Warehouse and Explore WEKA
CO2	Ability to perform data preprocessing tasks and Demonstrate performing classification, clustering and regression association rule mining on data sets
CO3	Develop compiler tools
CO4	Design simple compiler
CO5	Analyze transaction databases for association rules.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		1			3									3	
CO2				2											
CO3					3	1			2					3	
CO4					3			1						3	2
CO5				2					2			1		3	

Data Warehousing and Data Mining

Experiments:

1.Build Data Warehouse and Explore WEKA

A. Build a Data Warehouse/Data Mart (using open source tools like Pentaho Data Integration tool, Pentoaho Business Analytics; or other data warehouse tools like Microsoft-SSIS, Informatica, Business Objects, etc.).

(i). Identify source tables and populate sample data

(ii). Design multi-dimensional data modeSelect Subjectls namely Star, snowflake and Fact constellation schemas for any one enterprise (ex. Banking, Insurance, Finance, Healthcare, Manufacturing, Automobile, etc.).

(iii). Write ETL scripts and implement using data warehouse tools

(iv). Perform various OLAP operations such slice, dice, roll up, drill up and pivot

(v). Explore visualization features of the tool for analysis like identifying trends etc.

2.Perform data preprocessing tasks and Demonstrate performing association rule mining on data sets

A. Explore various options available in Weka for preprocessing data and apply (like Discretization Filters, Resample filter, etc.) on each dataset

B. Load each dataset into Weka and run Aprori algorithm with different support and confidence values. Study the rules generated.

C. Apply different discretization filters on numerical attributes and run the Apriori association rule algorithm. Study the rules generated. Derive interesting insights and observe the effect of discretization in the rule generation process.

3.Demonstrate performing classification on data sets

A. Load each dataset into Weka and run Id3, J48 classification algorithm. Study the classifier output. Compute entropy values, Kappa statistic.

B. Extract if-then rules from the decision tree generated by the classifier, Observe the confusion matrix and derive Accuracy, F-measure, TPrate, FPrate, Precision and Recall values. Apply cross-validation strategy with various fold levels and compare the accuracy results.

C. Load each dataset into Weka and perform Naïve-bayes classification and kNearest Neighbour classification. Interpret the results obtained.

D. Plot RoC Curves

E. Compare classification results of ID3, J48, Naïve-Bayes and k-NN classifiers for each dataset, and deduce which classifier is performing best and poor for each dataset and justify.

4.Demonstrate performing clustering on data sets

A. Load each dataset into Weka and run simple k-means clustering algorithm with different values of k (number of desired clusters). Study the clusters formed. Observe the sum of squared errors and centroids, and derive insights.

B. Explore other clustering techniques available in Weka.

C. Explore visualization features of Weka to visualize the clusters. Derive interesting insights and explain.

5. Demonstrate performing Regression on data sets

A. Load each dataset into Weka and build Linear Regression model. Study the clusters formed. Use Training set option. Interpret the regression model and derive patterns and conclusions from the regression results. x

B. Use options cross-validation and percentage split and repeat running the Linear Regression Model. Observe the results and derive meaningful results.

C. Explore Simple linear regression technique that only looks at one variable

6. Hospital Management System

Data Warehouse consists Dimension Table and Fact Table.

REMEMBER The following Dimension

The dimension object (Dimension):

_ Name

_ Attributes (Levels) , with one primary key

_ Hierarchies

One time dimension is must.

About Levels and Hierarchies

Dimension objects (dimension) consist of a set of levels and a set of hierarchies defined over those levels. The levels represent levels of aggregation. Hierarchies describe parent-child relationships among a set of levels.

For example, a typical calendar dimension could contain five levels. Two hierarchies can be defined on these levels:

H1: YearL > QuarterL > MonthL > WeekL > DayL

H2: YearL > WeekL > DayL

The hierarchies are described from parent to child, so that Year is the parent of Quarter, Quarter the parent of Month, and so forth.

About Unique Key Constraints

When you create a definition for a hierarchy, Warehouse Builder creates an identifier key for each level of the hierarchy and a unique key constraint on the lowest level (Base Level)

Design a Hospital Management system data warehouse (TARGET) consistig of Dimensions Patient, Medicine, Supplier, Time. Where measures are _ NO UNITS_, UNIT PRICE.

Assume the Relational database (SOURCE) table schemas as follows

TIME (day, month, year),

PATIENT (patient_name, Age, Address, etc.,)

MEDICINE (Medicine_Brand_name, Drug_name, Supplier, no_units, Uinit_Price, etc.,)
SUPPLIER :(Supplier_name, Medicine_Brand_name, Address, etc.,) If each Dimension has 6

levels, decide the levels and hierarchies, Assume the level names suitably.

Design the Hospital Management system data warehouse using all schemas. Give the example 4-D cube with assumption names.

Resource Sites:

1. **http://www.pentaho.com/**
2. **http://www.cs.waikato.ac.nz/ml/weka/**

Compiler Design Programs

List of Experiments:

1. Write a program to search for a given pattern in a set of files. It should support regular expressions. It should work similar to grep and fgrep of Linux environment.
2. Write programs to implement DFA and NFA.(Input : DFA or NFAand a string and Output : Verification of any given string for acceptance.)
3. Design a PDA for any given CNF. Simulate the processing of a string using the PDA and show the parse tree.
4. Design a Lexical analyzer for identifying different types of tokens used in C language.

Note: The reserved keywords such as if, else, class, structetc must be reported as invalid identifiers. C allows identifier names to begin with underscore character too.

5. Program to recognize the identifiers, if and switch statements of C using a lexical analyzer generator tool.
6. Consider the following grammar:

S --> ABC

A-->abA | ab

B--> b | BC

C--> c | cC

Design any shift reduced parser which accepts a string and tells whether the string is accepted by above grammar or not.

7. YACC program that reads the input expression and convert it to post fix expression.

References:

1. –Compiler Design using FLEX and YACC‖, Das, PHI.
2. –Compiler Design in C‖, Holub, PHI.

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III B.TECH – II SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A60501	**Data Analytics**	2	2	-	3

COURSE OBJECTIVES	
1	To introduce the terminology, technology and its applications
2	To introduce the concept of Analytics for Business
3	To introduce the tools, technologies & programming languages which is used in day to day analytics cycle
4	To understand the relationship between data.
5	To discuss the overall process of how data analytics is applied.

COURSE OUTCOMES	
CO1	Analyze data, test claims, and draw valid conclusions using appropriate statistical methodology.
CO2	Use appropriate resources to research, develop and contribute to advances and trends within the field of Data Analytics.
CO3	Formulate and use appropriate models of data analysis to solve hidden solutions to business-related challenge.
CO4	Use appropriate models of analysis, assess the quality of input, and derive insight from results.
CO5	Apply computing theory, languages and algorithms, as well as mathematical and statistical models, and the principles of optimization to appropriately formulate and use data analyses

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3		2		1		2	3				2	
CO2		3		2							2		3		
CO3		3			2				2	3	2			2	
CO4		3	3							3		1	3		
CO5			3	2						3			3		

Unit -1

Introduction to R: Introduction to R, Calculating Environment, Basic Programming, Input and Output, Functions, Data Structures, String handling

Unit - 2

Data Importing and Exporting: Reading Data from Files, Data Normalization, Relational Databases, Merging, Combining and subletting datasets, working with Binary and Image Files, Installing Packages.

Unit 3

Data Analysis: Data Types, Matrices, Data Frames, Importing and exporting Data, apply, lapply, sapply, mapply, split and tapply functions, ddply.

Unit -4

Data Visualization: Exploring Data, Scatter Plots, Line Graphs, Bar Graphs, Histograms, Box Plots,Pie charts, points, Using Color in plots, Facets, Summarized Data Distributions.

Unit -5

Probability and Statistics: Data Description, Probability, Distributions -Discrete and Continuous Distributions, Sample Distributions, Hypothesis testing, Regression Models – Linear and Multiple Regression models.privacy, security, ethics, A look back at Data Science, Next-generation data scientists.

Text Books:

1. Introduction to Scientific Programming and Simulation Using R, Owen Jones, Robert Maillardet and Andrew Robinson, Second Edition, CRC Press, 2014
2. A First Course in Statistical Programming with R, Braun W. J., Murdoch D. J.. — Cambridge University Press, 2007
3. Data Manipulation with R, Jaynal Abedin and Kishor Kumar Das, Second Edition, Packt publishing, BIRMINGHAM – MUMBAI.
4. Beginning R The Statistical Programming language- Mark Gardener, John Wiley & Sons, Inc, 2012

Reference Books:

1. Graphics for Statistics and Data Analysis with R – Kevin J. Keen, CRC Press, 2010
2. Data Analysis and Graphics Using R, Third Edition, John Maindonald, W. John Braun, Cambridge University Press, 2010
3. Exploratory Data Analysis with R – Roger D. Peng, Leanpub publications, 2015
4. Introduction to Probability and Statistics Using R, G. jay Kerns, First Edition, 2011
5. The Art of Data Science- A Guide for anyone Who Works with Data – Roger D. Peng and Elizabeth Matsui, Leanpub Publications, 2014

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III B.TECH – II SEMESTER

(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A60502	**OBJECT ORIENTED ANALYSIS AND DESIGN**	3	-	-	3

COURSE OBJECTIVES	
1	To understand how to solve complex problems
2	Analyze and design solutions to problems using object oriented approach
3	Study the notations of Unified modeling language

COURSE OUTCOMES	
CO1	Find solutions to the complex problems using object oriented approach
CO2	Represent classes, responsibilities and states using UML notation
CO3	Identify classes and responsibilities of the problem domain
CO4	Develop access layer classes using axioms and corollaries.
CO5	Model user interface and map object oriented system to relational system.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3		1	2				1			3		
CO2		1		1							1				
CO3	3		3				1						3	2	
CO4	3		3						2			1	3		
CO5	3		3			2			2				3	2	

UNIT-I: OOAD BASICS

Introduction – Overview of object oriented system development – Object basics-The Unified Process – Modelling concepts – Modelling as a design technique – Analysis and modelling – UML diagrams – Use case Modelling – Class modelling – State modelling – Interaction Modelling

UNIT-II :REQUIREMENTS& MODELING

Object Constraint Language - Inception – Evolutionary Requirements– Domain Models – System Sequence Diagrams – Operation Contracts.

UNIT-III:PRINCIPLES OF DESIGNING

Requirements to Design –Design Patterns – Logical Architecture – Package diagram – Design patterns – Model, View, Control pattern – Detailed design – Object design with GRASP pattern– Detailed class diagram with Visibility

UNIT-IV :MAPPING TO CODE

Mapping designs to code – Test Driven development and refactoring – UML Tools and UML as blueprint.

Case Studies – the Next Gen POS system, Online Bookshop - A Multi Threaded Airport Simulation.

UNIT-V: APPLYING DESIGN PATTERNS

More Patterns – Analysis update – Objects with responsibilities – Applying design patterns – Architectural Analysis – Logical Architecture Refinement – Package Design –Persistence framework with patterns.

Text Books:

11. Michael Blaha and James Rumbaugh, ―Object-oriented modelling and design with UML‖, Prentice-Hall of India, 2005.

2. Craig Larman. ―Applying UML and Patterns – An introduction to Object-Oriented Analysis and Design and Iterative Development‖, 3rd ed, Pearson Education, 2005.

REFERENCES:

1. Ali Bahrami, ―Object Oriented Systems Development‖, McGraw-Hill, 1999.

2. Booch, Grady. Object Oriented Analysis and Design. 2nd ed. Pearson Education 2000.

3. Fowler, Martin. UML Distilled. 3rd ed. Pearson Education. 2004.

4. Lunn, Ken. Software development with UML. Palgrave Macmillan. 2003.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS):: ANANTHAPURAMU
DEPARTMENT OF ECE
III B.TECH – II SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A624501	**Microprocessors & Microcontrollers**	3	-	-	3

COURSE OBJECTIVES	
The students will be able to	
1	Understand fundamental operating concepts behind microprocessors and microcontrollers.
2	Appreciate the advantages in using RISC microprocessors / microcontrollers in engineering applications.
3	Design microprocessor / microcontroller based solutions to problems.
4	Develop skill in simple program writing for 8086; MSP430 and applications.

COURSE OUTCOMES	
At the end of this course the student will be able to,	
CO1	Understands the internal architecture and organization of 8085 &8086 processors, MSP430 controller.
CO2	Design and implement programs on 8086 microprocessor.
CO3	Understands the interfacing techniques to 8086 and MSP 430 and can develop assembly language programming to design microprocessor/ micro controller based systems.
CO4	Program MSP 430 for designing any basic Embedded System.
CO5	Design and implement some specific real time applications.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1							2						
CO2		2	3						2					1	
CO3		3	3						2					2	
CO4	2	2	2						2				3	2	
CO5									2						

SYLLABUS

UNIT I

Introduction-8085 Architecture-Block Diagram, Flag Register, Pin Diagram, Timing and Control Signals, System Timing Diagram, Overview of 8086-Internal Architecture- Register Organization, Memory Segmentation, Flag Register, Pin Configuration. Interrupt structure of 8085 and 8086

UNIT II

Instruction Formats -Addressing Modes-Instruction Set of 8086, Assembler Directives-Macros and Procedures. Programs Involving Logical, Branch Instructions – Sorting and Evaluating Arithmetic Expressions – StringManipulations-Simple ALPs. Brief discussion of peripheral sub systems like 8251, 8253, 8255, 8257 and 8259 (only Pin diagrams and key features of these peripheral sub systems)

UNIT III

Comparison between RISC and CISC architecture, Low power RISC MSP430 – block diagram, features and architecture,Variants of the MSP430 family viz. MSP430x2x, MSP430x4x, MSP430x5x and their targeted applications, MSP430x5x series block diagram, address space, on-chip peripherals (analog and digital), and Register sets. Sample embedded system on MSP430 microcontroller.

UNIT-IV

I/O ports pull up/down registers concepts, Interrupts and interrupt programming. Watchdog timer. System clocks. Low Power aspects of MSP430: low power modes, Active vs Standby current consumption, FRAM vs Flash for low power & reliability.

Timer & Real Time Clock (RTC), PWM control, timing generation and measurements. Analog interfacing and data acquisition: ADC and Comparator in MSP430, data transfer using DMA.

Case Study: MSP430 based embedded system application using ADC & PWM demonstrating peripheral intelligence. ―Remote Controller of Air Conditioner Using MSP430‖

UNIT-V:

Serial communication basics, Synchronous/Asynchronous interfaces (like UART, USB, SPI, and I2C). UART protocol, I2C protocol, SPI protocol. Implementing and programming UART, I2C, SPI interface using MSP430, Interfacing external devices. Implementing Embedded Wi-Fi using C3100

Case Study: MSP430 based embedded system application using the interface protocols for communication with external devices: ―A Low-Power Battery less Wireless Temperature and Humidity Sensor with Passive Low Frequency RFID‖

Text Books:

1. ―Microprocessor and Microcontrollers‖, N. Senthil Kumar, M. Saravanan, S. Jeevanathan, Oxford Publishers. 1 st Edition, 2010
2. ―The X86 Microprocessors , Architecture, Programming and Inerfacing‖ , Lyla B. Das, Pearson Publications, 2010
3. MSP430 microcontroller basics. John H. Davies, Newnes Publication, I st Edition

References:

http://processors.wiki.ti.com/index.php/MSP430_LaunchPad_Low_Power_Mode
http://processors.wiki.ti.com/index.php/MSP430_16-Bit_Ultra Low_Power_MCU_Training

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
III B.TECH – II SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A60503	**ARTIFICIAL INTELLIGENCE**	3	-	-	3

COURSE OBJECTIVES	
1	To learn the basics of designing intelligent agents that can solve general purpose problems, represent and process knowledge, plan and act, reason under uncertainty and can learn from experiences.

COURSE OUTCOMES	
CO1	Select a search algorithm for a problem and estimate its time and space complexities.
CO2	Possess the skill for representing knowledge using the appropriate technique for a given problem
CO3	Possess the ability to apply AI techniques to solve problems of game playing, expert systems, machine learning and natural language processing.
CO4	Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information .
CO5	Understand the fundamentals of knowledge representation (logic-based, frame-based, semantic nets), inference and theorem proving.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2				3		1		1					2
CO2	2			2					3		1				
CO3		2		2		3			3				2	1	
CO4			2									2	2		
CO5			2			3			3			2			2

UNIT I
PROBLEM SOLVING
Introduction – Agents – Problem formulation – uninformed search strategies – heuristics – informed search strategies – constraint satisfaction

UNIT II
LOGICAL REASONING
Logical agents – propositional logic – inferences – first-order logic – inferences in firstorder logic – forward chaining – backward chaining – unification – resolution

UNIT III
PLANNING
Planning with state-space search – partial-order planning – planning graphs – planning and acting in the real world

UNIT IV
UNCERTAIN KNOWLEDGE AND REASONING
Uncertainty – review of probability - probabilistic Reasoning – Bayesian networks – inferences in Bayesian networks – Temporal models – Hidden Markov models.

UNIT V
LEARNING
Learning from observation - Inductive learning – Decision trees – Explanation based learning – Statistical Learning methods - Reinforcement Learning

TEXT BOOK:
1. S. Russel and P. Norvig, –Artificial Intelligence – A Modern Approach‖, Second Edition, Pearson Education, 2003.

REFERENCES:

1. David Poole, Alan Mackworth, Randy Goebel, ‖Computational Intelligence : a logical approach‖, Oxford University Press, 2004.
2. G. Luger, –Artificial Intelligence: Structures and Strategies for complex problem solving‖, Fourth Edition, Pearson Education, 2002.
3. J. Nilsson, –Artificial Intelligence: A new Synthesis‖, Elsevier Publishers, 1998.

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
III B.TECH – II SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A60504a.	**FREE AND OPEN SOURCE SOFTWARES**	3	-	-	3

COURSE OBJECTIVES	
1	Exposure to the context and operation of free and open source software (FOSS) communities and associated software projects.
2	Familiar with participating in a FOSS project
3	Learn scripting language like Python or Perl
4	Learn programming language like Ruby
5	Learn some important FOSS tools and techniques

COURSE OUTCOMES	
CO1	Install and run open-source operating systems.
CO2	Gather information about Free and Open Source Software projects from software releases and from sites on the Internet.
CO3	Build and modify one or more Free and Open Source Software packages.
CO4	Contribute software to and interact with Free and Open Source Software development projects.
CO5	Understand and demonstrate Version Control System along with its commands.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3	2		2		2		3	2				2
CO2			3										2		
CO3		1		2			1			3				1	
CO4			3	2		2		2		3	2				
CO5			3			2			1			2	2		2

UNIT I PHILOSOPHY

Notion of Community--Guidelines for effectively working with FOSS community--, Benefits of Community based Software Development --Requirements for being open, free software, open source software –Four degrees of freedom - FOSS Licensing Models - FOSS Licenses – GPL-AGPL- LGPL - FDL - Implications – FOSS examples.

UNIT II LINUX

Linux Installation and Hardware Configuration – Boot Process-The Linux Loader (LILO) - The Grand Unified Bootloader (GRUB) - Dual-Booting Linux and other Operating System - Boot-Time Kernel Options- X Windows System Configuration-System Administration – Backup and Restore Procedures- Strategies for keeping a Secure Server.

UNIT III PROGRAMMING LANGUAGES

Programming using languages like Python or Perl or Ruby

UNIT IV PROGRAMMING TOOLS AND TECHNIQUES

Usage of design Tools like Argo UML or equivalent, Version Control Systems like Git or equivalent, –

Bug Tracking Systems- Package Management Systems

UNIT V FOSS CASE STUDIES

Open Source Software Development - Case Study – Libreoffice -Samba

REFERENCES:

Philosophy of GNU URL: http://www.gnu.org/philosophy/.

Linux Administration URL: http://www.tldp.org/LDP/lame/LAME/linux-admin-made-easy/.

The Python Tutorial available at http://docs.python.org/2/tutorial/.

Perl Programming book at http://www.perl.org/books/beginning-perl/.

Ruby programming book at http://ruby-doc.com/docs/ProgrammingRuby/.

Version control system URL: http://git-scm.com/.

Samba: URL :http://www.samba.org/.

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III B.TECH – II SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A60504b.	**Intellectual Property Rights**	3	-	-	3

COURSE OBJECTIVES	
1	Understanding of the fundamental legal principles relating to confidential information, copyright, patents, designs, trademarks and unfair competition
2	ability to identify, apply and assess principles of law relating to each of the areas of intellectual property

COURSE OUTCOMES	
CO1	Able to demonstrate a capacity to identify, apply and assess ownership rights.
CO2	Able to anticipate and subject to critical analysis of arguments relating to the development and reform of intellectual property right institutions and their likely impact on creativity and innovation.
CO3	marketing protection under intellectual property law as applicable to information, ideas, new products and product marketing.
CO4	Understand the legal and practical steps needed to ensure that intellectual property rights remain valid and enforceable
CO5	Understand current and emerging issues relating to the intellectual property protection, including those relating to indigenous knowledge or culture

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3		1		2		2				2	2	
CO2		2		3							1			2	
CO3		2		3			2			2					
CO4			3	3		1				2			2		
CO5			3						2						

Unit-1

Introduction to Intellectual property law : Intellectual property law basics, Types of intellectual property, Agencies Responsible for Intellectual property Registration, International Organizations, Agencies and Treaties, The Increasing Importance of Intellectual property Rights.

Foundations of Trademark Law : Introduction, Purpose of Trademarks, Types of Marks, Acquisition of Trademark Rights, common Law Rights, Federal Registration under the Lanham Act, Laws and Treaties Governing Trademarks, and State Trademark Rights, Categories of Marks, Trade Names and Business Name, Protectable Matter, Protectable Matter, Exclusions from Trademark Protection, U.S. Patent and Trademark Office.

Trademark Selection and Searching: Selection and Evaluating a Mark, The Trademark Search.

The Trademark Registration Process: Preparing the Application, Drawing of Mark, Filing the Application, Docketing Critical Dates, and Initial Role of the U.S. Patent and Trademark Office, The Examinations Process, Post examination Procedure, Registration, The U.S. Patent and Trademark Office‘s TARR Monitoring System.

Unit-2

Postregistration Procedures, Trademark Maintenance, and Transfer of Rights to Marks: The Affidavit of Use,The Affidavit of Incontestability, Renewal of Registration, Docketing Requirements, Loss of Trademark Rights, Trademark Use and Compliance Policies, Trademark Policing and Maintenance, Use of Mark Owned by Third Parties, Transfer of Ownership or Rights in Trademarks.

Inter Partes Proceedings, Infringement, and Dilution: Inter Partes Proceedings, Infringement of Trademark, Dilution of Trademarks, Related Trademark Claims.

New Developments in Trademark Law: The Internet, Protecting a Domain Name, Hyperlinking and the Frist Amendment, Other Cyberspace Trademark Issues.

International Trademark Law: Applications in the United States Based in Foreign Applications and Registration, Securing Trademark Protection in Foreign Countries, Effects of New International Agreements, International Associations.

UNIT-3

Foundations of Copyright Law: Introduction, Common Law Rights under the 1976 Copyright Act, the U.S. Copyright Office.

The Subject Matter of Copyright: Introduction, Originality of Material, Fixation of Material, Work of Authorship, Exclusions from Copyright Protection, Compilation, Collections, and Derivative Works.

Right Afforded by Copy right Law: Introduction, Rights of Reproduction, Rights to Prepare Derivative works, Rights of Distribution and the First Sale Doctrine, Rights to perform the work Publicly, Rights to display the work Publicly, Other Limitations on Exclusive Rights, Moral Rights and the Visual Artists Rights act, Compulsory Licenses.

Copyright Ownership, Transfers, and Duration: Copyright Ownership Issues, Joint Works, Ownership in derivative or Collective works, Works made for Hire, Transfers of copyright, Termination of Transfers of copyright Rights, Duration of Copyright.

Unit-4

Copyright Registration, Searching copyright Office Records and Notice of Copyright :

Introduction, The Application for copyright Registration, Deposit Material, The Application Process and Registration of Copyright, Preregistration , Searching copyright Office Records, Obtaining copyright office Records and deposit Materials, Copyright Notice.

Copyright Infringement: Introduction, Elements of Infringement, Contributory infringement and vicarious Infringement, Defences to Infringement, Infringement Actions.

New Developments in Copyright Law and the Semiconductor Chip Protection Act : Introduction, Copyright Protection for Computer Programs, Copyright Protection for Automated Databases, Copyright in the Electronic Age, The digital Millennium Copyright Act, Entertainment notes, Recent Developments in Copyright Law, Terms of the Trade, Vessel Hull Protection , Semiconductor Chips Protection.

International Copyright Law: Introduction, The Berne Convention, Treaties Supplementing the BerneConvention: The WIPO Treaties, The Uruguay Round Agreements Act, The universal copyright convention, Trades Aspects of Intellectual Property Law, Gray Market Goods, Summary of US Relations with Foreign Nations.

Unit-5

The Law of Patents : Introduction, Rights under Federal Law, U.S Patent and Trademark Office, Patentability, Design Patent, Plant Patents, Double Patenting, The Orphan Drug Act.

Patent Searches, Applications, And Post-issuance proceeding : Patent Searching, The Patent Application Process, Prosecuting the Application, Post-Issuance Actions, Term and Maintenance of Patents, Patent Ownership and Transfer : Ownership Rights, Sole and Joint Inventors, Disputes over Inventorship, Inventions Made by Employees and Independent Contractors, Assignment of Patent Rights, Licensing of Patent Rights, Invention Developers and Promoters.

Patent Infringement : Direct Infringement, Inducement to Infringe and contributory Infringement, The first Sale Doctrine, Imports and Section 337 investigations, Indirect Infringement, Infringement Abroad, Claims interpretation, Defenses to Infringement, Remedies for Infringement, Resolving an Infringement Dispute, Patent Infringement Litigation.

New Developments and International Patent Law : New Developments in patent law, Introduction to International Patent Protection, The Paris convention, the patent cooperation Treaty , The European Patent organization, The patent Prosecution Highway , Agreement on trade- Related Aspects of Intellectual Property rights, The patent Law Treaty, Foreign filling Licences, Applications for US Patents by Foreign Applications.

Trade Secrets Law: Introduction, Determination of Trade Secret Status, Liability for Misappropriation of Trade Secrets, Employer – employee Relationship, Protection for Submission, Defenses to Trade Secrets misappropriation, Remedies for misappropriation, Trade Secret litigation , Trade Secret Protection Programs, new and International development in Trade Secret Law.

Unfair competition: Introduction, Passing Off, misappropriation, Right of publicly, false advertising, product disparagement, dilution, Infringement of trade dress, International production against unfair competitions.

Intellectual property Audits and give Diligence Reviews: Introduction, Practical Aspects of Intellectual property audits, conducting the Audit, Postaudit activity.

Text Book:

1) Intellectual Property the Law of Trademarks, Copyrights, Patents, and Trade Secrets 4th Edition by Deborah E. Bouchoux, Cengage Learning,2013.

Reference Text Books:

1) ―Intellectual Property Rights‖ by paruddha ganguli, Mc Graw Hill Educton

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS):: ANANTHAPURAMU

****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******

III B.TECH – II SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A60504c.	**Data Science**	3	-	-	3

COURSE OBJECTIVES	
1	Discussion and dissemination of best practice in use of data science.
2	Aims to bring to together researchers interested in data science to focus on techniques and methods that cut across all disciplines.
3	DSC will bring together researchers that develop methods and techniques and those that apply these methods to their research.
4	Will be used to raise awareness of funding opportunities (nationally and internationally) and potential collaborations related to the use of data analytics/big data techniques.
5	Will be led by a small academic steering group to ensure alignment with current academic topics.

COURSE OUTCOMES	
CO1	Use R to carry out basic statistical modeling and analysis.
CO2	Explain the significance of exploratory data analysis (EDA) in data science. Apply basic tools (plots, graphs, summary statistics) to carry out EDA.
CO3	Describe the Data Science Process and how its components interact.
CO4	Use APIs and other tools to scrap the Web and collect data.
CO5	Apply EDA and the Data Science process in a case study.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2		2							2		3	3	
CO2	2		1			2			1			1		2	
CO3		2		2							2		3		
CO4						2							3		
CO5	2				1		1			1					

UNIT-I

Introduction: What is Data Science: Big Data and Data Science hype – and getting past the hype, Why now? – Deification, Current landscape of perspectives, Skill sets needed.

Statistical Inference: Populations and samples, Statistical modeling, probability distributions, fitting a model, Intro to R.

UNIT-II

Exploratory Data Analysis and the Data Science Process: Basic tools (plots, graphs and summary statistics) of EDA**,** Philosophy of EDA, The Data Science Process, Case Study: Real Direct (online real estate firm)

Three Basic Machine Learning Algorithms: Linear Regression, k-Nearest Neighbors (k-NN),k-means.

UNIT-III

One More Machine Learning Algorithm and Usage in Applications: Motivating application: Filtering Spam, Why Linear Regression and k-NN are poor choices for Filtering Spam, Naive Bayes and why it works for Filtering Spam, Data Wrangling: APIs and other tools for scrapping the Web.

Feature Generation and Feature Selection (Extracting Meaning From Data) : Motivating application: user (customer) retention, Feature Generation (brainstorming, role of domain expertise, and place for imagination),Feature Selection algorithms, Filters; Wrappers; Decision Trees; Random Forests.

UNIT-IV

Recommendation Systems: Building a User-Facing Data Product: Algorithmic ingredients of a Recommendation Engine, Dimensionality Reduction, Singular Value Decomposition,

Principal Component Analysis.

Mining Social-Network Graphs: Social networks as graphs, Clustering of graphs, direct discovery of communities in graphs, Partitioning of graphs, Neighborhood properties in graphs.

UNIT-V

Data Visualization: Basic principles, ideas and tools for data visualization, Examples of inspiring (industry) projects.

Data Science and Ethical Issues: Discussions on privacy, security, ethics**,** a look back at Data Science, Next-generation data scientists.

Text Books:

1) Cathy O‘Neil and Rachel Schutt. Doing Data Science, Straight Talk from the Frontline. O‘Reilly. 2014.

Reference Books:

1) Jure Leskovek, Anand Rajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1,Cambridge University Press. 2014. (free online)
2) Kevin P. Murphy. Machine Learning: A Probabilistic Perspective. ISBN 0262018020. 2011
3) Foster Provost and Tom Fawcett. Data Science for Business: What You Need to Know aboutData Mining and Data-analytic Thinking. ISBN 1449361323. 2013

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****** DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES ******
III B.TECH – II SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A69901	**French(Foreign Language)**	2	-	-	-

COURSE OBJECTIVES	
1	To be able to understand frequently used phrases and expressions in French related to relevant areas of experience.
2	To be able to carry out simple, habitual daily tasks and exchanges in French.
3	To be able to describe in French, in simple terms, their past, their environment and issues related to their immediate needs.

COURSE OUTCOMES	
CO1	Respond appropriately to simple statements and instructions in French in everyday situations, for example, questions and directions;
CO2	Participate in conversations based on everyday topics and respond orally in everyday situations in a manner acceptable to native speakers;
CO3	Equipped with sufficient vocabulary to operate in familiar and predictable situations.

SYLLABUS

UNIT I:**Everyday activities-** Home life and school- Home life- School routine

Food, health and fitness- Eating and drinking- Health and fitness

UNIT II: **Personal and social life-** Self, family and personal relationships- Self, family, pets, personal- relationships- Holidays and special occasions- Festivals and special occasions- Holidays; getting around

UNIT III: **The world around us-** Home town and local area- Home town and geographical-surroundings- Natural and made environment- Natural environment- Weather- People, places and customs

UNIT IV: **The world of work-** Continuing education- Careers and employment- Language and communication in the work place

UNIT V: **The international world-** Tourism at home and abroad- Holiday travel and transport- Life in other countries and communities- Places and customs- World events and issues- Issues according to available resources and individual interest

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS):: ANANTHAPURAMU
****** DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES ******
III B.TECH – II SEMESTER
(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A69901	**Spanish(Foreign Language)**	2	-	-	-

COURSE OBJECTIVES	
1	to be able to understand frequently used phrases and expressions in Spanish related to relevant areas of experience.
2	to be able to carry out simple, habitual daily tasks and exchanges in Spanish.
3	to be able to describe in Spanish, in simple terms, their past, their environment and issues related to their immediate needs.

COURSE OUTCOMES	
CO1	respond appropriately to simple statements and instructions in Spanish in everyday situations, for example, questions and directions;
CO2	participate in conversations based on everyday topics and respond orally in everyday situations in a manner acceptable to native speakers;
CO3	equipped with sufficient vocabulary to operate in familiar and predictable situations.

SYLLABUS

UNIT I:**Everyday activities-** Home life and school- Home life- School routine

Food, health and fitness- Eating and drinking- Health and fitness

UNIT II: **Personal and social life-** Self, family and personal relationships- Self, family, pets, personal- relationships- Holidays and special occasions- Festivals and special occasions- Holidays; getting around

UNIT III: **The world around us-** Home town and local area- Home town and geographical-surroundings- Natural and made environment- Natural environment- Weather- People, places and customs

UNIT IV: **The world of work-** Continuing education- Careers and employment- Language and communication in the work place

UNIT V: **The international world-** Tourism at home and abroad- Holiday travel and transport- Life in other countries and communities- Places and customs- World events and issues- Issues according to available resources and individual interest

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****** DEPARTMENT COMPUTER SCIENCE & ENGINEEIRNG ******
III B.TECH – II SEMESTER
Advanced English Language Communication Skills Lab
(w.e.f Academic Year 2017-18)

Subject Code	**Title of the Lab**	**L**	**T**	**P**	**C**
17A65501	Advanced English Language Communication Skills Lab	-	1	3	2

COURSE OBJECTIVES	
1	To improve the students‘ fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
2	Further, they would be required to communicate their ideas relevantly and coherently in writing.
3	To prepare all the students for their placements.
4	To initiate them into greater use of the computer in resume preparation, report writing, format making etc.
5	To train them to use language effectively to face interviews, group discussions, public speaking.

COURSE OUTCOMES	
CO1	Accomplishment of sound vocabulary and its proper use contextually
CO2	Flair in Writing and felicity in written expression.
CO3	Effective Speaking Abilities for enhanced job prospects.
CO4	Able to use technology to enhance job oppurtunities
CO5	Develop language competency and become confident users of English in interviews, Group Discussions, and Public Speaking

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1										3		2			1
CO2										3					1
CO3										2					
CO4										2		2			
CO5										3		2			3

UNIT-I: COMMUNICATIVE COMPETENCY

1. Reading Comprehension
2. Listening comprehension
3. Vocabulary for competitive purpose
4. Spotting errors

UNIT-II: TECHNICAL WRITING

1. Report writing
2. Curriculum vitae
3. E-mail writing
4. Abstract & Synopsis Writing
5. Reviewing (Book/Film)

UNIT-III: PRESENTATIONAL SKILLS

1. Oral presentation
2. Power point presentation
3. Poster presentation
4. Stage dynamics
5. Body Language

UNIT-IV: CORPORATE SKILLS

1. Telephonic skills
2. Net Etiquettes
3. SMART Goal setting
4. Time Management
5. Negotiation Skills

UNIT-V: GETTING READY FOR JOB

1. Group discussions-II
2. Interview skills
3. Answering Strategies
4. Mock Interviews

MINIMUM REQUIREMENT FOR ELCS LAB:

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 60 students in the lab:

- Spacious room with appropriate acoustics.
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ
- T. V, a digital stereo & Camcorder
- Headphones of High quality

SUGGESTED SOFTWARE:

10. Walden Infotech English Language Communication Skills.
11. Clarity Pronunciation Power – Part I (Sky Pronunciation)
12. Clarity Pronunciation Power – part II
13. LES(Learn English Select) by British council
14. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
15. *DELTA's key to the Next Generation TOEFL Test: Advanced Skills Practice.*
16. Lingua TOEFL CBT Insider, by Dreamtech
17. English Pronunciation in Use (Elementary, Intermediate, Advanced) CUP

18. Cambridge Advanced Learners' English Dictionary with CD.

REFERENCE BOOKS:

The software consisting of the prescribed topics elaborated above should be procured and used.

1. **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
2. **TOEFL & GRE**(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
3. **Train2success.com**

1. **Objective English for Competitive Exams**, Hari Mohana Prasad, 4th edition, Tata Mc Graw Hill.
2. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, O U Press 2009.
3. Books on **TOEFL/GRE/GMAT/CAT/IELTS** by Barron's/DELTA/Cambridge University Press.2012.
4. **Soft Skills for Everyone,** Butterfield Jeff, Cengage Publications, 2011.
5. **Practice Psychometric Tests**: How to familiarize yourself with genuine recruitment tests, 2012.
6. **Management Shapers Series** by Universities Press (India) Pvt Ltd., Himayatnagar, Hyderabad 2008.
7. **Handbook for Technical Writing** by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
8. **English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hill 2009.**
9. **Word Power Made Handy,** Shalini Verma, S Chand Publications, 2011.
10. **Effective Technical Communication,** Ashrif Rizvi, TataMcGrahill, 2011.

<u>Method of Evaluation:</u>

English Language Laboratory Practical Examination:

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.

2. For the Language lab sessions, there shall be a continuous evaluation during the year for 40 sessional marks and 60 year-end Examination marks. Of the 40 marks, 20 marks shall be awarded for day-to-day work and 20 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS):: ANANTHAPURAMU
DEPARTMENT OF ECE
III B.TECH – II SEMESTER (CSE)

Subject Code	Title of the Lab	L	T	P	C
17A624502	Microprocessors & Microcontrollers Lab	-	1	3	2

COURSE OBJECTIVES	
The students will be able to	
1	Write ALP for arithmetic and logical operations in 8086
2	Familiarize with MASM, Embedded C & Code composer studio
3	Write and execute programs in 8086 and MSP430.

COURSE OUTCOMES	
At the end of this course the student will be able to,	
CO1	Execution of different programs for 8086 in Assembly Level Language using MASM Assembler
CO2	Program MSP 430 for various applications.
CO3	Design and implement some specific real time applications.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2	3					1	2					1	
CO2		3	3					1						3	
CO3		3	3		1			1	2				2	3	

LIST OF EXPERIMENTS:

Part A: 8086 Microprocessor Programs using NASM/8086 microprocessor kit.

1. Introduction to MASM Programming.
2. Programs using arithmetic and logical operations
3. Programs using string operations and Instruction prefix: Move Block, Reverse string, Sorting, Length of the string, String comparison.
4. Programs using CALL and RET instructions

Part B: Embedded C Experiments using MSP430 Microcontroller

1. Interfacing and programming GPIO ports in C using MSP430 (blinking LEDs , push buttons)
2. Usage of Low Power Modes: (Use MSPEXP430FR5969 as hardware platform and demonstrate the low power modes and measure the active mode and standby mode current)
3. Interrupt programming examples through GPIOs
4. PWM generation using Timer on MSP430 GPIO
5. Interfacing potentiometer with MSP430
6. PWM based Speed Control of Motor controlled by potentiometer connected to MSP430 GPIO

7. Using ULP advisor in Code Composer Studio on MSP430
8. Low Power modes and Energy trace++:
   a. Enable Energy Trace and Energy Trace ++ modes in CCS
   b. Compute Total Energy, and Estimated lifetime of an AA battery.

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******
III B.TECH – II SEMESTER
(LAB)

Subject Code	Title of the Subject	L	T	P	C
17A60505	**Object Oriented Analysis and Design& Data Analytics Lab**		1	3	2

COURSE OBJECTIVES	
1	Practice the notation for representing various UML diagrams
2	Analyze and design the problem by representing using UML diagrams
3	Become familiar with all phases of OOAD
4	Design, develop and test software systems for engineering applications.
5	Analyze technical solutions to computational problems and develop efficient algorithms

COURSE OUTCOMES	
CO1	Find solutions to the problems using object oriented approach
CO2	Gain Core Knowledge of R and Programming Concepts
CO3	Understand mathematics from a numerical point of view, including the application of these concepts root-finding, numerical integration and optimization
CO4	Understand the purpose for random variable and expectations required to understand simulations
CO5	Implement the Monte carlo and Stochastic Modelling

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2		1		1			1				3		
CO2	2		2							3		2	3		1
CO3	2		2							3		2		2	
CO4		2			2						1				
CO5					2		1			3			3		

OOAD Problems that may be considered are

1. College information system

2. Hostel management

3. ATM system

4. Library management system

5. Passport Automation System

6. Political Administration System.

Data Analytics

1. R Environment Setup & R as calculating environment

2. R Basic programming, Input and output

3. Programming with functions & Sophisticated Data structures

4. Better Graphics using Graphics parameters

5. Frames and environments & Object –oriented Programming

6. Numerical Accuracy and program efficiency

7. Probability & Statistics: The law of Total probability

8. Simulation: Monte Carlo Integration – Hit and miss method

9. Data Modeling: Linear and Multiple Regression Models

Case Study

Consider the data set of Ozone levels in United States for the year 2014 and do the following analysis

- ✓ Formulate your questions
- ✓ Read in your data
- ✓ Check the packaging
- ✓ Look at the top and the bottom of your data
- ✓ Check your –n‖ s
- ✓ Validate with at least one external data source
- ✓ Make a plot
- ✓ Follow up

Text Books:

1. Introduction to Scientific Programming and Simulation Using R, Owen Jones, Robert Maillardet and

Andrew Robinson, Second Edition, CRC Press, 2014

2. The Art of Data Science: A Guide for Anyone Who Works with Data, Roger D. Peng, Elizabeth Matsui, LeanPub, 2015.

3. Data Science for Business: What You Need to Know about Data Mining and Data-analytic Thinking, Foster Provost and Tom Fawcett. 2013

4. Elements of Statistical Learning, Trevor Hastie, Robert Tibshirani and Jerome Friedman, Springer, 2009.

Reference Books:

1. .Mining of Massive Datasets,JureLeskovek, AnandRajaraman and Jeffrey Ullman. , Cambridge University Press. 2014.

2.Machine Learning: A Probabilistic Perspective.Kevin P. Murphy, MIT Press, 2013.

3. Avrim Blum, John Hopcroft and Ravindran Kannan. Foundations of Data Science.

4.Data Mining and Analysis: Fundamental Concepts and Algorithms, Mohammed J. Zaki and Wagner Miera Jr., Cambridge University Press. 2014.

5. R Programming for Data Science, Roger D. Peng, LeanPub, 2015.

6.Python for Data Science for Dummies, Luca Massaron and John Paul Mueller, John Wiley and Sons, 2015.

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******

IV B.TECH – I SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A70501	**SOFTWARE TESTING**	3	-	-	3

COURSE OBJECTIVES	
1	Fundamentals for various testing methodologies.
2	Describe the principles and procedures for designing test cases.
3	Provide supports to debugging methods.
4	Acts as the reference for software testing techniques and strategies.

COURSE OUTCOMES	
CO1	Understand the basic testing procedures.
CO2	Able to support in generating test cases and test suites.
CO3	Able to test the applications manually by applying different testing methods and automation tools.
CO4	Apply tools to resolve the problems in Real time environment.
CO5	Analyze different testing techniques individually.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3									3		2		
CO2	3										3	1		1	
CO3		3	1							2					2
CO4		3		2	1	1			1	2			2		
CO5				2				1			3				2

UNIT I

Introduction: Purpose of Testing, Dichotomies, Model for Testing, Consequences of Bugs, Taxonomy of Bugs.

Flow graphs and Path testing: Basics Concepts of Path Testing, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Application of Path Testing.

UNIT II

Transaction Flow Testing: Transaction Flows, Transaction Flow Testing Techniques.

Dataflow testing: Basics of Dataflow Testing, Strategies in Dataflow Testing, Application of Dataflow Testing.

UNIT III

Domain Testing: Domains and Paths, Nice & Ugly Domains, Domain testing, Domains and Interfaces Testing, Domain and Interface Testing, Domains and Testability.

UNIT IV

Paths, Path products and Regular expressions: Path Products & Path Expression, Reduction Procedure, Applications, Regular Expressions & Flow Anomaly Detection.

Logic Based Testing: Overview, Decision Tables, Path Expressions, KV Charts, Specifications.

UNIT V:

State, State Graphs and Transition Testing: State Graphs, Good & Bad State Graphs, State Testing, Testability Tips.

Graph Matrices and Application: Motivational Overview, Matrix of Graph, Relations, Power of a Matrix, Node Reduction Algorithm, Building Tools.

Text Books:

1. Software testing techniques – Boris Beizer, Dreamtech, second edition.

Reference Books :

1. The craft of software testing - Brian Marick, Pearson Education.

2. Software Testing- Yogesh Singh, Camebridge

3. Software Testing, 3rd edition, P.C. Jorgensen, Aurbach Publications (Dist.by SPD).

4. Software Testing, N.Chauhan, Oxford University Press.

5. Introduction to Software Testing, P.Ammann & J.Offutt, Cambridge Univ. Press.

6. Effective methods of Software Testing, Perry, John Wiley, 2nd Edition, 1999.

7. Software Testing Concepts and Tools, P.Nageswara Rao, dreamtech Press

8. Win Runner in simple steps by Hakeem Shittu,2007 Genixpress.

9. Foundations of Software Testing, D.Graham & Others, Cengage Learning

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******

IV B.TECH – I SEMESTER

(THEORY)

Subject Code	**Title of the Subject**	**L**	**T**	**P**	**C**
17A70502	Mobile Application Development	2	2	-	3

COURSE OBJECTIVES	
1	Introducing the J2ME and how to write the code for small computing device.
2	Design & program real working education based mobile application projects.
3	To introduce the Android technology and its application.
4	Become familiar with common mobile application technologies and platforms.
5	Students will learn about record management system, JDBC and User Interface Designing.

COURSE OUTCOMES	
CO1	Understand the limitations and challenges of working in a mobile and wireless environment and research opportunities presented by these technologies.
CO2	Create application models / architectures and best practices/patterns used to develop mobile software applications.
CO3	Able to understand the Command, Item, Event processing classes and High level display classes, low level display classes and Record Management System.
CO4	Design Android User Interface for mobile applications.
CO5	Understanding of the specific requirements, possibilities and challenges when developing for a mobile context.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3		2		2			2					
CO2	3	1		1							2		2		
CO3	3					1			1			1			
CO4	3		3							2			2	1	
CO5			3		2		2				2				

UNIT-I

J2ME Overview: Java 2 Micro Edition and the World of Java, Inside J2ME, J2ME and Wireless Devices.Small computing Technology: Wireless Technology, Radio Data Networks, Microwave Technology, Mobile Radio Networks, Messaging, Personal Digital Assistants.

J2ME Architecture and Development Environment: J2ME Architecture, Small Computing DeviceRequirements, Run – Time Environment, MIDlet programming, Java Language for J2ME, J2ME Software Development Kits, Hello World J2ME Style, Multiple MIDlets in a MIDlet Suite, J2ME wireless Toolkit.

UNIT-II

J2ME Best Practices and Patterns: The Reality of Working in a J2ME World, Best Practices.
Commands, Items, and Event Processing: J2ME User Interfaces, Display Class, The Palm OS Emulator, CommandClass, Item Class, Exception Handling.

High – Level Display: Screens, Screen Class, Alert Class, Form Class, Item Class, List Class, Text BoxClass, Ticker Class.

UNIT-III

Low Level Display: The Canvas, User Interactions, Graphics, Clipping Regions, Animation.

Record Management System: Record Storage, Writing and Reading Records, Record Enumeration, Sorting Records,Searching Records, Record Listener.

UNIT-IV

JDBC Objects: The Concept of JDBC, JDBC Driver Types, JDBC Packages. Overview of the JDBC process,Database Connection, Statement Objects, Result Set, Transaction Processing, Metadata, Data Types, Exceptions.

JDBC and Embedded SQL: Model programs, Tables, Indexing, Inserting Data into Tables, Selecting Datafrom a Table, Updating Tables, Deleting Data from a table. Joining Tables, Calculating Data, Grouping and Ordering Data

UNIT-V

Getting started with Android Programming: What is Android, Obtaining the required tools, Creating your First Android Application. Anatomy of an Android Application.

Activities, Fragments and Intents: Understanding Activities, Linking Activities Using Intents,Fragments, Calling Built – in Applications using Intents, Displaying Notifications

Android User Interface: Understanding the Components of a Screen, Adapting to Display Orientation,Managing Changes to Screen Orientation, Utilizing the Action Bar, Listening for UI Notifications.

TEXT BOOKS:

1. J2ME: The Complete Reference, James Keogh, TMH.
2. Beginning Android 4 Application Development, Wei-Meng Lee, WileyIndia

REFERENCES:

1. Enterprise J2ME: Developing Mobile Java Applications, Michael Juntao Yuan, Pearson Education, 2004.

2. Android Application Development for Java programming by James C. Sheusi, Cengage.
3. Learning Android A Programmers Guide by Jerome DiMargio, TMH.

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IV B.TECH – I SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A70503	**Design pattern**	2	2	-	3

COURSE OBJECTIVES	
1	Identifying the appropriate patterns for design problems.
2	To understand design patterns and their underlying object oriented concepts.
3	To understand implementation of design patterns and providing solutions to real world software design problems.
4	To understand patterns with each other and understanding the consequences of combining patterns on the overall quality of a system.

COURSE OUTCOMES	
CO1	Knows the underlying object oriented principles of design patterns.
CO2	Understands the context in which the pattern can be applied.
CO3	Understands how the application of a pattern affects the system quality and its tradeoffs.
CO4	Understands the importance of design patterns in software development.
CO5	Learns that design patterns are solutions, and they can solve many problems that can be encountered in the future.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3		1		1			3			3		
CO2		2									1		3		
CO3	1		3			1						2	3		
CO4			3	2						3		2		1	
CO5		2		2						3			3		

UNIT-I

Introduction: What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve

Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

UNIT-II

A Case Study: Designing a Document Editor : Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary .

Creational Patterns : Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

UNIT-III

Structural Pattern Part-I : Adapter, Bridge, Composite.

Structural Pattern Part-II : Decorator, açade, Flyweight, Proxy.

UNIT-IV

Behavioral Patterns Part-I : Chain of Responsibility, Command, Interpreter, Iterator.

Behavioral Patterns Part-II : Mediator, Memento, Observer.

UNIT-V

Behavioral Patterns Part-II (cont‘d): State, Strategy, Template Method, Visitor, and Discussion of Behavioral Patterns.

What to Expect from Design Patterns, a Brief History, the Pattern Community An Invitation, A Parting Thought.

TEXT BOOK:

1. Design Patterns By Erich Gamma, Pearson Education

REFERENCE BOOKS:

1. Pattern‘s in JAVA Vol-I By Mark Grand, Wiley DreamTech.
2. Pattern‘s in JAVA Vol-II By Mark Grand, Wiley DreamTech.
3. JAVA Enterprise Design Patterns Vol-III By Mark Grand, Wiley DreamTech.
4. Head First Design Patterns By Eric Freeman-Oreilly-spd
5. Design Patterns Explained By Alan Shalloway,Pearson Education.
6. Pattern Oriented Software Architecture, F.Buschmann &others, John Wiley & Sons.

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**** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ****

IV B.TECH – I SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A70504	**Cloud Computing**	3	-	-	3

COURSE OBJECTIVES	
1	To explain the evolving computer model called cloud computing.
2	To introduce the various levels of services that can be achieved by cloud.
3	To describe the security aspects in cloud.

COURSE OUTCOMES	
CO1	Ability to create cloud computing environment
CO2	Ability to design applications for Cloud environment
CO3	Design & develop backup strategies for cloud data based on features.
CO4	Use and Examine different cloud computing services.
CO5	Apply different cloud programming model as per need.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2		3		1		1		2	3			3		
CO2											1		3		
CO3	2		3			1			2			2	3		
CO4				2						3		2		1	
CO5		1	3	2						3			3		

Unit-1

Introduction to cloud computing: Introduction, Characteristics of cloud computing, Cloud Models, Cloud Services Examples, Cloud Based services and applications

Cloud concepts and Technologies: Virtualization, Load balancing, Scalability and Elasticity, Deployment, Replication, Monitoring, Software defined, Network function virtualization, Map Reduce, Identity and Access Management, services level Agreements, Billing.

Cloud Services and Platforms : Compute Services, Storage Services, Database Services, Application services, Content delivery services, Analytics Services, Deployment and

Management Services, Identity & and Access Management services, Open Source Private Cloud software.

Unit-2

Hadoop&MapReduce: Apache Hadoop, HadoopMapReduce Job Execution, Hadoop Schedulers, Hadoop Cluster setup.

Cloud Application Design: Reference Architecture for Cloud Applications, Cloud Application Design Methodologies, Data Storage Approaches.

Python Basics : Introduction, Installing Python, Python data Types & Data Structures, Control flow, Function, Modules, Packages, File handling, Date/Time Operations, Classes.

Unit-3

Python for Cloud: Python for Amazon web services, Python for Google Cloud Platform, Python for windows Azure, Python for MapReduce, Python packages of Interest, Python web Application Frame work, Designing a RESTful web API.

Cloud Application Development in Python: Design Approaches, Image Processing APP,Document Storage App, MapReduce App, Social Media Analytics App.

Unit-4

Big Data Analytics: Introduction, Clustering Big Data, Classification of Big data, Recommendation of Systems.

Multimedia Cloud: Introduction, Case Study: Live video Streaming App, Streaming Protocols, case Study: Video Transcoding App.

Cloud Application Benchmarking and Tuning: Introduction, Workload Characteristics, Application Performance Metrics, Design Considerations for a Benchmarking Methodology, Benchmarking Tools, Deployment Prototyping, Load Testing & Bottleneck Detection case Study, Hadoop benchmarking case Study.

Unit-5

Cloud Security: Introduction, CSA Cloud Security Architecture, Authentication, Authorization, Identity & Access Management, Data Security, Key Management, Auditing.

Cloud for Industry, Healthcare &Education: Cloud Computing for Healthcare, Cloud computing for Energy Systems, Cloud Computing for Transportation Systems, Cloud Computing for Manufacturing Industry, Cloud computing for Education.

Migrating into a Cloud: Introduction, Broad Approaches to migrating into the cloud, the seven –step model of migration into a cloud.

Organizational readiness and Change Management in The Cloud Age : Introduction, Basic concepts of Organizational Readiness, Drivers for changes : A frame work to comprehend the competitive environment , common change management models, change management maturity models, Organizational readiness self – assessment.

Legal Issues in Cloud Computing : Introduction, Data Privacy and security Issues, cloud contracting models, Jurisdictional issues raised by virtualization and data location, commercial and business considerations , Special Topics

Text Books:

1. Cloud computing A hands-on Approach‖ By ArshdeepBahga, Vijay Madisetti, Universities Press, 2016

2.Cloud Computing Principles and Paradigms: By Raj kumarBuyya, James Broberg, AndrzejGoscinski, wiley, 2016

References:

1. Mastering Cloud Computing by Rajkumar Buyya, Christian Vecchiola,S Thamarai Selvi, TMH
2. Cloud computing A hands-On Approach by Arshdeep Bahga and Vijay Madisetti.
3. Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, TataMcGraw Hill, rp2011.
4. Enterprise Cloud Computing, GautamShroff, Cambridge University Press, 2010.
5. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O'Reilly, SPD, rp2011.
6. Essentials of Cloud Computing by K. Chandrasekaran. CRC Press

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******

IV B.TECH – I SEMESTER

Subject Code	**Title of the Subject**	**L**	**T**	**P**	**C**
17A70505a	**SOFTWARE PROJECT MANAGEMENT**	3	-	-	3

COURSE OBJECTIVES	
1	Understanding the specific roles within a software organization as related to project and process management
2	Learn the principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience-based creation & improvement of models (process management).
3	Understanding the basic infrastructure competences (e.g., process modeling and measurement)
4	Analyze the basic steps of project planning, project management, quality assurance, and process management and their relationships

COURSE OUTCOMES	
CO1	Understand the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
CO2	Apply, analyze, design and develop the software project and design various estimation levels of cost and effort
CO3	Compare and differentiate organization structures and project structures
CO4	Acquire the knowledge of managing, economics for conventional, modern and future software projects.
CO5	Sketch various artifacts sets for better understanding of software development

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3	2								2		3		
CO2	1	3	2		2								3	2	
CO3					2				1						
CO4				1											
CO5		3						1			2		3	2	

UNIT I

Conventional Software Management: The waterfall model, conventional software Management performance. Evolution of Software Economics: Software Economics, pragmatic software cost estimation

UNIT II

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

The old way and the new: The principles of conventional software engineering, principles of modern software management, transitioning to an iterative process

UNIT III

Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts. Model based software architectures: A Management perspective and technical perspective.

UNIT IV

Work Flows of the process: Software process workflows, Inter Trans workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic status assessments. Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Interaction planning process, Pragmatic planning.

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.

Process Automation: Automation Building Blocks, The Project Environment

UNIT V

Project Control and Process instrumentation: The server care Metrics, Management indicators, quality indicators, life cycle expectations pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminates, Example.

Future Software Project Management: Modern Project Profiles Next generation Software economics, modern Process transitions.

Case Study: The Command Center Processing and Display System-Replacement (CCPDS-R)

Text Books:

1. Software Project Management, Walker Royce, Pearson Education.
2. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition,Tata Mc-Graw Hill

Reference Books :

1. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O‟Reilly,2006
2. Head First PMP, Jennifer Greene & Andrew Stellman, O‟Reilly,2007
3. Software Engineering Project Managent, Richard H. Thayer & Edward Yourdon, second edition,Wiley India, 2004.
4. Agile Project Management, Jim Highsmith, Pearson education, 2004
5. The art of Project management, Scott Berkun, O‟Reilly, 2005.
6. Software Project Management in Practice, Pankaj Jalote, Pearson Education,2002

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****** DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING ******

IV B.TECH – I SEMESTER

(THEORY)

Subject Code	**Title of the Subject**	**L**	**T**	**P**	**C**
17A70505b.	**DISASTER MANAGEMENT**	3	-	-	3

COURSE OBJECTIVES	
1	To provide an exposure to disasters, types and their significance.
2	To understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
3	To gain a preliminary understanding of Disaster Risk Reduction approaches
4	To develop rudimentary ability to respond to their surroundings with potential disaster response in living areas, with due sensitivity
5	To enhance awareness of institutional processes in the country

COURSE OUTCOMES	
CO1	Analyze the types of disasters, causes and their impact on environment and society.
CO2	Assess vulnerability and various methods of risk reduction measures as well as mitigation.
CO3	Draw the hazard and vulnerability profile of India, selected models of disaster management.
CO4	Disaster damage assessment and management, Scenarios in the Indian context.
CO5	Knowledge about existing global frameworks and existing agreements.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
CO1		3	2								2		3		
CO2	1	3	2		2										

CO3					2				1				3	3	
CO4				1										3	
CO5		3									2		3		

UNIT - I:

INTRODUCTION TO DISASTERS

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters –

Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don‘ts during various types of Disasters.

UNIT II

APPROACHES TO DISASTER RISK REDUCTION (DRR)

Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community

based DRR, Structural- nonstructural measures, Roles and responsibilities of- community,

Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stakeholders-Institutional Processess and Framework at State and Central Level- State Disaster

Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

UNIT III

INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as

dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT IV

DISASTER RISK MANAGEMENT IN INDIA

Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health,Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

UNIT V

DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD

WORKS

Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

TEXTBOOKS:

1 Singhal J.P. –Disaster Management‖, Laxmi Publications, 2010. ISBN-10: 9380386427

ISBN-13: 978-9380386423

2 Tushar Bhattacharya, –Disaster Science and Management‖, McGraw Hill India Education

Pvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13: 978-1259007361]

3 Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management,

NIDM, New Delhi, 2011

4 Kapur Anu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers,

New Delhi, 2010.

REFERENCES

1. Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005

2. Government of India, National Disaster Management Policy,2009.

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IV B.TECH – I SEMESTER

(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A70505c.	**DIGITAL MARKETING**	3	-	-	3

COURSE OBJECTIVES	
1	To provide foundation in the key concepts on digital marketing.
2	Understand how and why to use digital marketing for multiple goals within a larger marketing and/or media strategy.
3	Learn to develop, evaluate, and execute a comprehensive digital marketing strategy and plan.
4	Understand the major digital marketing channels - online advertising: Digital display, video, mobile, search engine, and social media
5	Learn how to measure digital marketing efforts and calculate ROI
COURSE OUTCOMES	
CO1	Investigate and evaluate issues in adapting to globalised markets that are constantly changing and increasingly networked.
CO2	Develop an appropriate online distribution strategy to achieve the digital marketing objectives.
CO3	Analyze, implement and evaluate outward facing communication systems and their usage.
CO4	Develop web applications utilizing industry standard markup, protocols, and languages.
CO5	Interpret the traditional marketing mix within the context of a changing and extended range of digital strategies and tactics.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2			2					2				
CO2		3	2		2					3			2	1	
CO3					2				1						
CO4	2			1						3			2		
CO5		3				2				3	2	1			

UNIT-I

Principles and Drivers of New Marketing Environment - Digital Media Industry - reaching Audience Through Digital Channels- Traditional and Digital Marketing - Introduction to Online Marketing Environment - Dotcom Evolution - Internet Relationships - Business in Modern Economy - Integrating E-Business to an Existing Business Model – Online Marketing Mix - Mobile Marketing - Digital Signage.

UNIT-II

Purchase Behavior of Consumers in Digital Marketing Format – Online Customer Expectations - Online B2C Buying Process - Online B2B Buying Behavior -Website Designing - Website Content - Forms of Search Engines – Working of Search Engines - Revenue Models in Search Engine Positioning – SEO - Display advertising - Trends.

UNIT-III

Product Attributes and Web Marketing Implications - Augmented Product Concept - Customizing the Offering - Dimensions of Branding Online -Internet Pricing Influences - Price and Customer Value - Online Pricing Strategies and Tactics – Time-based Online Pricing - Personalized Pricing- Bundle Pricing.

UNIT-IV

Internet Enabled Retailing - Turning Experience Goods into Search Goods-Personalization through Mass Customization - Choice Assistance -Personalized Messaging - Selling through Online Intermediaries – Director Customer Interaction - Online Channel Design for B2C and B2BMarketing.

UNIT-V

Integrating Online Communication into IMC Process - Online Advertising– Email Marketing - Viral marketing - Affiliate Marketing – Participatory Communication Networks - Social Media Communities – Consumer Engagement - Co-Created Content Management-Interactive Digital Networks - Customer – Led Marketing Campaigns- Legal and Ethical aspects related to Digital Marketing

TEXT BOOKS:

1. Smith P R Chaffey Dave, E-Marketing Excellence: The Heart of E-Business, Butterworth Heinemann, USA

2. Strauss Judy, E-Marketing, Prentice Hall, India

REFERENCES:

1. Fleming Hansen Emotions, Advertising and Consumer Choice .Copenhagen Business School Press.

2. Curtis P. Haugtvedt, Karen A. Machleit and Richard Yalch Online Consumer Psychology: Understanding and Influencing Consumer Behavior in the Virtual Worldby

3. Marieke K. de Mooij Global Marketing and Advertising: Understanding Cultural Paradoxes, Sage publications

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IV B.TECH – I SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A70506a.	**Digital Forensics & Cyber Laws**	3	-	-	3

	COURSE OBJECTIVES
1	Study digital forensics and Cyber laws
2	How to prepare for digital evidence investigations
3	Study the importance of maintaining professional conduct.
4	Study requirements for data recovery workstations and software.

	COURSE OUTCOMES
CO1	Ability to learn the concepts of computer forensics.
CO2	Select and apply current computer forensics tools.
CO3	Identify and apply current practices for processing crime and incident scenes.
CO4	Apply digital evidence controls.
CO5	Conduct basic cyber forensic analysis.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2												3		
CO2			3		1					3			3		
CO3		1	3					2		3			3	1	
CO4			3					2		3			3		
CO5	2			1							1				

Unit-1:

Digital forensics: Introduction – Evidential potential of digital devices: closed vs. open systems, evaluating digital evidence potential- Device handling: seizure issues, device identification, networked devices and contamination

Unit-2:

Digital forensics examination principles: Previewing, imaging, continuity, hashing and evidence locations- Seven element security model- developmental model of digital systems- audit and logs- Evidence interpretation: Data content and context

Unit 3:

Network Forensics: Collecting Network Based Evidence - Investigating Routers - Network Protocols - Email Tracing - Internet Fraud-Systems Investigation and Ethical Issues: Data Analysis Techniques - Investigating Live Systems (Windows &UNIX) - Investigating Hacker Tools - Ethical Issues – Cybercrime

Unit-4:

Mobile phone forensics: crime and mobile phones, evidences, forensic procedures, files present in SIM card, device data, external memory dump, evidences in memory card, operators systems Android forensics: Procedures for handling an android device, imaging android USB mass storage devices, logical and physical techniques

Unit -5:

Cybercrimes and Cyber Security: the Legal Perspectives Introduction Cyber Crime and Legal Landscape around the world, Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario In India, Digital signatures and the Indian IT Act, Amendments to the Indian IT Act, Cybercrime and Punishment Cyber law, Technology and Students: Indian Scenario.

Text Books

1. Peter Stephenson, "Investigating Computer Crime: A Handbook for Corporate Investigations", Sept 1999
2. Eoghan Casey, "Handbook Computer Crime Investigation's Forensic Tools and Technology", Academic Press, 1st Edition, 2001
3. Iosif I. Androulidakis, ― Mobile phone security and forensics: A practical approach‖, Springer publications, 2012
4. Andrew Hoog, ― Android Forensics: Investigation, Analysis and Mobile Security for Google Android‖, Elsevier publications, 2011
5. Angus M.Marshall, ― Digital forensics: Digital evidence in criminal investigation‖, John – Wiley and Sons, 2008
6. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunil Belapure, Wiley INDIA .

REFERENCES

1. Skoudis. E., Perlman. R. Counter Hack: *A Step-by-Step Guide to Computer Attacks and Effective Defenses.*Prentice Hall Professional Technical Reference. 2001.
2. Bill Nelson,Amelia Philips and Christopher Steuart, ‒Guide to computer forensics and investigations‖,course technology,4thedition,ISBN: 1-435-49883-6
3. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.

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IV B.TECH – I SEMESTER

(THEORY)

Subject Code	Title of the Subject	L	T	P	C
17A70506b.	**Service Oriented Architecture**	3	-	-	3

COURSE OBJECTIVES	
1	Understand SOA and evolution of SOA.
2	Understand web services, primitive and contemporary SOA.
3	Understand principles of service orientation and various service layers.
4	Understand business process design and service-oriented business process design.
5	Understand basic concepts of SOA platforms, integration considerations
COURSE OUTCOMES	
CO1	Knowledge on various principles of service orientation also understand the technology underlying the service design.
CO2	Knowledge on basic concepts of SOA and it differs with other architectures.
CO3	Knowledge on advanced concepts of service composition, Orchestration and Choreography.
CO4	Understanding of web service framework with respect to SOA.
CO5	Build applications based on XML ,SOA-based applications for intra-enterprise and inter-enterprise applications.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		2								1		3		
CO2	3			2					2			2	3		
CO3		1												1	
CO4	3			2					2						
CO5			2									2	3		

UNIT-I Introduction to SOA

Fundamental SOA; Common Characteristics of contemporary SOA; Common tangible benefits of SOA; An SOA timeline (from XML to Web services to SOA); The continuing evolution of SOA (Standards organizations and Contributing vendors)

UNIT-II Web Services and Primitive SOA

The Web services framework; Services (as Web services); Service descriptions (with WSDL); Messaging (with SOAP).

Web Services and Contemporary SOA

Message exchange patterns; Service activity; Coordination; Atomic Transactions; Business activities; Orchestration; Choreography.

UNIT-III Principles of Service Orientation

Services-orientation and the enterprise; Anatomy of a service-oriented architecture; Common Principles of Service-orientation; How service orientation principles inter-relate; Service-orientation and object-orientation; Native Web service support for service-orientation principles.

UNIT-IV Service Layers - Abstraction, Business and Orchestration Service Layers.

Business Process Design: WS-BPEL language basics; WS-Coordination overview; Service-oriented business process design; WS-addressing language basics; WS-Reliable Messaging language basics.

UNIT-V SOA Platforms

SOA platform basics; SOA support in J2EE; SOA support in .NET; Integration considerations. Amazon web services as an example.

TEXT BOOKS:

1. Thomas Erl, ―Service-Oriented Architecture – Concepts, Technology, and Design‖, Pearson Education, 2005.
2. Eric Newcomer, Greg Lomow, ‖Understanding SOA with Web Services‖, Pearson Education,

2005.

REFERENCES:

1) The Definitive guide to SOA, Jeff Davies & others, Apress, Dreamtech.
2) Java SOA Cook book, E.Hewitt, SPD.
3) SOA in Practice, N.M.Josuttis, SPD.
4) Applied SOA, M.Rosen and others, Wiley India pvt. Ltd.
5) Java Web Services Architecture, J.Mc Govern, and others, Morgan Kaufmann Publishers, Elsevier.
6) SOA for Enterprise Applications, Shankar.K, Wiley India Edition.
7) SOA-Based Enterprise Integration, W.Roshen, TMH.
8) SOA Security, K.Rama Rao, C.Prasad, dreamtech press.

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IV B.TECH – I SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A70506c.	**ETHICAL HACKING**	3	-	-	3

COURSE OBJECTIVES	
1	The aim of the course is to introduce the methodologies and framework of ethical hacking for enhancing the security
2	The course includes-Impacts of Hacking; Types of Hackers; Information Security Models; Information Security Program; Business Perspective; Planning a Controlled Attack; Framework of Steps (Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Deliverable and Integration)

COURSE OUTCOMES	
CO1	Gain the knowledge of the use and availability of tools to support an ethical hack
CO2	Gain the knowledge of interpreting the results of a controlled attack
CO3	Understand the role of politics, inherent and imposed limitations and metrics for planning of a test
CO4	Comprehend the dangers associated with penetration testing
CO5	Identify methods to gain access to systems.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		1					1			1		3		
CO2	3	2										1	3		
CO3					1									1	
CO4	3												3		
CO5		2													

UNIT I

Introduction: Hacking Impacts, The Hacker Framework: Planning the test, Sound Operations, Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Final Analysis, Deliverable, Integration Information Security Models: Computer Security, Network Security, Service Security, Application Security, Security Architecture Information Security Program: The Process of Information Security, Component Parts of Information Security Program, Risk Analysis and Ethical Hacking

UNIT II

The Business Perspective: Business Objectives, Security Policy, Previous Test Results, Business Challenges Planning for a Controlled Attack: Inherent Limitations, Imposed Limitations, Timing is Everything, Attack Type, Source Point, Required Knowledge, Multi-Phased Attacks, Teaming and Attack Structure, Engagement Planner, The Right Security Consultant, The Tester, Logistics, Intermediates, Law Enforcement

UNIT III

Preparing for a Hack: Technical Preparation, Managing the Engagement Reconnaissance: Social Engineering, Physical Security, Internet Reconnaissance

UNIT IV

Enumeration: Enumeration Techniques, Soft Objective, Looking Around or Attack, Elements of Enumeration, Preparing for the Next Phase Exploitation: Intutive Testing, Evasion, Threads and Groups, Operating Systems, Password Crackers, RootKits, applications, Wardialing, Network, Services and Areas of Concern

UNIT V

Deliverable: The Deliverable, The Document, Overal Structure, Aligning Findings, Presentation Integration: Integrating the Results, Integration Summary, Mitigation, Defense Planning, Incident Management, Security Policy, Conclusion

TEXT BOOK

1 James S. Tiller, –The Ethical Hack: A Framework for Business Value Penetration Testing‖, Auerbach Publications, CRC Press

REFERENCE BOOKS

1. EC-Council, –Ethical Hacking and Countermeasures Attack Phases‖, Cengage Learning
2. Michael Simpson, Kent Backman, James Corley, –Hands-On Ethical Hacking and Network Defense‖, Cengage Learning

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IV B.TECH – I SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A70507	**SOFTWARE TESTING Lab**	-	1	3	2

COURSE OBJECTIVES	
1	Fundamentals for various testing methodologies.
2	Describe the principles and procedures for designing test cases.
3	Provide supports to debugging methods.
4	Acts as the reference for software testing techniques and strategies.

COURSE OUTCOMES	
CO1	Describe the basic testing procedures.
CO2	Able to support in generating test cases and test suites.
CO3	Understanding Selenium tool to perform testing
CO4	Construct and test simple programs.
CO5	Understanding the use of bug tracking and testing tool Bugzilla

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3														
CO2		2		3				2		3			2		
CO3	3				2										
CO4			1	3						3			2	1	
CO5	3			3	2			2		3		1			

Sample problems on testing:

1. Write programs in ‗C‘ Language to demonstrate the working of the following constructs: i) do...while ii) while….do iii) if…else iv) switch v) for
2. −A program written in ‗C‘ language for Matrix Multiplication fails‖ Introspect the causes

for its failure and write down the possible reasons for its failure.

3. Take any system (e.g. ATM system) and study its system specifications and report the various bugs.
4. Write the test cases for any known application (e.g. Banking application)
5. Create a test plan document for any application (e.g. Library Management System)
6. Study of any testing tool (e.g. Win runner)
7. Study of any web testing tool (e.g. Selenium)
8. Study of any bug tracking tool (e.g. Bugzilla, bugbit)
9. Study of any test management tool (e.g. Test Director)
10. Study of any open source-testing tool (e.g. Test Link)
11. Take a mini project (e.g. University admission, Placement Portal) and execute it. During the Life cycle of the mini project create the various testing documents* and final test report document.

Additional problems on testing:

1. Test the following using JUnit and CPPUnit:
i)Sorting problems ii)Searching problems iii)Finding gcd of two integers iv)Finding factorial of a number.
2. Test web based forms using HTMLUnit.
3. Test database stored procedures using SQLUnit.

(Use sufficient number of test cases in solving above Problems)

*Note: To create the various testing related documents refer to the text –Effective Software Testing Methodologies by William E. Perry‖

REFERENCE BOOKS:

1. Software Testing Concepts and Tools,P.Nageswara Rao,dreamtech press.
2. Software Testing Tools,Dr.K.V.K.K.Prasad,dreamtech Press.

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IV B.TECH – I SEMESTER

Subject Code	**Title of the Lab**	**L**	**T**	**P**	**C**
17A70508	Mobile Application Development Lab		1	3	2

COURSE OBJECTIVES	
1	In this lab, a student is expected to design, implement, document and present a mobile client/server system using standard Java and Java 2 Micro Edition (J2ME) platform.
2	Specifically it is required to design and implement a system that consists mainly of a mobile client (MC) and a Proxy Server (PS).
3	MC will be written in J2ME, MIDP 2.0, while PS will be written in standard Java. It is necessary to use a mobile phone emulator to develop and demonstrate the experiments.
4	It may be necessary to use other components or existing resources (servers) as needed. For instance a database local to PS or a web service available on the
5	Internet that can be invoked by the PS.

COURSE OUTCOMES	
CO1	Demonstrate J2ME 2.5.2 Wireless Toolkit/Android studio and Layout Managers.
CO2	Design Graphical primitives in J2ME 2.5.2 Wireless Toolkit/Android studio.
CO3	Implement Multi-threading and GPS location information.
CO4	Deploy applications to hand-held devices.
CO5	Develop various Android applications related to layouts & rich uses interactive interfaces.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3		2							1	3		
CO2		2	3	3				1		3				2	
CO3				3	2								3		
CO4			3	3						3			3		
CO5	1			3										2	

List of Experiments:

Week - 1: Installation of Java Wireless Toolkit (J2ME)

1) If the Java Development Kit (JDK) is not there or only having the Java Runtime Environment (JRE) installed, install the latest JDK from http://java.sun.com/javase/downloads/index.jsp. Current stable release of Java is JDK 6 Update 7 but check the web page in case there are newer non-beta releases available.

2) Next, download the Java Wireless Toolkit (formerly called J2ME Wireless Toolkit) from: http://java.sun.com/products/sjwtoolkit/download.html.

3) Run the installer (for example, for Windows it is: sun_java_wireless_toolkit- 2_5_2-windows.exe). The installer checks whether a compatible Java environment has been pre-installed. If not, it is necessary to uninstall old versions of Java and perform Step 1 again.

Once after successful installation of Java and the tool kit compile this program and run the following program in the toolkit.

Steps to run this program in toolkit:

1. Start -> All Programs -> Sun Java Tool Kit -> Wireless Tool Kit
2. Click New Project – Enter Project Name -> Enter Class Name -> Click on Create Project.
3. Choose appropriate API Selection and Configurations.
4. Place Java Source file in WTK2.1 / WTK2.2\apps\projectname\src
5. Build the Project.
6. Run the Project.

```
import javax.microedition.lcdui.*;

import javax.microedition.midlet.*;


public class HelloWorld extends MIDlet{

  private Form form;

  private Display display;
public HelloWorld(){

super();

  }

public void startApp(){

form = new Form("Hello World");

    String msg = "Hello World!!!!!!!";

form.append(msg);
```

```
    display = Display.getDisplay(this);
display.setCurrent(form);
  }
public void pauseApp(){}
public void destroyApp(boolean unconditional){
notifyDestroyed();
  }
}
```

Week - 2 Working with J2ME Features:

Working with J2ME Features: Say, creating a Hello World program Experiment with the most basic features and mobile application interaction concepts (lists, text boxes, buttons, radio boxes, soft buttons, graphics, etc)

Create a program which creates to following kind of menu.

* cut

* copy

* past

* delete

* select all

* unselect all

Event Handling.

Create a menu which has the following options:

* cut - can be on/off

* copy - can be on/off
* paste - can be on/off

* delete - can be on/off

* select all - put all 4 options on

* unselect all - put all 4 options off

2.3. Input checking: Create an MIDP application which examine, that a phone number, which a user has entered is in the given format.

* Area code should be one of the following: 040, 041, 050, 0400, 044

* There should 6-8 numbers in telephone number (+ area code)

Week - 3 Threads & High Level UI:

3.1. Create a slide show which has three slides, which includes only text. Program should change to the new slide after 5 seconds. After the third slide program returns to the first slide.

High-level UI

Create a MIDP application, which show to the user 5-10 quiz questions. All questions have 4 possible options and one right option exactly. Application counts and shows to the user how many right answers were right and shows them to user.

Create a MIDP application, where the user can enter player name and points. The program saves the information to the record using RMS at MIDP device. Program should also print out the top 10 player list to the end user. You can use this class in your game if you made own class for saving and reading record sets.

Week - 4 Working on Drawing and Images

Create a slide show which has three slides, which includes pictures at PNG format. Program should change to the new slide other 5 seconds.

Create a MIDP application, which draws a bar graph to the display. Data values can be given at int[] array.

Create a MIDP application, which draws a bar graph to the display. Data values can be given at int[] array. You can enter four data (integer) values to the input text field.

Week - 5 Developing Networked Applications using the Wireless Toolkit

Creating a Simple Client-Server Application

Create, compile and run a basic UDP-based client-server application.

Creating the Datagram Server project

1) Click on Wireless Toolkit 2.5.2 under the group: All Programs→Sun Java (TM) Wireless Toolkit 2.5.2.

2) Click on 'New Project...' button.

3) Enter project name as 'DatagramServer'. Enter MIDlet name as 'DatagramServer'. Note that the Midlet name is the same as the name of the class in the source code, which extends the MIDlet class, otherwise the application won‘t run.

4) Another window pops up where it is required to select a target platform. Select 'MIDP 1.0' from the drop down list.

5) After clicking OK, the project is created; and the Wireless Toolkit tells that the name of the folder where source code files are created. The path of the source code folder is displayed in the debug output window.

Creating and Compiling the DatagramServer source files

The Wireless Toolkit does not come with an IDE by default so Use any IDE or a text editor like Notepad.

1) Create a new text file called DatagramServer.java in the source folder of the project. The exact path of this folder is displayed in the Wireless Toolkit window.

2) Paste contents DatagramServer.java from into the source file.
Running your Server application on the Phone simulator

1) After compiling the project successfully, click on the Run button in the Wireless Toolkit window.

2) A graphical window depicting a phone handset will appear with the name of your application highlighted on its screen as shown below.

3) To start the application, click on the right soft-key (marked with a dot) below the ‗Launch' command.

4) The phone simulator might ask if it is OK to run the network application. Select ‗Yes' by clicking on the appropriate soft-key. The server is now up and running.

5) Keep the server running during the creation, compilation and running of the Datagram Client application.

Creating the DatagramClient project

1) Use the same instance of the Wireless Toolkit that is used for creating and compiling the Datagram Server project.

2) Click on 'New Project...' button.

3) A new window pops up. Enter project name as 'DatagramClient'. Enter MIDlet name as 'DatagramClient'. Note that the Midlet name is the same as the name of the class in the source code, which extends the MIDlet class.

4) Another window pops up where one has to select a target platform. Select 'MIDP 1.0' from the drop down list.

5) After clicking OK, the project is created and the Wireless Toolkit tells where to place the source code files. The path of the source code folder is displayed in the debug output window as explained before.

Creating and Compiling the DatagramClient source files

1) Create a new text file called DatagramClient.java in the source folder of the

project.

2) Paste contents DatagramClient.java into the source file.

3) Then click on the Build button in the Wireless Toolkit window. If the compilation is OK, it will say Build Complete in the window's debug output window, otherwise it will show the errors. Note: In the source code, use the System.out.println() statement to output debug information to this window.

Running your Client application on the Phone simulator

1) After compiling the project successfully, click on the Run button in the Wireless Toolkit window.

2) A graphical window depicting a phone handset will appear with the name of the application highlighted on its screen.

3) To start the application, click on the right soft-key (marked with a dot) below the ‗Launch' command.

4) The phone simulator might ask if it is OK to run the network application. Select ‗Yes' by clicking on the appropriate soft-key. The client is now up and running.

5) When the client executes on the phone simulator, one should see a text box with the caption 'Message'. Enter any message and press the right soft-key (corresponding to Send). If the client-server application is working properly, the screen of the server phone will display the message sent by the client and the client screen will now display a message sent by the server in response. The response message from the server is the original client message in reverse.

6) Try various features of the phone simulator including the different look-and feel options.

Week - 6 Authentication with a Web Server

Write a sample program to show how to make a SOCKET Connection from j2me phone.

This J2ME sample program shows how to how to make a SOCKET Connection from a J2ME Phone. Many a times there is a need to connect backend HTTP server from the J2ME application. shows how to make a SOCKET connection from the phone to port 80.

Login to HTTP Server from a J2ME Program

This J2ME sample program shows how to display a simple LOGIN SCREEN on the J2ME phone and how to authenticate to a HTTP server.

Many J2ME applications for security reasons require the authentication of the user. This free J2ME sample program, shows how a J2ME application can do authentication to the backend server.

Note: Use Apache Tomcat Server as Web Server and Mysql as Database Server.

Week - 7 & 8 Web Application using J2ME

The following should be carried out with respect to the given set of application domains: (Assume that the Server is connected to the well-maintained database of the given domain. Mobile Client is to be connected to the Server and fetch the required data value/information)

- Students Marks Enquiry
- Town/City Movie Enquiry
- Railway/Road/Air (For example PNR) Enquiry/Status
- Sports (say, Cricket) Update

- Town/City Weather Update
- Public Exams (say Intermediate or SSC)/ Entrance (Say EAMCET) Results Enquiry

Divide Students into Batches and suggest them to design database according to their domains and render information according to their requests.

Text Books:

1 J2ME: The Complete Reference, James Keogh, TMH.

2 Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India

References:

3 Enterprise J2ME: Developing Mobile Java Applications, Michael Juntao Yuan, Pearson Education, 2004.

4 Android Application Development for Java programming by James C. Sheusi, Cengage.

5 Learning Android A Programmers Guide by Jerome DiMargio, TMH.

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IV B.TECH – II SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A80501a	**Information & cyber security**	3	-	-	3

COURSE OBJECTIVES	
1	Extensive, thorough and significant understanding of the concepts, issues, principles and theories of computer network security
2	Identifying the suitable points for applying security features for network traffic
3	Understanding the various cryptographic algorithms and implementation of the same at software level
4	Understanding the various attacks, security mechanisms and services

COURSE OUTCOMES	
CO1	Protect the network from both internal and external attacks
CO2	Design of new security approaches
CO3	Ability to choose the appropriate security algorithm based on the requirements.
CO4	Identify core networking and infrastructure components and the roles they serve.
CO5	Analyze business requirements, research, develop and integrate solutions for enterprise IT requirements.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3		2							3			
CO2		2	3			1				2			2		
CO3	3				2							3			
CO4		2	3							2			2		
CO5	3							1				3		1	

UNIT I

Security Goals, Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs.

UNIT II

Conventional Encryption Principles & Algorithms (DES, AES, RC4), Block Cipher Modes of Operation, Location of Encryption Devices, Key Distribution, Public key cryptography principles, public key cryptography algorithms (RSA, RABIN, ELGAMAL, Diffie-Hellman, ECC), Key Distribution.

UNIT III

Approaches of Message Authentication, Secure Hash Functions (SHA-512, WHIRLPOOL) and HMAC Digital Signatures: Comparison, Process- Need for Keys, Signing the Digest, Services, Attacks on Digital Signatures, Kerberos, X.509 Directory Authentication Service.

UNIT IV

Email Security: Pretty Good Privacy (PGP) and S/MIME.

IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key ManagementWeb Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT V

Cyber Security: Organizational Implications

Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, Social media marketing: Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

Text book:

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education, 2008.

2. Cryptography & Network Security by Behrouz A. Forouzan, TMH 2007**.**

3. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunil Belapure, Wiley INDIA

4. Introduction to Cyber Security , Chwan-Hwa(john) Wu,J.David Irwin.CRC Press T&F Group

Reference book:

1. Information Systems Security,Godbole,Wiley Student Edition.
2. Cryptography and Network Security by William Stallings, Fourth Edition,Pearson

Education 2007.
3. Fundamentals of Computer Security , Springer.
4. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
5. Computer Security Basics by Rick Lehtinen, Deborah Russell & G.T.Gangemi Sr., SPD O'REILLY 2006.
6. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.

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IV B.TECH – II SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A8050b	**Software Architecture**	3	-	-	3

COURSE OBJECTIVES	
1	To understand interrelationships, principles and guidelines governing architecture and evolution over time.
2	Introduction to the fundamentals of software architecture
3	To understand various architectural styles of software systems.
4	To understand design patterns and their underlying object oriented concepts.
5	Software architecture and quality requirements of a software system
6	Fundamental principles and guidelines for software architecture design, architectural styles, patterns, and frameworks.
7	Methods, techniques, and tools for describing software architecture and Documenting design rationale.
8	Software architecture design and evaluation processes

COURSE OUTCOMES	
CO1	Design and motivate software architecture for large scale software systems
CO2	Recognize major software architectural styles, design patterns, and frameworks
CO3	Describe a software architecture using various documentation approaches and architectural description languages
CO4	Generate architectural alternatives for a problem and select among them
CO5	Use well-understood paradigms for designing new systems

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3		2							3			
CO2		2	3			1				2					
CO3					2							3			
CO4		2	3							2					
CO5	3							1				3			

UNIT I: ENVISIONING ARCHITECTURE

What is software Architecture-What is Software Architecture, Other Points of View, Architectural Patterns, Reference Models, and Reference Architectures, Importance of Software Architecture, Architectural Structures and views.

ENVISIONING ARCHITECTURE:
Architecture Business Cycle- Architectures influences, Software Processes and the Architecture Business Cycle, Making of –Good‖ Architecture.

ARCHITECTURAL DESIGN: Software Architecture, Architectural Genres, Architectural Styles, Architectural Design.
COMPONENT-LEVEL DESIGN: What is a Component, Designing Class-Based Components Conducting Component-Level Design, Component-Level Design for WebApps.

UNIT II: DESIGNING THE ARCHITECTURE WITH STYLES
Designing the Architecture: Architecture in the Life Cycle, Designing the Architecture, Formatting the Team Structure, Creating a Skeletal System.
Architecture Styles: Architectural Styles, Pipes and Filters, Data Abstraction and Object-Oriented Organization, Event-Based, Implicit Invocation, Layered Systems, Repositories, Interpreters.

UNIT III: CREATING AN ARCHITECTURE-I
Creating an Architecture: Understanding Quality Attributes – Functionality and Architecture, Architecture and Quality Attributes, System Quality Attributes, Quality Attribute. Scenarios in Practice, Other System Quality Attributes, Business Qualities, Architecture Qualities.
Achieving Qualities: Introducing Tactics, Availability Tactics, Modifiability Tactics, Performance Tactics, Security Tactics, Testability Tactics, Usability Tactics.

UNIT IV: CREATING AN ARCHITECTURE-II
Documenting Software Architectures: Use of Architectural Documentation, Views, Choosing the RelevantViews, Documenting a view, Documentation across Views. Reconstructing Software Architecture: Introduction, Information Extraction, Database Construction, View Fusion, and Reconstruction.

UNIT V: ANALYZING ARCHITECTURES
The ATAM: Participants in the ATAM, Outputs of The ATAM, Phases Of the ATAM. The CBAM: Decision-Making Context, The Basis for the CBAM, Implementing the CBAM. The World Wide Web:A Case study in Interoperability- Relationship to the Architecture Business Cycle, Requirements and Qualities, Architecture Solution, Achieving Quality Goals.

TEXT BOOKS:
1. Software Architectures in Practice , Len Bass, Paul Clements, Rick Kazman, 2nd Edition, Pearson Publication.
2. Software Architecture , Mary Shaw and David Garlan, First Edition, PHI Publication, 1996.\

REFERENCES BOOKS:
1. **Software Design: From Programming to Architecture**, Eric Braude**,** Wiley, 2004.
2. N. Domains of Concern in Software Architectures and Architecture Description Languages. Medvidovic and D. S. Rosenblum. USENIX.

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IV B.TECH – II SEMESTER

(THEORY)

Subject Code	**Title of the Subject**	**L**	**T**	**P**	**C**
17A80501c	**SYSTEM APPLICATIONS PRODUCTS**	3	-	-	3

COURSE OBJECTIVES	
1	Understand the role of enterprise systems in supporting business processes.
2	Identify key integration points between financial accounting and other processes.
3	Analyze the organizational data.
4	Understand the role of the credit management process in fulfillment.
5	Analyze the key concepts associated with material planning.

COURSE OUTCOMES	
CO1	Adopt and apply an integrated perspective to business processes
CO2	Effectively use SAP ERP to execute key steps in the procurement process.
CO3	Ability to use SAP ERP to extract meaningful information about the production process.
CO4	Extract and evaluate meaningful information about the material planning process using the SAP ERP system.
CO5	Implement measures to create secure web sites.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3										2			2	
CO2		2		2						1			3		
CO3	3			2										2	
CO4			1								2	1	3		
CO5	3	2											3		

Unit 1:

Introduction to Business Processes: The Functional Organizational Structure, Business Processes, Global Bike Incorporated (GBI). **Introduction to Enterprise Systems:** Enterprise Systems, Data in an Enterprise System, Reporting. **Introduction to Accounting:** Organizational Data, Master Data, Key Concepts, Processes, Reporting.

Unit 2:

The Procurement Process: Organizational Data, Master Data, Key Concepts, Process, Reporting.

Unit 3:

The Fulfillment Process: Organizational Data, Master Data, Process, Credit Management Process, Reporting.

Unit 4:

The Production Process: Master Data, Process, Reporting. **Inventory and Warehouse Management Processes:** Inventory Management, Organizational Data in warehouse Management, Master Data in Warehouse Management, Processes in Warehouse Management, Reporting.

Unit 5:

The Material Planning Process: Master Data, Process, Reporting, **Process Integration:** Procurement, Fulfillment, and IWM Processes, Procurement, Fulfillment, Production, and IWM Processes.

Text Book:

1. –Integrated Business Processes with ERP systems‖ Simha R.Magal, Jeffery word, JOHN WILEY & SON S, INC.

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IV B.TECH – II SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A80502a	**Internet of Things**	3	-	-	3

COURSE OBJECTIVES

1.	Students will be explored to the interconnection and integration of the physical world and the cyber space.
2.	a solid grounding in the key technologies involved and how they're integrated to form complete IoT systems

COURSE OUTCOMES

CO1	Able to understand the building blocks of Internet of things, characteristics and application areas of IoT
CO2	Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
CO3	Understand and be able to explain the role of big data, cloud computing and data analytics in a typical IoT system
CO4	Design a simple IoT system made up of sensors, wireless network connection, data analytics and display/actuators, and write the necessary control software .
CO5	Build and test a complete working IoT system

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3												3		
CO2	3		3		2			2		1					
CO3	3														
CO4		2	3		2			2				1	3	2	
CO5		2	3	1									3	2	

UNIT I: Introduction to Internet of Things

Introduction, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies.

UNIT II: Domain Specific IoTs

Introduction, Home Automation, cities, Environment, Retail, Agriculture, Industry, Health & Lifestyle.

UNIT III:

IoT and M2M

Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT.

IoT System Management with NETCONF-YANG

Need for IoT Systems Management, Simple Network Management Protocol(SNMP), Network Operator requirements, NETCONF, YANG, IoT System Management with NETCONF-YANG.

UNIT IV: Developing Internet of Things

Introduction, IoT Design Methodology, Case Study on IoT System for Weather Monitoring.

UNIT V:

Case Studies Illustrating IoT Design:

Introduction, Home Automation, Cities, Environment, Agriculture, Productivity Applications.

Advanced Topics:

Introduction, Apache Hadoop, Using Hadoop Map Reduce for Batch Data Analysis.

TEXT BOOKS:

1. Internet of Things a Hands-on Approach by Arshdeep Bahga and Vijay Madisetti. University Press

REFFERENCE BOOOKS:

1. Internet of Things: Architecture, Design Principles and Applications by Raj Kamal MCGraw Hill Edition.
2. The Internet of Things key applications and protocols by Oliver Hersent, David Boswarthickand Omar elloumi.Wiley Student Editon.

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IV B.TECH – II SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A80502b	**IMAGE PROCESSING**	3	-	-	3

COURSE OBJECTIVES	
1	Describe and explain basic principles of digital image processing;
2	Design and implement algorithms that perform basic image processing (e.g., noise removal and image enhancement);
3	Design and implement algorithms for advanced image analysis (e.g., image compression, image segmentation);
4	Assess the performance of image processing algorithms and systems.

COURSE OUTCOMES	
CO1	Review the fundamental concepts of a digital image processing system.
CO2	Apply various frequency domain transforms on images.
CO3	Practice the techniques for image enhancement and image restoration.
CO4	Use various segmentation and boundary representation techniques.
CO5	Illustrate various compression techniques.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3		3					3	2		3		
CO2		1		1							2			1	
CO3	1		3			1						1			
CO4			3		3					3			3		
CO5					3					3			3		

UNIT-I

DIGITAL IMAGE FUNDAMENTALS

Elements of visual perception – Image sensing and acquisition – Image Formation Model, imageSampling and Quantization, Representation of Digital Images, Spatial and Gray levelResolution, Zooming and Shrinking of Digital Images, Basic relationship between pixels – Basic gray level transformations. Color images – Color models - Chromaticity diagram.

UNIT-II

IMAGE TRANSFORMS

1D and 2D image transforms - Separable Transforms - One dimensional Fourier Transform-DFT – Two dimensional Fourier Transform - Discrete Cosine Transform-Walsh–HadamardTransform – Wavelet transform –discrete and continuous- Haar transform – Properties.

UNIT-III

IMAGE ENHANCEMENT AND RESTORATION

Image Enhancement: Spatial Domain Methods. Image subtraction– Image averaging– Spatialfiltering - Smoothing, Sharpening filters–First and Second Derivatives– Histogram – Histogram –Equalization Frequency Domain Methods – Filtering - Smoothing andSharpening– Butterworth filterImage Restoration: Model of Image Degradation/ Restoration process – Linear, position–invariant degradation – Estimating the degradation function – Inverse filtering-Weinerfiltering–Unconstrained restoration.

UNIT-IV

IMAGE SEGMENTATION AND REPRESENTATION

Detection of discontinuities - Point, Line and Edge detection – Gradient operators – Edgelinking – Graph theoretic technique - Thresholding – global and adaptive – Region-basedsegmentation.Boundary representation – chain codes - Polygonal approximation– Signatures– skeletons –Boundary segments– Boundary descriptors: Shape numbers-Fourier descriptors-Regionaldescriptors–topological descriptors.

UNIT-V

IMAGE COMPRESSION

Introduction t o image compression– Lossy and Lossless compression – Sequential andProgressive Compression – Rate/Distortion optimization - compression metrics- Huffman coding – Run Length Coding – Predictive coding – DPCM –Transform coding –Vector quantization-Image compression standards: JPEG, JPEG2000.

TEXT BOOKS:

1. R. C. Gonzalez, R. E. Woods, ―Digital Image Processing, Prentice-Hall, 3rd Edition, 2008.

REFERENCES:

1.Anil K. Jain, ―Fundamentals of Digital Image Processing‖ Prentice Hall, 7th edition, 1989.
2.David Salomon, ―Data Compression‖, Springer Verlag NewYork Inc., 4th Edition, 2006.
3 Dr.S.Jayaraman, ― Digital Image Processing‖, Tata McGraw-Hill, 2009.
4 William K Pratt, ―Digital Image Processing‖, John Wiley and Sons, 2007, 4th Edition.
5.Dr.Sridhar ―Digital Image Processing‖, OUP India, 2011.

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IV B.TECH – II SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A80502c	**HIGH PERFORMANCE COMPUTING**	3	-	-	3

	COURSE OBJECTIVES
1	Study the Parallel Computing & Parallel Programming Platforms**.**
2	Study Principles of Parallel Algorithm Design
3	Study Analytical Modeling of Parallel Programs.
	COURSE OUTCOMES
CO1	To develop the skills required to implement high-performance software, including the interaction between algorithms, computer architecture and compilers.
CO2	To learn techniques for analyzing the performance ofprograms and their interaction with the underlying hardware
CO3	To understand features of modern processors that affect performance and be able to use these features in the designand optimization of high-performance software
CO4	Identify the performance issues in Parallel Programming using OpenMP and MPI
CO5	To utilize techniques to automatically implement, optimize, and adapt programs to different platforms

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3		1				3	3			3		
CO2			3						3	3				2	
CO3		2		1							1		3		
CO4	1					1			3			1	3		
CO5		2	3							3				2	

UNIT I INTRODUCTION TO PARALLEL COMPUTING & PARALLEL PROGRAMMING PLATFORMS

Motivating Parallelism, Scope of Parallel Computing, Implicit Parallelism: Trends in

Microprocessor Architectures, Limitations of Memory System Performance, Dichotomy of Parallel Computing Platforms, Physical Organization of Parallel Platforms, Communication Costs in Parallel Machines, Routing Mechanisms for Interconnection Networks, Impact of Process- Processor Mapping and Mapping Techniques

UNIT II PRINCIPLES OF PARALLEL ALGORITHM DESIGN

Preliminaries, Decomposition Techniques, Characteristics of Tasks and Interactions, Mapping Techniques for Load Balancing, Methods for Containing Interaction Overheads Parallel Algorithm Models

UNIT III ANALYTICAL MODELING OF PARALLEL PROGRAMS

Sources of Overhead in Parallel Programs, Performance metrics for parallel systems, The effect of Granularity on performance, Scalability of Parallel Systems, Minimum execution time and minimum cost optimal execution time, Asymptotic analysis of Parallel programs, Other Scalability Metrics

UNIT IV PROGRAMMING USING THE MESSAGE PASSING PARADIGM

Principles of Message – Passing Programming, The Building Blocks, MPI: The Message passing Interface, Overlapping Communication with Computation, Collective Communication and Computation Operations, Groups & Communicators

UNIT V PROGRAMMING SHARED ADDRESS SPACE PLATFORMS

Thread Basics, POSIX Thread API, Synchronization Primitives in Pthreads, Controlling Thread and Synchronization Attributes, Thread Cancellation, Composite Synchronization Constructs, OpenMP: A standard for Directive Based Parallel Programming.

Text Books:

1. –Introduction to Parallel Computing – by Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, Pearson Education, 2nd Edition 2009.

Reference Books:

1. –Parallel Programming- Techniques and applications using networked workstations and parallel computers‖ by Barry Wilkinson, Michael Allen Pearson Education, 2nd Edition 2007.

2. –Multi Core Programming – Increasing Performance through Software Multi-threading‖ by Shameem Akhter and Jason Roberts, Intel Press 2006.

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IV B.TECH – II SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A80503a	**Entrepreneurship Development**	3	-	-	3

COURSE OBJECTIVES	
1	The students develop and can systematically apply an entrepreneurial way of thinking that will allow them to identify and create business opportunities that may be commercialized successfully.

COURSE OUTCOMES	
CO1	Have the ability to discern distinct entrepreneurial traits
CO2	Know the parameters to assess opportunities and constraints for new business ideas
CO3	Understand the systematic process to select and screen a business idea.
CO4	Design strategies for successful implementation of ideas
CO5	Write a business plan.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1					1										
CO2	2			3							2		2		
CO3	2					1									
CO4		1		3				2			2		2	1	
CO5				3				2		1		1			

UNIT 1:

Introduction to Entrepreneurship Definition of Entrepreneur, Entrepreneurial Traits, Entrepreneur vs. Manager, Entrepreneur vs Intrapreneur. The Entrepreneurial decision process. Role of Entrepreneurship in Economic Development, Ethics and Social responsibility of Entrepreneurs. Opportunities for

Entrepreneurs in India and abroad. Woman as Entrepreneur.Creating and Starting the Venture, Sources of new Ideas, Methods of generating ideas, creating problem solving, product planning and development process.

UNIT II:

The Business Plan Nature and scope of Business plan, Writing Business Plan, Evaluating Business plans, Using and implementing business plans. Marketing plan, financial plan and the organizational plan, Launching formalities.

UNIT III:

Financing and Managing the new venture, Sources of capital, venture capital, angel investment, Record keeping, recruitment, motivating and leading teams, financial controls. Marketing and sales controls. E-commerce and Entrepreneurship, Internet advertising.

UNIT IV:

New venture Expansion Strategies and Issues, Features and evaluation of joint ventures, acquisitions, merges, franchising. Public issues, rights issues, bonus issues and stock splits.

Choosing location and layout, Issues related to Selection of layout.

UNIT V:

Production and Marketing Management Thrust of production management, Selection of production Techniques, plant utilization and maintenance, Designing the work place, Inventory control, material handling and quality control. Marketing functions, market segmentation, market research and channels of distribution, Sales promotion and product pricing. Global aspects of Entrepreneurship.

Text Books:

1. Robert Hisrich, & Michael Peters: Entrepreneurship, TMH, 5th Edition
2. Dollinger: Entrepreneurship,4/e, Pearson, 2004.

REFERENCES:

1. Vasant Desai: Dynamics of Entrepreneurial Development and management, Himalaya Publishing House, 2004.
2. Harvard Business Review on Entrepreneurship. HBR Paper Back, 1999.
3. Robert J.Calvin: Entrepreneurial Management, TMH, 2004.
4. Gurmeet Naroola: The Entrepreneurial Connection, TMH, 2001.
5. Bolton & Thompson: Entrepeneurs- Talent, Temperament, Technique, Butterworth Heinemann, 2001.
6. Agarwal :Indian Economy, Wishwa Prakashan 2005.
7. Dutt & Sundaram: Indian Economy. S. Chand, 2005.
8. Srivastava: Industrial Relations & Labour Laws, Vikas, 2005.
9. Aruna Kaulgud: Entrepreneurship Management by. Vikas publishing house, 2003.
10. Thomas W. Zimmerer & Norman M. Scarborough: Essential of Entrepreneurship and small business management, PHI, 4/e, 2005.
11. Mary Coulter: Entrepreneurship in Action, PHI, 2/e, 2005.
12. Kaplan: Patterns of Entrepreneurship, Willey, 2005.
13. ND Kapoor: Industrial Law, Sultan Chand & Sons, 2005.

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IV B.TECH – II SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A80503b	**Natural Language Processing**	3	-	-	3

COURSE OBJECTIVES	
1	Understand current methods for statistical approaches to machine translation.
2	Understand language modeling.
3	Understand machine learning techniques used in NLP.

COURSE OUTCOMES	
CO1	Understand the fundamental concepts of Natural Language Processing
CO2	Apply fundamental algorithms and techniques in the area of natural language processing (NLP).
CO3	Different approaches to syntax and semantics in NLP.
CO4	Learn useful systems for language processing and related tasks involving text processing.
CO5	Understand the theoretical underpinnings of natural language processing in linguistics and formal language theory.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3												3		
CO2		2	3								3				
CO3	3	2	3			2							3	2	
CO4			3	1		2					3		3		
CO5	3										3			2	

UNIT – I

Introduction to Natural Language, Applications of NLP, Corpora and Corpus Analysis, Lexicon and Morphology, Syntax and Semantics.

UNIT II

Language Modeling: Introduction, n-gram models, Smoothing: Interpolation and Backoff.

UNIT III

Introduction to Machine Translation: History, Rule Based MT, Direct Transfer & INTERLINGUA Approaches, MT Evaluation.

UNIT IV

Statistical MT: Parallel Corpus and Alignment, Lexical Translation Model, Decoding Algorithms.

UNIT V

Applications: Automatic Text Categorization, Text Summarization, Information Extraction, Sentiment Analysis.

Text Books:

1 –Natural Language Processing: An Information Access Perspective‖, Ess Ess Publications, Kavi Narayana Murthy, 2006.

2 –Foundations of Statistical Natural Language Processing‖, Christopher Manning, MIT Press, 1999.

Reference Books:

1. James A.. Natural language Understanding 2e, Pearson Education, 1994
2. Bharati A., Sangal R., Chaitanya V.. Natural language processing: a Paninian perspective, PHI, 2000
3. Siddiqui T., Tiwary U. S.. Natural language processing and Information retrieval, OUP, 2008

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IV B.TECH – II SEMESTER

Subject Code	Title of the Subject	L	T	P	C
17A80503c	**Machine Learning**	3	-	-	3

COURSE OBJECTIVES	
1	To understand the basic theory underlying machine learning.
2	To be able to formulate machine learning problems corresponding to different applications.
3	To understand a range of machine learning algorithms along with their strengths and weaknesses.
4	To be able to apply machine learning algorithms to solve problems of moderate complexity

COURSE OUTCOMES	
CO1	Ability to understand what is learning and why it is essential to the design of intelligent machines
CO2	Apply theoretical foundations of decision trees to identify best split and Bayesian classifier to label data points
CO3	Acquire knowledge in deep learning and be able to implement deep learning models for language, vision, speech and decision making
CO4	Illustrate the working of classifier models like SVM, Neural Networks and identify classifier model for typical machine learning applications
CO5	Illustrate and apply clustering algorithms and identify its applicability in real life problems.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2				3		1						3		
CO2		3	2	1											
CO3	2	3	2		3	1							3	2	
CO4					3										
CO5		3							1	1		1	3	2	

UNIT I INTRODUCTION

Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

UNIT II NEURAL NETWORKS AND GENETIC ALGORITHMS

Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evalution and Learning.

UNIT III BAYESIAN AND COMPUTATIONAL LEARNING

Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

UNIT IV INSTANT BASED LEARNING

K- Nearest Neighbour Learning – Locally weighted Regression – Radial Bases Functions – Case Based Learning.

UNIT V ADVANCED LEARNING

Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning

TEXT BOOKS:

1. Machine Learning – Tom M. Mitchell, - MGH

REFERENCE BOOKS

1. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis

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Course Structure for R19 Regulations

Semester – 1					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	19A15101	Linear Algebra And Calculus	BS	3-1-0	4
2.	19A15201	Applied Physics	BS	3-0-0	3
3.	19A10501	Problem Solving & Programming	ES	3-1-0	4
4.	19A15501	Communicative English 1	HS	2-0-0	2
5.	19A10504	Computer Science & Engineering Workshop	LC	0-0-2	1
6.	19A15202	Applied Physics Lab	BS	0-0-3	1.5
7.	19A10506	Problem Solving & Programming Lab	ES	0-0-3	1.5
8.	19A15502	Communicative English Lab-1	HS	0-0-2	1
				Total	**18**

Semester - 2					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1	19A10502	Python Programming	ES	3-0-0	3
2	19A15103	Probability And Statistics	BS	3-0-0	3
3	19A15303	Chemistry	BS	2-1-0	3
4	19A10503	Data Structures	ES	2-1-0	3
5	19A10303	Engineering Workshop	LC	0-0-2	1
6	19A10304	Engineering Graphics	ES	1-0-3	2.5
7	19A10804	Environmental Science	MC	3-0-0	0
8	19A10508	Statistical Programming Lab	BS	0-0-3	1.5
9	19A10505	Python Programming Lab	ES	0-0-3	1.5
10	19A15304	Chemistry Lab	BS	0-0-3	1.5
11	19A10507	Data Structures Lab	ES	0-0-3	1.5
				Total	**21.5**

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II B.Tech I Sem					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	19A20605	Number Theory and its Applications	BSC	3-0-0	3
2.	19A20501	Digital Logic Design	PCC	3-0-0	3
3.	19A20502	OOPS Through JAVA	PCC	2-0-0	2
4.	19A20503	Design and Analysis of Algorithms	PCC	3-0-0	3
5.	19A22451	Basic Electrical and Electronics Engineering	BSC/ESC	3-0-0	3
6.	19A20504	Database Management Systems	PCC	3-0-0	3
7.	19A20901	Universal Human Values	HE	2-0-0	2
8.	19A20505	OOPS Through Java Lab	PCC	0-0-3	1.5
9.	19A22552	Basic Electrical Electronics-Lab	PCC	0-0-3	1.5
10.	19A20506	Database Management Systems – Lab	PCC	0-0-3	1.5
11.	19A28801	Biology For Engineers	MC	3-0-0	0
				Total	**23.5**

II B.Tech II Sem					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	19A20507	Computer Organization	PCC	3-0-0	3
2.	19A20508	Operating Systems	PCC	3-0-0	3
3.	19A20509	Computer Graphics	PCC	3-0-0	3
4.	19A20510	Discrete Mathematics	PCC	3-0-0	3
5.	19A20511	Entrepreneurship	BSC/ESC	3-0-0	3
6.	19A20512	Software Engineering	PCC	3-0-0	3
7.	19A20513	Operating Systems Lab	PCC	0-0-2	1
8.	19A20514	Software Engineering Lab	PCC	0-0-2	1
9.	19A20515	Computer Graphics Lab	PCC	0-0-2	1
10.	19A20902	Constitution of India	MC	3-0-0	0
				Total	**21**

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III B.Tech I Sem					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	19A50501	Formal Languages and Automata Theory	PCC	4-0-0	4
2.	19A50502	Computer Networks	PCC	3-0-0	3
3.	19A55501	English Language Skills	HSMC	3-0-0	3
4.	19A50503 19A50504 19A50505	Professional Elective-I ● Software Testing ● Data Mining and Warehousing ● Principles of Programming Languages	PEC-1	3-0-0	3
5.	19A50506 19A50507 19A50508	Open Elective-I ● Artificial Intelligence ● Web Technologies ● Distributed computing	OEC-1	3-0-0	3
6.	19A50509	Object Oriented Analysis and Design	PCC	1-0-0	1
7.	19A50510	Computer Networks Lab	PCC	0-0-3	1.5
8.	19A55502	English Language Skills Lab	HSMC	0-0-3	1.5
9.	19A50511	Object Oriented Analysis and Design Lab	PCC	0-0-3	1.5
10.	19A50512	Socially Relevant Project	PR	0-0-0.5	0.5
				Total	**22**

III B.Tech II Sem					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	19A60501	Compiler Design	PCC	3-0-0	3
2.	19A60502	Cryptography & Network Security	PCC	3-0-0	3
3.	19A60503	Machine Learning	HSMC	3-0-0	3
4.	19A60504 19A60505 19A60506	Professional Elective-II • Virtual Reality and Augmented Reality • Distributed Systems • Design patterns	PEC-2	3-0-0	3
5.	19A60507 19A60508 19A60509	Open Elective-II • Game Design and Development • Mobile Application Development • Soft computing	OEC-2	3-0-0	3
6.	19A65401 19A65402 19A65403	Humanities Elective-I • Managerial Economics and Financial Analysis • Business Ethics and Corporate Governance • Entrepreneurship & Incubation	HSMC	3-0-0	3
7.	19A60510	Network Security and Compiler Design Lab	PCC	0-0-3	1.5
8.	19A60511	Machine Learning Lab	HSMC	0-0-2	1
9.	19A60512	Socially Relevant Project	PR	0-0-0.5	0.5
10.	19A55401	Research Methodology	MC	3-0-0	0
				Total	**21**

*** Marks shall be awarded in 7th semester, but started at end of 6th semester and complete before beginning of 7th semester.**

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IV B.Tech I Sem					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	19A70501	Data Analytics	PCC	3-0-0	3
2.	19A70502	Internet of Things	PCC	3-0-0	3
3.	19A70503 19A70504 19A70505	Professional Elective-III ● Service Oriented Architecture ● High performance computing ● Block chain technologies	PEC-3	3-0-0	3
4.	19A70506 19A70507 19A70508	Open Elective-III ● Mobile Computing ● No SQL data bases ● Data Visualisation techniques	OEC-3	3-0-0	3
5.	19A75401 19A75402 19A75403	Humanities Elective-II ● Management Science ● Organizational Behaviour ● Business Environment	HSMC	3-0-0	3
6.	19A70509	Data Analytics Lab	PCC	0-0-3	1.5
7.	19A70510	Internet of Things Lab	PCC	0-0-3	1.5
8.	19A70511	Project	PR	------	1.5
9	19A70512	SEMINAR		0-0-1	0.5
9.	19A70513	Industrial Training/Skill Development/Research Project/Internship/Two subjects MOOCs*	PR	------	10
				Total	**30**

IV B.Tech II Sem					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	19A80501 19A80502 19A80503	Professional Elective-IV ● Software Project Management ● Cloud Computing ● Deep learning	PEC-4	3-0-0	3
2.	19A80504 19A80505 19A80506	Open Elective-IV ● Digital Marketing ● Natural Language Processing ● Cyber Security	OEC-4	3-0-0	3
3.	19A80507	Project	PR	0-0-14	7
				Total	**13**

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B.Tech (R19 Regulation)

B. Tech –I Sem

SubjectCode	TitleoftheSubject	L	T	P	C
19A15101	**Linear Algebra and Calculus** (Common to all branches of Engineering)	**3**	**1**	**0**	**4**

Course Objectives:

- This course will illuminate the students in the concepts of calculus and linearalgebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and theirapplications.

Bridge Course: Limits, continuity, Types of matrices

Unit1:Matrices **10hrs**

Rank of a matrix by echelon form, solving system of homogeneous and non-homogeneous equations linear equations. Eigen values and Eigen vectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, diagonalisation of a matrix, quadratic forms and nature of the quadratic forms, reduction of quadratic form to canonical forms by orthogonal transformation.

Learning Outcomes:

At the end of this unit, the student will be able to

- solving systems of linear equations, using technology to facilitate row reduction determine the rank, eigenvalues and eigenvectors, diagonal form and different factorizations of a matrix;(L3)
- identify special properties of a matrix, such as positive definite, etc., and use this information to facilitate the calculation of matrix characteristics;(L3)

Unit 2: MeanValueTheorems **6hrs**

Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof);

Learning Outcomes:

At the end of this unit, the student will be able to

- Translate the given function as series of Taylor's and Maclaurin's with remainders(L3)
- Analyzethebehaviourof functions by using mean value theorems(L3)

Unit 3:Multivariablecalculus **8hrs**

Partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

Learning Outcomes:

At the end of this unit, the student will be able to

- Find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies.(L3)
- Acquire the Knowledge maxima and minima of functions of several variable(L1)
- Utilize Jacobian of a coordinate transformation to deal with the problems in change of variables (L3)

Unit4:MultipleIntegrals **10hrs**

Double integrals, change of order of integration, double integration in polar coordinates, areas enclosed by plane curves. Evaluation of triple integrals, change of variables between Cartesian, cylindrical and spherical polar co-ordinates.

Learning Outcomes:

- At the end of this unit, the student will be ableto
- Evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates(L5)
- Apply double integration techniques in evaluating areas bounded by region(L4)
- Evaluate multiple integrals in Cartesian, cylindrical and spherical geometries(L5)

Unit5:SpecialFunctions **6hrs**

Beta and Gamma functions and their properties, relation between beta and gamma functions, evaluation of definite integrals using beta and gamma functions.

Learning Outcomes:

At the end of this unit, the student will be able to

- understand beta and gamma functions and its relations(L2)
- Conclude the use of special function in evaluating definite integrals(L4)

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons,2011.
2. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers,2017.

Reference Books:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd.,2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers,2013.
3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers,201.
4. Micheael Greenberg, Advanced Engineering Mathematics, 9^{th} edition, Pearsonedn
5. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRCPress
6. Peter O'neil, Advanced Engineering Mathematics, CengageLearning.
7. R.L. Garg Nishu Gupta, Engineering Mathematics Volumes-I &II, PearsonEducation
8. B. V. Ramana, Higher Engineering Mathematics, Mc Graw Hill Education
9. H. k Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand.
10. N. Bali, M. Goyal, C. Watkins, Advanced Engineering Mathematics, Infinity Science Press.

Course Outcomes:

At the end of the course, the student will be able to

- develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
- Utilize mean value theorems to real life problems(L3)
- familiarize with functions of several variables which is useful in optimization(L3)
- Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems(L5)
- Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of specialfunctions

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B.Tech (R19 Regulation)

B.Tech –I/IISem

SubjectCode	TitleoftheSubject	L	T	P	C
19A15201	**Applied Physics (Common to ECE, CSE, EEE & IT)**	3	0	0	3

Course Objectives:

- To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineeringapplications.
- To explain the significant concepts of dielectric and magnetic materials this leads to potential applications in the emerging microdevices.
- To impart knowledge in basic concepts of electromagnetic waves and its propagation in optical fibers along with its Engineeringapplications.
- To identify the importance of semiconductors in the functioning of electronicdevices.
- To teach the concepts related to superconductivity which lead to their fascinating applications.
- To familiarize the applications of nanomaterials relevant to engineeringbranches.

Unit-I :WaveOptics **8hrs**

Interference-Principle of Superposition-Interference of light-Conditions for sustained Interference -Interference in thin films (reflected light)-Newton's Rings-Determination of Wavelength- Engineering applications ofInterference

Diffraction-Fraunhofer Diffraction-Single and Double slits - Diffraction Grating – Grating Spectrum -Determination of Wavelength - Engineering applications of diffraction

Polarization-Polarization by double refraction-Nicol's Prism--Half wave and Quarter wave plate- Engineering applications of Polarization.

Unit Outcomes:

The students will be able to

- **explain** the need of coherent sources and the conditions for sustained interference(L2)
- **identify** engineering applications of interference including homodyne and heterodyne detection(L3)
- **analyze**the differences between interference and diffraction with applications(L4)
- **illustrate** the concept of polarization of light and its applications(L2)
- **classify** ordinary polarized light and extraordinary polarized light(L2)

Unit-II : Dielectric andMagneticMaterials **(8hrs)**

Introduction--Dielectric polarization-Dielectric polarizability, Susceptibility and Dielectric constant- Types of polarizations: Electronic and Ionic, (Quantitative), Orientation Polarizations (Qualitative)- Frequency dependence of polarization-Lorentz (internal) field-Claussius - Mosotti equation-Applications of Dielectrics:Ferroelectricity.

Introduction-Magnetic dipole moment-Magnetization-Magnetic susceptibility and permeability- Origin of permanent magnetic moment -Classification of Magnetic materials-Weiss theory of ferromagnetism (qualitative)-Hysteresis-soft and hard magnetic materials-Magnetic device applications (Magnetic bubble memory).

Unit Outcomes:

The students will be able to

- **explain** the concept of dielectric constant and polarization in dielectric materials(L2)
- **summarize** various types of polarization of dielectrics(L2)
- **interpret** Lorentz field and Claussius- Mosotti relation in dielectrics(L2)
- **classify** the magnetic materials based on susceptibility and their temperature dependence (L2)
- **explain** the applications of dielectric and magnetic materials(L2)
- **Apply** the concept of magnetism to magnetic devices(L3)

Unit – III: Electromagnetic Waves andFiberOptics **10hrs**

Divergence and Curl of Electric and Magnetic Fields- Gauss' theorem for divergence and Stokes' theorem for curl- Maxwell's Equations (Quantitative)- Electromagnetic wave propagation (Non-conducting medium) -Poynting'sTheorem.

Introduction to Optical Fibers-Total Internal Reflection-Critical angle of propagation-Acceptance angle-Numerical Aperture-Classification of fibers based on Refractive index profile– Propagation of electromagnetic wave through optical fiber – modes -importance of V-number- Attenuation, Block Diagram of Fiber optic Communication -Medical Applications-Fiber optic Sensors.

Unit Outcomes:

The students will be able to

- **apply** the Gauss' theorem for divergence and Stokes' theorem for curl(L3)
- **evaluate** the Maxwell's equations, Maxwell's displacement current and correction in Ampere's law(L5)
- **asses** the electromagnetic wave propagation and its power in non-conducting medium(L5)
- **explain** the working principle of optical fibers(L2)
- **classify** optical fibers based on refractive index profile and mode of propagation(L2)
- **identify** the applications of optical fibers in medical, communication and other fields(L2)
- **Apply** the fiber optic concepts in various fields(L3).

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Unit –IV:Semiconductors **8hrs**

Origin of energy bands - Classification of solids based on energy bands – Intrinsic semiconductors - density of charge carriers-Fermi energy – Electrical conductivity - extrinsic semiconductors - P-type & N-type - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature- Direct and Indirect band gap semiconductors-Hall effect- Hallcoefficient-ApplicationsofHalleffect-DriftandDiffusioncurrents-Continuityequation - Applications ofSemiconductors.

Unit Outcomes:

The students will be able to

- **classify** the energy bands of semiconductors(L2)
- **outline** the properties of n-type and p-type semiconductors and charge carriers(L2)
- **interpret** the direct and indirect band gap semiconductors(L2)
- **identify** the type of semiconductor using Hall effect(L2)
- **identify** applications of semiconductors in electronic devices(L2)

Unit – V: SuperconductorsandNanomaterials **8**

hrsSuperconductors-Properties- Meissner's effect-BCS Theory-Josephson effect (AC &DC)-Types of Super conductors-Applications ofsuperconductors.

Nano materials – Significance of nanoscale – Properties of nanomaterials: Physical, Mechanical, Magnetic, Optical – Synthesis of nanomaterials: Top-down-Ball Milling, Bottom-up -Chemical vapour deposition – characterization of nanomaterials: X-Ray Diffraction (XRD), Scanning Electron Microscope (SEM) - Applications of Nano materials.

Unit Outcomes:

The students will be able to

- **explain** how electrical resistivity of solids changes with temperature(L2)
- **classify** superconductors based on Meissner's effect(L2)
- **explain** Meissner's effect, BCS theory & Josephson effect in superconductors(L2)
- **identify** the nano size dependent properties of nanomaterials(L2)
- **illustrate** the methods for the synthesis and characterization of nanomaterials(L2)
- **Apply** the basic properties of nanomaterials in various Engineering branches(L3).

TextBooks:

1. M. N. Avadhanulu, P.G. Kshirsagar&TVS ArunMurthy" AText book of Engineering Physics"- S. Chand Publications, 11th Edition2019.
2. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning,2012.

Reference Books:

1. Shatendra Sharma, Jyotsna Sharma, " Engineering Physics", PearsonEducation,2018
2. David J.Griffiths, "Introduction to Electrodynamics"- 4/e, PearsonEducation

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I B.TECH – I SEMESTER

SubjectCode	**TitleoftheSubject**	**L**	**T**	**P**	**C**
19A10501	Problem Solving & Programming	2	1	0	3

Course Objectives:

1. Introduce the internal parts of a computer, and peripherals.
2. Introduce the Concept of Algorithm anduse it to solve computational problems
3. Identify the computational and non-computational problems
4. Teach the syntax and semantics of a C Programming language
5. Demonstrate the use of Control structures of C Programming language
6. Illustrate the methodology for solving Computational problems

Unit 1:

Computer Fundamentals: What is a Computer, Evolution of Computers, Generations of Computers, Classification of Computers, Anatomy of a Computer, Memory revisited, Introduction to Operating systems, Operational overview of a CPU.

Introduction to Programming, Algorithms and Flowcharts: Programs and Programming, Programming languages, Compiler, Interpreter, Loader, Linker, Program execution, Fourth generation languages, Fifth generation languages, Classification of Programming languages, Structured programming concept, Algorithms, Pseudo-code, Flowcharts, Strategy for designing algorithms, Tracing an algorithm to depict logic, Specification for converting algorithms into programs.

Introduction to computer problem solving: Introduction, the problem-solving aspect, top-down design, implementation of algorithms, the efficiency of algorithms, the analysis of algorithms.

Unit Outcomes:

Student should be able to

1. Identify the different peripherals, ports and connecting cables in a PC (L2)
2. Illustrate the working of a Computer (L3)
3. Select the components of a Computer in the market and assemble a computer (L4)
4. Solve complex problems using language independent notations (L3)

Unit 2:

Types, Operators, and Expressions: Variable names, data types and sizes, constants, declarations, arithmetic operators, relational and logical operators, type conversions, increment and decrement operators, bitwise operators, assignment operators and expressions, conditional expressions precedence and order of evaluation.

Input and output: standard input and output, formatted output-Printf, formatted input-Scanf.

Control Flow: Statements and blocks, if-else, else-if, switch, Loops-while and for, Loops-Do-while, break and continue, Goto and labels.

Learning Outcomes: Student should be able to

1. Solve Computational problems (L3)
2. Apply Algorithmic approach to solving problems (L3)
3. Analyze the algorithms (L4)

Unit 3:

Fundamental algorithms: Exchanging the values of two variables, counting, summation of a set of numbers, factorial computation, sine function computation, generation of the Fibonacci sequence, reversing the digits of an integer.

Functions and Program Structure: Basics of functions, functions returning non-integers, external variables, scope variables, header variables, register variables, block structure, initialization, recursion, the C processor.

Learning Outcomes: Student should be able to

1. Recognize the programming elements of C Programming language (L1)
2. Select the control structure for solving the problem (L4)
3. Apply modular approach for solving the problem (L3)

Unit 4:

Factoring methods: Finding the square root of a number, the smallest divisor of a number, the greatest common divisor of two integers, generating prime numbers.

Pointers and arrays: Pointers and addresses, pointers and function arguments, pointers and arrays, address arithmetic, character pointers and functions, pointer array; pointers to pointers, Multi-dimensional arrays, initialization of arrays, pointer vs. multi-dimensional arrays, command line arguments, pointers to functions, complicated declarations.

Array Techniques: Array order reversal, finding the maximum number in a set, removal of duplicates from an order array, finding the k^{th} smallest element

Learning Outcomes: Student should be able to

1. Solve mathematical problems using C Programming language (L3)
2. Structure the individual data elements to simplify the solutions (L6)
3. Facilitate efficient memory utilization (L6)

Unit 5:

Sorting and Searching: Sorting by selection, sorting by exchange, sorting by insertion, sorting by partitioning, binary search.

Structures: Basics of structures, structures and functions, arrays of structures, pointers to structures, self-referential structures, table lookup, typedef, unions, bit-fields.

Some other Features: Variable-length argument lists, formatted input-Scanf, file access, Error handling-stderr and exit, Line Input and Output, Miscellaneous Functions.

Learning Outcomes: Student should be able to

1. Select sorting algorithm based on the type of the data (L4)
2. Organize heterogeneous data (L6)
3. Design a sorting algorithm (L6)

Text Books:

1. Pradip Dey, and Manas Ghosh, "Programming in C", 2018, Oxford University Press.
2. R.G. Dromey, "How to Solve it by Computer". 2014, Pearson.
3. Brian W. Kernighan, and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, Pearson.

Reference Books:

1. P.Chenna Reddy, " Computer Fundamentals and C Programming" 2018, BS Publications
2. RS Bichkar" Programming with C", 2012, Universities Press.
3. Pelin Aksoy, and Laura Denardis, "Information Technology in Theory", 2017, Cengage Learning.

Course Outcomes:

1. Construct his own computer using parts (L6).
2. Recognize the importance of programming language independent constructs (L2)
3. Solve computational problems (L3)
4. Select the features of C language appropriate for solving a problem (L4)
5. Design computer programs for real world problems (L6)
6. Organize the data which is more appropriated for solving a problem (L6)

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I B.TECH – I SEMESTER

SubjectCode	TitleoftheSubject	L	T	P	C
19A15501	Communicative English-I	2	0	0	2

Introduction

The course is designed to train students in receptive (listening and reading) as well as productive and interactive (speaking and writing) skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from *learning about the language* to *using the language*. On successful completion of the compulsory English language course/s in B.Tech., learners would be confident of appearing for international language qualification/proficiency tests such as IELTS, TOEFL, or BEC, besides being able to express themselves clearly in speech and competently handle the writing tasks and verbal ability component of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions.

Course Objectives

- ➢ Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- ➢ Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- ➢ Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- ➢ Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
- ➢ Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing

Unit 1

Lesson: On the Conduct of Life: William Hazlitt

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions. Speaking:Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information. Reading for Writing :Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph.Grammar and Vocabulary: Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countable and uncountable; singular and plural; basic sentence structures; simple question form - wh-questions; word order in sentences.

Learning Outcomes

At the end of the module, the learners will be able to

- understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
- ask and answer general questions on familiar topics and introduce one self/others
- employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
- recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
- form sentences using proper grammatical structures and correct word forms

Unit 2

Lesson: The Brook: Alfred Tennyson

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts.Speaking:Discussion in pairs/small groups on specific topics followed by short structured talks. Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together. Writing: Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writing - punctuation, capital letters. Grammar and Vocabulary: Cohesive devices - linkers, sign posts and transition signals; use of articles and zero article; prepositions.

Learning Outcomes

At the end of the module, the learners will be able to

- comprehend short talks on general topics
- participate in informal discussions and speak clearly on a specific topic using suitable discourse markers
- understand the use of cohesive devices for better reading comprehension
- write well structured paragraphs on specific topics
- identify basic errors of grammar/ usage and make necessary corrections in short texts

Unit 3

Lesson: The Death Trap: Saki

Listening: Listening for global comprehension and summarizing what is listened to. Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed Reading: Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.Writing: Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions. Grammar and Vocabulary: Verbs - tenses; subject-verb agreement; direct and indirect speech, reporting verbs for academic purposes.

Learning Outcomes

At the end of the module, the learners will be able to

- comprehend short talks and summarize the content with clarity and precision
- participate in informal discussions and report what is discussed
- infer meanings of unfamiliar words using contextual clues
- write summaries based on global comprehension of reading/listening texts
- use correct tense forms, appropriate structures and a range of reporting verbs in speech and writing

Unit4

Lesson: Innovation: Muhammad Yunus

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video. Speaking: Role plays for practice of conversational English inacademic contexts (formal and informal) - asking for and giving information/directions. Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data. Writing:Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables. Grammar and Vocabulary: Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison; use of antonyms

Learning Outcomes

At the end of the module, the learners will be able to

- infer and predict about content of spoken discourse
- understand verbal and non-verbal features of communication and hold formal/informal conversations
- interpret graphic elements used in academic texts
- produce a coherent paragraph interpreting a figure/graph/chart/table
- use language appropriate for description and interpretation of graphical elements

Unit 5

Lesson: Politics and the English Language: George Orwell

Listening: Identifying key terms, understanding concepts and answering a series of relevantquestions that test comprehension.**Speaking:** Formal oral presentations on topics from academic contexts - without the use of PPT slides.**Reading:** Reading for comprehension. **Writing:** Writing structured essays on specific topics using suitable claims and evidences. **Grammar and Vocabulary:**Editing short texts – identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Learning Outcomes

At the end of the module, the learners will be able to

- take notes while listening to a talk/lecture and make use of them to answer questions
- make formal oral presentations using effective strategies
- comprehend, discuss and respond to academic texts orally and in writing
- produce a well-organized essay with adequate support and detail
- edit short texts by correcting common errors

Prescribed Text:

Language and Life: A Skills Approach- I Edition 2019, Orient Black Swan

Reference Books

- Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
- Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
- Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
- Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.
- Oxford Learners Dictionary, 12th Edition, 2011

Course Outcomes

At the end of the course, the learners will be able to

- Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
- Apply grammatical structures to formulate sentences and correct word forms
- Analyze discourse markers to speak clearly on a specific topic in informal discussions
- Evaluate reading/listening texts and to write summaries based on global comprehension of these texts.
- Create a coherent paragraph interpreting a figure/graph/chart/table

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

B.Tech (R19 Regulation)

I B.TECH – I SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A10504	**Computer Science & Engineering Workshop**	0	0	2	1

Course Objectives:

- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations
- To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system
- Teach them how to connect two or more computers
- Introduce to the Raspberry Pi board
- Explain storytelling by creating Graphics, Web pages and Videos

Preparing your Computer

Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2: Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and trouble shooting a computer.

Task 3: Install Operating system: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Task 4: **Operating system features**: Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

Productivity tools

Task 5: Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

Task 6: Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement.Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet application considered.

Task 7: Presentations: creating, opening, saving and running the presentations,Selecting the style for slides, formatting the slides with different fonts, colours, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

Networking

Task 8: Wired network: Select a LAN cable, Identify the wires in the cable, Define the purpose of each wire, Study the RJ45 connecter, Use crimping tool to fix the cable to the connecter, Test the cable using LAN tester, Connect two or more computers using cross and straight cables, Configure the computers, share the data between the computers.

Task 9: Wireless network Connect the wireless LAN card or identify the built-in wireless LAN card, configure four computers using adhoc mode and share the data, connect four computers using infrastructure mode (Access point) and share the data.

IoT

Task 10: Raspberry Pi

Study the architecture of Raspberry pi, configure software, Install SD card, Connect the cables, Install Raspbian (or any other) operating system, Configure Wi-Fi, Remotely connect to your Raspberry Pi.

Story Telling

Task 11: Storytelling

Use Adobe spark or any other tool to create Graphics, Web pages, and Videos.

References:

1. B. Govindarajulu, "IBM PC and Clones Hardware Trouble shooting and Maintenance", 2nd edition, Tata McGraw-Hill, 2002

2. “MOS study guide for word, Excel, Powerpoint& Outlook Exams”, Joan Lambert, Joyce Cox, PHI.
3. “Introduction to Information Technology”, ITL Education Solutions limited, Pearson Education.
4. Rusen, “Networking your computers and devices”, PHI
5. Bigelows, “Trouble shooting, Maintaining& Repairing PCs”, TMH.
6. https://www.adobe.com
7. https://www.raspberrypi.org

Course Outcomes:

- Construct a computer from its parts and prepare it for use (L3)
- Develop Documents using Word processors (L3)
- Develop presentations using the presentation tool (L3)
- Perform computations using spreadsheet tool (L3)
- Connect computer using wired and wireless connections (L4)
- Design Graphics, Videos and Web pages (L6)
- Connect things to computers (L30

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I B.TECH – I SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A15202	**Applied Physics Lab**	0	0	3	1.5

COURSE OBJECTIVES	
1	To make the students gain practical knowledge to co-relate with the theoretical studies. To develop practical applications of engineering materials and use of principle in the right way to implement the modern technology.

COURSE OUTCOMES	
CO1	**Operate** optical instruments like microscope and spectrometer (L2)
CO2	**Estimate** the desired physical parameters by performing the concerned experiments (L2)
CO3	**Plot** the concerned physical parameter to know their related variations (L3)
CO4	**Identify** the role of various physical phenomenon in relation with the experimental concepts (L3)

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		2		2	2		2		1		2		
CO2	3	2		2		2	2		2		1		2		
CO3	3	3		2		2	2		2		1		2		
CO4	3	2		2		2	2		2		1		2		

List of Physics Experiments

1. Determination of thickness of thin object by wedge method
2. Determination of radius of curvature of lens by Newton's rings
3. Determination of wavelengths of various colours of mercury spectrum using diffraction grating in normal incidence method
4. Determination of dispersive power of the prism
5. Determination of dielectric constant and Curie temperature of a ferroelectric material
6. B-H curve
7. Determination of numerical aperture of an optical fiber
8. Laser: Determination of wavelength using diffraction grating
9. Laser: Determination of particle size
10. To determine the resistivity of semiconductor by four probe method
11. Energy gap of a material using p-n junction diode
12. Magnetic field along the axis of a current carrying coil – Stewart-Gee's Method
13. Hall effect : Determination of mobility of charge carriers in semiconductor
14. Measurement of resistance of a semiconductor with varying temperature

15. To determine the self inductance of the coil (L) using Anderson's bridge

Note: Out of twelve experiments, two experiments will be performed using virtual laboratory.
Data Books Required: Nil

References:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers, 2017.
2. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University

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I B.TECH – I SEMESTER

SubjectCode	TitleoftheSubject	L	T	P	C
19A10506	**Problem Solving & Programming Lab**	0	0	3	1.5

Laboratory Experiments

1. Basic DOS Commands/Unix Commands
2. Familiarize with windows/Linux Environment.
3. Familiarize with development environment of C Language
4. Design a C program which reverses the number
5. Design a C program which finds the second maximum number among the given list of numbers.
6. Construct a program which finds the kth smallest number among the given list of numbers.
7. Design an algorithm and implement using C language the following exchanges

   a b c d

6. Develop a C Program which counts the number of positive and negative numbers separately and also compute the sum of them.

7. Implement the C program which computes the sum of the first n terms of the series

   Sum = 1 – 3 + 5 -7 + 9

8. Design a C program which determines the numbers whose factorial values are between 5000 and 32565.

9. Design an algorithm and implement using a C program which finds the sum of the infinite series

   $1 - x^2/2! + x^4/4! - x^6/6! + ...$

10 Design a C program to print the sequence of numbers in which each number is the sum of the three most recent predecessors. Assume first three numbers as 0, 1, and 1.

11. Implement a C program which converts a hexadecimal, octal and binary number to decimal number and vice versa.

12. Develop an algorithm which computes the all the factors between 1 to 100 for a given number and implement it using C.

13. Construct an algorithm which computes the sum of the factorials of numbers between m and n.

14. Design a C program which reverses the elements of the array.

15. Given a list of n numbers, Design an algorithm which prints the number of stars equivalent to the value of the number. The starts for each number should be printed horizontally.

16. Implement the sorting algorithms a. Insertion sort b. Exchange sort c. Selection sort

d.. Partitioning sort.

17. Illustrate the use of auto, static, register and external variables.

18. Designalgorithm and implement the operations creation, insertion, deletion, traversing on a singly linked list.

19. Develop a C program which takes two numbers as command line arguments and finds all the common factors of those two numbers.

20. Design a C program which sorts the strings using array of pointers.

Course outcomes: Student should be able to

1. Construct a Computer given its parts (L6)
2. Select the right control structure for solving the problem (L6)
3. Analyze different sorting algorithms (L4)
4. Design solutions for computational problems (L6)
5. Develop C programs which utilize the memory efficiently using programming constructs like pointers.

References:

1. B. Govindarajulu, "IBM PC and Clones Hardware Trouble shooting and Maintenance", Tata McGraw-Hill, 2nd edition, 2002.
2. R.G. Dromey, "How to Solve it by Computer". 2014, Pearson.
3. P.Chenna Reddy, " Computer Fundamentals and C Programming" 2018, BS Publications

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I B.TECH – I SEMESTER

SubjectCode	TitleoftheSubject	L	T	P	C
19A15502	**Communicative English Lab-1**	0	0	3	1.5

Course Objectives

- ➢ students will be exposed to a variety of self instructional, learner friendly modes of language learning
- ➢ students will cultivate the habit of reading passages from the computer monitor. Thus providing them with the required facility to face computer based competitive exams like GRE, TOEFL, and GMAT etc.
- ➢ students will learn better pronunciation through stress, intonation and rhythm
- ➢ students will be trained to use language effectively to face interviews, group discussions, public speaking
- ➢ students will be initiated into greater use of the computer in resume preparation, report writing, format making etc

Course Outcomes

- CO1: Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills
- CO2: Apply communication skills through various language learning activities
- CO3: Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
- CO4: Evaluate and exhibit acceptable etiquette essential in social and professional settings
- CO5: Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

Unit 1

1. Phonetics for listening comprehension of various accents
2. Reading comprehension
3. Describing objects/places/persons

Learning Outcomes

At the end of the module, the learners will be able to

- understand different accents spoken by native speakers of English
- employ suitable strategies for skimming and scanning on monitor to get the general idea of a text and locate specific information
- learn different professional registers and specific vocabulary to describe different persons, places and objects

Unit 2

1. JAM
2. Small talks on general topics
3. Debates

Learning Outcomes

At the end of the module, the learners will be able to

- produce a structured talk extemporarily
- comprehend and produce short talks on general topics
- participate in debates and speak clearly on a specific topic using suitable discourse markers

Unit 3

1. Situational dialogues – Greeting and Introduction
2. Summarizing andNote making
3. Vocabulary Building

Learning Outcomes

At the end of the module, the learners will be able to

- Learn different ways of greeting and introducing oneself/others
- summarize the content with clarity and precision and take notes while listening to a talk/lecture and make use of them to answer questions
- replenish vocabulary with one word substitutes, homonyms, homophones, homographs to reduce errors in speech and writing

Unit4

1. Asking for Information and Giving Directions
2. Information Transfer
3. Non-verbal Communication – Dumb Charade

Learning Outcomes

At the end of the module, the learners will be able to

- Learn different ways of asking information and giving directions
- Able to transfer information effectively
- understand non-verbal features of communication

Unit 5

1. Oral Presentations
2. Précis Writing and Paraphrasing
3. Reading Comprehension and spotting errors

Learning Outcomes

At the end of the module, the learners will be able to

- make formal oral presentations using effective strategies
- learn different techniques of précis writing and paraphrasing strategies
- comprehend while reading different texts and edit short texts by correcting common errors

Suggested Software

- Young India Films
- Walden Infotech
- Orell

Reference Books

- Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.

- Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking*. Heinley ELT; 2nd Edition, 2018.

- Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
- Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.
- A Textbook of English Phonetics for Indian Students by T.Balasubramanyam

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I B.TECH – II SEMESTER

SubjectCode	TitleoftheSubject	L	T	P	C
19A10502	**Python Programming**	3	0	0	3

Course Objectives:

1. To teach the fundamentals of Python
2. To elucidate problem-solving using a Python programming language
3. To introduce a function-oriented programming paradigm through python
4. To train in the development of solutions using modular concepts
5. To introduce the programming constructs of python

Unit – I

Introduction: What is a program, Running python, Arithmetic operators, Value and Types. Variables, Assignments and Statements: Assignment statements, Script mode, Order of operations, string operations, comments.

Functions: Function calls, Math functions, Composition, Adding new Functions, Definitions and Uses, Flow of Execution, Parameters and Arguments, Variables and Parameters are local, Stack diagrams, Fruitful Functions and Void Functions, Why Functions.

Learning Outcomes: Student should be able to

1. List the basic constructs of Python (L1)
2. Solve the problems by applying modularity principle (L3)

Unit – II

Case study: The turtle module, Simple Repetition, Encapsulation, Generalization, Interface design, Refactoring, docstring.

Conditionals and Recursion: floor division and modulus, Boolean expressions, Logical operators, Conditional execution, Alternative execution, Chained conditionals, Nested conditionals, Recursion, Infinite Recursion, Keyboard input.

Fruitful Functions: Return values, Incremental development, Composition, Boolean functions, More recursion, Leap of Faith, Checking types,

Learning Outcomes: Student should be able to

1. Apply the conditional execution of the program (L3)
2. Apply the principle of recursion to solve the problems (L3)

Unit - III

Iteration: Reassignment, Updating variables, The while statement, Break, Square roots, Algorithms.
Strings: A string is a sequence, len, Traversal with a for loop, String slices, Strings are immutable, Searching, Looping and Counting, String methods, The in operator, String comparison.
Case Study: Reading word lists, Search, Looping with indices.
Lists: List is a sequence, Lists are mutable, Traversing a list, List operations, List slices, List methods, Map filter and reduce, Deleting elements, Lists and Strings, Objects and values, Aliasing, List arguments.

Learning Outcomes: Student should be able to

1. Use the data structure list (L3)
2. Design programs for manipulating strings (L6)

Unit – IV

Dictionaries: A dictionary is a mapping, Dictionary as a collection of counters, Looping and dictionaries, Reverse Lookup, Dictionaries and lists, Memos, Global Variables.
Tuples: Tuples are immutable, Tuple Assignment, Tuple as Return values, Variable-length argument tuples, Lists and tuples, Dictionaries and tuples, Sequences of sequences.
Files: Persistence, Reading and writing, Format operator, Filename and paths, Catching exceptions, Databases, Pickling, Pipes, Writing modules.
Classes and Objects: Programmer-defined types, Attributes, Instances as Return values, Objects are mutable, Copying.
Classes and Functions:

Learning Outcomes: Student should be able to
1. Apply object orientation concepts (L3)
2. Use data structure dictionaries (L3)
3. Organize data in the form of files (L6)

Unit – V

Classes and Functions: Time, Pure functions, Modifiers, Prototyping versus Planning
Classes and Methods: Object oriented features, Printing objects, The init method, The __str__method, Operator overloading, Type-based Dispatch, Polymorphism, Interface and Implementation
Inheritance: Card objects, Class attributes, Comparing cards, decks, Printing the Deck, Add Remove shuffle and sort, Inheritance, Class diagrams, Data encapsulation.
The Goodies: Conditional expressions, List comprehensions, Generator expressions, any and all, Sets, Counters, defaultdict, Named tuples, Gathering keyword Args,

Learning Outcomes: Student should be able to
1. Plan programs using object orientation approach (L6)

2. Illustrate the principle of inheritance (L4)

Text books:

1. Allen B. Downey, “Think Python”, 2nd edition, SPD/O’Reilly, 2016.

Reference Books:

1. Martin C.Brown, “The Complete Reference: Python”, McGraw-Hill, 2018.
2. Kenneth A. Lambert, B.L. Juneja, “Fundamentals of Python”, CENGAGE, 2015.
3. R. Nageswara Rao, “Core Python Programming”, 2nd edition, Dreamtech Press, 2019

Course Outcomes: Student should be able to

1. Explain the features of Python language (L2)
2. Select appropriate data structure for solving a problem (L4)
3. Design object oriented programs for solving real-world problems (L6)

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I B.TECH – II SEMESTER

SubjectCode	TitleoftheSubject	L	T	P	C
19A15103	Probability and Statistics	3	0	0	3

Course Objectives:

1) To familiarize the students with the foundations of probability and statistical methods
2) To impart probability concepts and statistical methods in various engineering applications

Unit 1: Descriptive statistics and methods for data science **10 hrs**

Data science, Statistics Introduction, Population vs Sample, Collection of data, primary and secondary data, Type of variable: dependent and independent Categorical and Continuous variables, Data visualization, Measures of Central tendency, Measures of Variability (spread or variance) Skewness, Kurtosis, correlation, correlation coefficient, rank correlation, regression coefficients, method of least squares, regression lines.

Learning Outcomes:

At the end of this unit, the student will be able to

- summarize the basic concepts of data science and its importance in engineering (L2)
- analyze the data quantitatively or categorically , measure of averages, variability (L4)
- adopt correlation methods and principle of least squares, regression analysis (L5)

UNIT 2: Probability **8 hrs**

Probability, probability axioms, addition law and multiplicative law of probability, conditional probability, Baye's theorem, random variables (discrete and continuous), probability density functions, properties, mathematical expectation.

Learning Outcomes:

At the end of this unit, the student will be able to

- define the terms trial, events, sample space, probability, and laws of probability (L1)
- make use of probabilities of events in finite sample spaces from experiments (L3)
- apply Baye's theorem to real time problems (L3)
- explain the notion of random variable, distribution functions and expected value(L2)

UNIT 3: Probability distributions **6 hrs**

Probability distributions: Binomial, Poisson and Normal-their properties (Chebyshevs inequality). Approximation of the binomial distribution to normal distribution.

Learning Outcomes:

At the end of this unit, the student will be able to

- apply Binomial and Poisson distributions for real data to compute probabilities, theoretical frequencies (L3)
- interpret the properties of normal distribution and its applications (L2)

Unit4: Estimation and Testing of hypothesis, large sample tests **8 hrs**

Estimation-parameters, statistics, sampling distribution, point estimation, Formulation of null hypothesis, alternative hypothesis, the critical and acceptance regions, level of significance, two types of errors and power of the test. Large Sample Tests: Test for single proportion, difference of proportions, test for single mean and difference of means. Confidence interval for parameters in one sample and two sample problems

Learning Outcomes:

At the end of this unit, the student will be able to

- explain the concept of estimation, interval estimation and confidence intervals (L2)
- apply the concept of hypothesis testing for large samples (L4)

Unit 5: Small sample tests **8 hrs**

Student t-distribution (test for single mean, two means and paired t-test), testing of equality of variances (F-test), $\chi 2$ - test for goodness of fit, $\chi 2$ - test for independence of attributes.

Learning Outcomes:

At the end of this unit, the student will be able to

- apply the concept of testing hypothesis for small samples to draw the inferences (L3)
- estimate the goodness of fit (L5)

Textbooks:

1. Miller and Freunds, Probability and Statistics for Engineers,7/e, Pearson, 2008.
2. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.

Reference Books:

1. S. Ross, a First Course in Probability, Pearson Education India, 2002.
2. W. Feller, an Introduction to Probability Theory and its Applications, 1/e, Wiley, 1968.
3. B. V. Ramana, Higher Engineering Mathematics, Mc Graw Hill Education.
4. N. Bali, M. Goyal, C. Watkins, Advanced Engineering Mathematics, Infinity Science Press.

Course Learning Outcomes:

Upon successful completion of this course, the student should be able to

- make use of the concepts of probability and their applications (L3)
- apply discrete and continuous probability distributions (L3)
- classify the concepts of data science and its importance (L4)
- interpret the association of characteristics and through correlation and regression tools (L4)
- Design the components of a classical hypothesis test (L6)
- infer the statistical inferential methods based on small and large sampling tests (L6)

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B.Tech (R19 Regulation)

I B.TECH – II SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A15303	**Chemistry**	3	0	0	3

COURSE OBJECTIVES	
1	To familiarize engineering chemistry and its applications
2	To train the students on the principles and applications of electrochemistry and polymers
3	To introduce instrumental methods, molecular machines and switches

COURSE OUTCOMES	
CO1	**Apply**Schrodinger wave equation to hydrogen and particle in a box, **illustrate** the molecular orbital energy level diagram of different molecular species, **explain** the band theory of solids for conductors, semiconductors and insulators **discuss** the magnetic behaviour and colour of complexes.
CO2	**apply** Nernst equation for calculating electrode and cell potentials, **differentiate** between pH metry, potentiometric and conductometric titrations, **explain** the theory of construction of battery and fuel cells, **solve** problems based on cell potential
CO3	**explain** the different types of polymers and their applications, **explain** the preparation, properties and applications of Bakelite, Nylon-66, and carbon fibres, **describe** the mechanism of conduction in conducting polymers, **discuss** Buna-S and Buna-N elastomers and their applications
CO4	**explain** the different types of spectral series in electromagnetic spectrum, **understand** the principles of different analytical instruments, **explain** the different applications of analytical instruments
CO5	**explain** the band theory of solids for conductors, semiconductors and insulators, **explain**supramolecular chemistry and self assembly, **demonstrate** the application of Rotaxanes and Catenanes as artificial molecular machines

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		2		2	2		2		1		2		
CO2	3	2		2		2	2		2		1		2		
CO3	3	3		2		2	2		2		1		2		
CO4	3	2		2		2	2		2		1		2		
CO5	3	2		2		2	2		2		1		2		

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SYLLABUS

Unit 1: Structure and Bonding Models: (10 hrs)

Planck's quantum theory, dual nature of matter, Schrodinger equation, significance of Ψ and Ψ^2 , applications to hydrogen, particle in a box and their applications for conjugated molecules, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of O_2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order, crystal field theory – salient features – splitting in octahedral and tetrahedral geometry, magnetic properties and colour, band theory of solids – band diagrams for conductors, semiconductors and insulators, role of doping on band structures.

Unit 2: Electrochemistry and Applications: (10 hrs)

Electrodes – concepts, reference electrodes (Calomel electrode, Ag/AgCl electrode and glass electrode) electrochemical cell, Nernst equation, cell potential calculations, numerical problems, potentiometry-potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations), photovoltaic cell – working and applications, photogalvanic cells with specific examples. Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.

Primary cells – Zinc- MnO_2battery(Laclanche cell), Secondary cells – lead acid and lithium ion batteries- working of the batteries including cell reactions.Fuel cells, hydrogen-oxygen, methanol fuel cells – working of the cells.

Unit 3: Polymer Chemistry:(10 hrs)

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation.

Plastics - Thermoplastics and Thermosettings, Preparation, properties and applications of – Bakelite, urea-formaldehyde, Nylon-6,6, carbon fibres, Elastomers–Buna-S, Buna-N–preparation, properties and applications.

Conducting polymers – polyacetylene, polyaniline, mechanism of conduction and applications.

Unit 4: Instrumental Methods and Applications: (10 hrs)

Electromagnetic spectrum. Absorption of radiation: Principle and applications of pH metry, potentiometry, conductometry, UV-Visible**,** IR and Basic concepts of Chromatography techniques and their applications

Unit 5: Advanced Engineering Materials:(10 hrs)

(i) Concepts and terms of supra molecular chemistry, complementarity, Basic Lock and Key principle, examples of Supramolecules, Applications of Supra molecules(sensors, catalysts, medical and molecular switches)

ii) Semiconducting and Super Conducting materials-Principles and some examples

iii) Electrical Insulators or Dielectric materials: Definition and classification, Characteristics of electrical insulators and applications of electrical insulating materials

(iv) Nanochemistry: Introduction, classification of nanomaterials properties and applications of Fullerenes, Carbon nano tubes and Graphines nanoparticles.

Text Books:

1. Engineering Chemistry by KNJayaveera, GVSubba Reddy and C. Ramachandraiah, McGraw Hill Higher Education, Foruth Edition, New Delhi
2. A Text Book of Enigneering Chemistry, Jain and Jain, Dhanapathi Rai Publications, New Delhi

References:

1.A Text book of Engineering Chemistry by SS Dhara, S. Chand Publications, New Delhi

2. Engineering Chemistry by K.B.Chandra Sekhar, UN.Das and Sujatha Mishra, SCITECH Pubblications India Pvt Limited.
3. Concepts of Engineering Chemistry- Ashima Srivastavaf and N.N. Janhavi
4. Text Book of Engineering Chemistry – C. Parameswara Murthy, C.V.Agarwal and Andra Naidu
5. Chemistry of Engineering Materials, C.V.Agarwal, C.Parameswaramurthy and Andranaidu
6. Text Book of Engineering Chemistry, Shashichawla, Dhanapathirai Publications.

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I B.TECH – II SEMESTER

SubjectCode	TitleoftheSubject	L	T	P	C
19A10503	**Data Structures**	3	0	0	3

Course Objectives:
1. To teach the representation of solution to the problem using algorithm
2. To explain the approach to algorithmanalysis
3. To introduce different data structures for solving the problems
4. To demonstrate modeling of the given problem as a graph
5. To elucidate the existing hashing techniques

Unit – 1: Introduction

Algorithm Specification, Performance analysis, Performance Measurement. Arrays: Arrays, Dynamically Allocated Arrays. Structures and Unions. Sorting: Motivation, Quick sort, how fast can we sort, Merge sort, Heap sort

Learning Outcomes:

Student should be able to
1. Analyze the given algorithm to find the time and space complexities.(L4)
2. Select appropriate sorting algorithm (L4)
3. Designa sorting algorithm (L6)

Unit – 2: Stack, Queue and Linked lists

Stacks, Stacks using Dynamic Arrays, Queues, Circular Queues Using Dynamic Arrays, Evaluation of Expressions, Multiple Stacks and Queues. Linked lists: Singly Linked Lists and Chains, Representing Chains in C, Linked Stacks and Queues, Additional List Operations, Doubly Linked Lists.

Learning outcomes:

Student should be able to
1. Evaluate expressions (L5)
2. Develop the applications using stacks and queues (L3)
3. Construct the linked lists for various applications (L6)

Unit – 3 :Trees

Introduction, Binary Trees, Binary Tree Traversals, Additional Binary Tree Operations, Binary Search Trees, Counting Binary Trees, AVL Trees.

Learning outcomes
1. Explain the concept of a tree (L2)
2. Compare different tree structures (L4)
3. Apply trees for indexing (L3)

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Unit – 4 :Graphs and Hashing

The Graph Abstract Data Type, Elementary Graph Operations, Minimum Cost Spanning Trees, Shortest Paths and Transitive Closure

Hashing: Introduction to Hash Table, Static Hashing, Dynamic Hashing.

Learning outcomes:
Student should be able to
1. Recognize the importance of Graphs in solving real world problems (L2)
2. Apply various graph traversal methods to applications (L3)
3. Design a minimum cost solution for a problem using spanning trees (L6)
4. Select the appropriate hashing technique for a given application (L5)
5. Design a hashing technique (L6)

Unit – 5: Files and Advanced sorting

File Organization: Sequential File Organization, Direct File Organization, Indexed Sequential File Organization.
Advanced sorting: Sorting on Several keys, List and Table sorts, Summary of Internal sorting, External sorting.

Learning outcomes:
Student should be able to
1. Organize data in the form of Files (L6)
2. Apply sorting on large amount of data (L3)

Text Books:
1. Ellis Horowitz and Sartaj Sahni, “Fundamentals of Data Structures in C”, 2nd Edition, University Press, 2007.
2. Alan L. Tharp, “File Organization and Processing”, Wiley and Sons, 1988.

Reference Text Books:
1. D. Samanta, “Classic Data Structures”, 2nd Edition, Prentice-Hall of India, Pvt. Ltd., India, 2012.
2. Peter Bras, “Advanced Data Structures”, Cambridge University Press, 2016
3. Richard F.Gilberg, Behrouz A.Forouzan, “Data Structures A Pseudo code Approach with C”, Second Edition, Cengage Learning 2005.

Course Outcomes:

Students should be able to

1. Select Appropriate Data Structure for solving a real world problem (L4)
2. Select appropriate file organization technique depending on the processing to be done (L4)
3. Construct Indexes for Databases (L6)
4. Analyse the Algorithms (L4)
5. Develop Algorithm for Sorting large files of data (L3)

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I B.TECH – II SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A10303	**Engineering Workshop**	3	0	0	3

Course Objective:
To familiarize students with wood working, sheet metal operations, fitting and electrical house Wiring skills

Wood Working:
Familiarity with different types of woods and tools used in wood working and make following joints

a) Half – Lap joint*
b) Mortise and Tenon joint*
c) Corner Dovetail joint or Bridle joint

Sheet Metal Working:
Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets

a) Tapered tray *
b) Conical funnel *
c) Elbow pipe *
d) Brazing

Fitting:
Familiarity with different types of tools used in fitting and do the following fitting exercises

a) V-fit*
b) Dovetail fit *
c) Semi-circular fit
d) Wheel balancing, tubeless tyre puncture and change of two wheelertyre.

Electrical Wiring:
Familiarities with different types of basic electrical circuits and make the following connections

a) Parallel and series*
b) Two way switch*
c) Godown lighting
d) Tube light*
e) Three phase motor
f) Soldering of wires

Note:* Students exercise. Remaining all for demonstration.

Course Outcomes:
After completion of this labthe student will be able to

1. Apply wood working skills in real world applications.
2. Build different parts with metal sheets in real world applications.
3. Apply fitting operations in various applications.
4. Apply different types of basic electric circuit connections.
5. Demonstrate soldering and brazing.
6. Understanding the principle of automobile wheel balancing and alignment.

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I B.TECH – II SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A10304	**Engineering Graphics**	1	0	3	2.5

UNIT-I

Introduction to EngineeringDrawing, Principles of Engineering Graphics and their significance.
Curves used in practice:
Conic sections – Ellipse, Parabola, Hyperbola & Rectangular Hyperbola(general method)
Cycloid, Epicycloid and Hypocycloid – Normal and Tangent
Involutes – Normal and Tangents

UNIT –II

Principles of orthographic projections – First and Third angle projections Projection of points. Projections of lines inclined to one plane and inclined to both planes – True length, true angles of projected lines- Projection of regular planes inclined to one plane and both planes.

UNIT –III

Projection of solids inclined to one plane and inclined to both planes by rotational method – Prism, Cylinder, Pyramid, Cone.

UNIT –IV

Sections of solids: Sections and Sectional views of Regular solids – Prism, Cylinder, Pyramid, Cone – True shapes. Development of Regular solids- Prism, Cylinder, Pyramid, Cone.

UNIT –V

Orthographic projections: Conversion of Pictorial views to orthographic views – Conventions.

Isometric projection: Isometric views of lines, plane figures, simple solids – orthographic views into isometric views.

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhat, Charotar Publishers
2. Engineering Drawing, K.L. Narayana & P. Kannaih, Scitech Publishers, Chennai.

REFERENCES:

3. Engineering Drawing, Johle, Tata McGraw-Hill Publishers.
4. Engineering Drawing, Shah and Rana,2/e, Pearson Education
5. Engineering Drawing and Graphics, Venugopal/New age Publishers
6. Engineering Graphics, John&john.

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I B.TECH – II SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A10804	**Environmental Science**	3	0	0	3

OBJECTIVE: To make the students to get awareness on environment, to understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life to save earth from the inventions by the engineers.

UNIT – I:

MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES: – Definition, Scope and Importance – Need for Public Awareness.

NATURAL RESOURCES : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

UNIT – II:

ECOSYSTEMS: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem.
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

BIODIVERSITY AND ITS CONSERVATION : Introduction 0 Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – III:

ENVIRONMENTAL POLLUTION: Definition, Cause, effects and control measures of :

a. Air Pollution.
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

SOLID WASTE MANAGEMENT : Causes**,** effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT – IV:

SOCIAL ISSUES AND THE ENVIRONMENT: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT – V:

HUMAN POPULATION AND THE ENVIRONMENT: Population growth, variation among nations. Population explosion – Family Welfare Programmed. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health –

FIELD WORK : Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc..

TEXT BOOKS :

(1) Text book of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission, Universities Press.
(2) Environmental Studies by Palani Swamy – Pearson education
(3) Environmental Studies by Dr.S.AzeemUnnisa, Academic Publishing Company

REFERENCES :

(1) Textbook of Environmental Science by Deeksha Dave and E.Sai Baba Reddy, Cengage Pubilications.
(2) Text book of Environmental Sciences and Technology by M.Anji Reddy, BS Publication.
(3) Comprehensive Environmental studies byJ.P.Sharma, Laxmi publications.
(4) Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Printice hall of India Private limited.
(5) A Text Book of Environmental Studies by G.R.Chatwal, Himalaya Pubilishing House
(6) Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Printice hall of India Private limited.

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I B.TECH – II SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A15304	**Statistical Programming Lab**	3	0	0	3

1. History of R

2. Installing R and packages in R

3. Programs on data types in R

i. Use R to calculate the following

a) 31*78 b) 697/41

c) assign the value of 39 to X

d) assign the value of 22 to Y

e) make the value of X-Y

f) display the value of Z in the console

4. calculate the square root of 2345 and perform a log2 transformation on the result

5. Print 1 to 100 numbers in reverse order.

6. Find 10 random numbers between 0 and 100

7. Built-in functions in R

8. Creating and manipulating a vector in R

i) consider two vectors, X,Y X=c(4,6,5,7,10,9,4,15) Y=c(0.10.1.8.2.3.4.1) what is the value of X*Y and X+Y

ii) If X=c(1:2) what is the value of: dim(X)

what is the value of: length(X)

iii) I X= c('blue', 'red', green, 'black') what is the value of: is. Character(X)

9. Creating matrix and manipulating in R

i) matrix <- matrix (data = 1, nrow=3, ncolumn=3)

ii) vector8 <- 1:12 matrix3 <- matrix(data = vector8, nrow=4)

iii) V1 <- matrix(c(1,2,3,4,5,6,7,8,9), nrow=3)

iv) Consider A=matrix(c(2,0,1,3),ncol=2) and B=matrix(c(5,2,4,-1),ncol=2)

a) Find A+B b) Find A-B

10. Creating and operations on factor in R

i) If X=c(1,2,3,,3,5,3,2,4,NA), what are the levels of Factor(X)?

11. Operations on data frames in R

i) Create the following data frame, afterwards invert Age for all Individuals.

	Age	Height	Weight	Sex
Alex	25	177	57	F
Lilly	23	163	69	F
Mark	52	190	83	M
Oliver	76	179	75	M
Martha	49	163	70	F
Lucas	26	183	83	M
Caroline	31	164	53	F

12. Operations in lists in R
13. Programs on operators in R
14. Comparison of matrices and vectors in R
15. Programs on if-else statements in R
16. programs on while loops in R
17. customising and saving to graphs in R
18. PLOT function in R to customize graphs
19. 3D PLOT in R to customise graphs

Text Books:

1.Introduction to Scientific Programming and Simulation Using R, Owen Jones, Robert Maillardet and Andrew Robinson, Second Edition, CRC Press, 2014

The Art of Data Science: A Guide for Anyone Who Works with Data,RogerD.Peng,Elizabeth Matsui, LeanPub, 2015.

3. Data Science for Business: What You Need to Know about Data Mining and Data-analytic Thinking, Foster Provost and Tom Fawcett. 2013

Elements of Statistical Learning, Trevor Hastie, Robert Tibshirani and Jerome Friedman, Springer, 2009.

Reference Books:

1. Mining of Massive Datasets,JureLeskovek, AnandRajaraman and Jeffrey Ullman. , Cambridge University Press. 2014.

2.Machine Learning: A Probabilistic Perspective.Kevin P. Murphy, MIT Press, 2013.

3. Avrim Blum, John Hopcroft and Ravindran Kannan. Foundations of Data Science.

4.Data Mining and Analysis: Fundamental Concepts and Algorithms, Mohammed J. Zaki and Wagner Miera Jr., Cambridge University Press. 2014.

5. R Programming for Data Science, Roger D. Peng, LeanPub, 2015.

6.Python for Data Science for Dummies, Luca Massaron and John Paul Mueller, John Wiley and Sons, 2015.

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I B.TECH – II SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A10505	**Python Programming Lab**	0	0	3	1.5

Course Objectives:

1. To train solving computational problems
2. To elucidate solving mathematical problems using Python programming language
3. To illustrate the features of Python language

Laboratory Experiments

1. Install Python Interpreter and use it to perform different Mathematical Computations. Try to do all the operations present in a Scientific Calculator
2. Write a function that draws a grid like the following:

```
+ - - - -  + - - - - +
|          |         |
|          |         |
|          |         |
|          |         |
+ - - - -  + - - - - +
|          |         |
|          |         |
|          |         |
|          |         |
+ - - - - + - - - - +
```

3. Write a function that draws a Pyramid with # symbols

```
      #
    # # #
  # # # # #
# # # # # # #
      .
      .
      .
```

Up to 15 hashes at the bottom

4. Using turtles concept draw a wheel of your choice
5. Write a program that draws Archimedean Spiral

6. The letters of the alphabet can be constructed from a moderate number of basic elements, like vertical and horizontal lines and a few curves. Design an alphabet that can be drawn with a minimal number of basic elements and then write functions that draw the letters. The alphabet can belong to any Natural language excluding English. You should consider at least Ten letters of the alphabet.
7. The time module provides a function, also named time that returns the current Greenwich Mean Time in "the epoch", which is an arbitrary time used as a reference point. On UNIX systems, the epoch is 1 January 1970.

   ```
   >>> import time
   >>>time.time()
   1437746094.5735958
   ```

   Write a script that reads the current time and converts it to a time of day in hours, minutes, and seconds, plus the number of days since the epoch.
8. Given $n+r+1 <= 2^r$ .n is the input and r is to be determined. Write a program which computes minimum value of r that satisfies the above.
9. Write a program that evaluates Ackermann function
10. The mathematician Srinivasa Ramanujan found an infinite series that can be used to generate a numerical approximation of 1/**π** :
11. Write a function called estimate_pi that uses this formula to compute and return an estimate of **π.**

$$\frac{1}{\pi} = \frac{2\sqrt{2}}{9801} \sum_{k=0}^{\infty} \frac{(4k)!(1103 + 26390k)}{(k!)^4 396^{4k}}$$

   It should use a while loop to compute terms of the summation until the last term is smaller than 1e-15 (which is Python notation for 10^{-15}). You can check the result by comparing it to math.pi.
12. Choose any five built-in string functions of C language. Implement them on your own in Python. You should not use string related Python built-in functions.
13. Given a text of characters. Write a program which counts number of vowels, consonants and special characters.
14. Given a word which is a string of characters. Given an integer say 'n'. Rotate each character by 'n' positions and print it. Note that 'n' can be positive or negative.
15. Given rows of text, write it in the form of columns.

16. Given a page of text. Count the number of occurrences of each latter (Assume case insensitivity and don't consider special characters). Draw a histogram to represent the same
17. Write program which performs the following operations on list's. Don't use built-in functions
    a) Updating elements of a list
    b) Concatenation of list's
    c) Check for member in the list
    d) Insert into the list
    e) Sum the elements of the list
    f) Push and pop element of list
    g) Sorting of list
    h) Finding biggest and smallest elements in the list
    i) Finding common elements in the list

18. Write a program that reads a file, breaks each line into words, strips whitespace and punctuation from the words, and converts them to lowercase.

19. Go to Project Gutenberg (http://gutenberg.org) and download your favorite out-of-copyright book in plain text format. Read the book you downloaded, skip over the header information at the beginning of the file, and process the rest of the words as before. Then modify the program to count the total number of words in the book, and the number of times each word is used. Print the number of different words used in the book. Compare different books by different authors, written in different eras.

20. Go to Project Gutenberg (http://gutenberg.org) and download your favorite out-of-copyright book in plain text format. Write a program that allows you to replace words, insert words and delete words from the file.

21. Consider all the files on your PC. Write a program which checks for duplicate files in your PC and displays their location. Hint: If two files have the same checksum, they probably have the same contents.

22. Consider turtle object. Write functions to draw triangle, rectangle, polygon, circle and sphere. Use object oriented approach.

23. Write a program illustrating the object oriented features supported by Python.

24. Design a Python script using the Turtle graphics library to construct a turtle bar chart representing the grades obtained by N students read from a file categorising them into distinction, first class, second class, third class and failed.

25. Design a Python script to determine the difference in date for given two dates in YYYY:MM:DD format(0 <= YYYY <= 9999, 1 <= MM <= 12, 1 <= DD <= 31) following the leap year rules.

26. Design a Python Script to determine the time difference between two given times in HH:MM:SS format.(0 <= HH <= 23, 0 <= MM <= 59, 0 <= SS <= 59)

Course outcomes: Student should be able to

1. Design solutions to mathematical problems (L6)
2. Organize the data for solving the problem (L6)
3. Develop Python programs for numerical and text based problems (L3)
4. Select appropriate programming construct for solving the problem (L5)
5. Illustrate object oriented concepts (L3)

Reference Books:

1. Peter Wentworth, Jeffrey Elkner, Allen B. Downey and Chris Meyers, "How to Think Like a Computer Scientist: Learning with Python 3", 3rd edition, Available at http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf
2. Paul Barry, "Head First Python a Brain Friendly Guide" 2nd Edition, O'Reilly, 2016
3. DainelY.Chen "Pandas for Everyone Python Data Analysis" Pearson Education, 2019

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I B.TECH – II SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A10507	**Chemistry Lab**	0	0	3	1.5

COURSE OBJECTIVES	
1	Verify the fundamental concepts with experiments

COURSE OUTCOMES	
CO1	determine the cell constant and conductance of solutions
CO2	prepare advanced polymer materials
CO3	measure the strength of an acid present in secondary batteries
CO4	analyse the IR and NMR of some organic compounds
CO5	Would have acquired the practical skill to handle the analytical methods with confidence.

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		2		2	2		2		1		2		
CO2	3	2		2		2	2		2		1		2		
CO3	3	3		2		2	2		2		1		2		
CO4	3	2		2		2	2		2		1		2		
CO5	3	2		2		2	2		2		1		2		

LIST OF EXPERIMENTS

1. Conductometrictitration of strong acid vs strong base
2. Conductometrictitration of weak acid vs. strong base
3. Determination of cell constant and conductance of solutions
4. Potentiometry - determination of redox potentials and emfs
5. Estimation of Ferrous Iron by Dichrometry.
6. Determination of Strength of an acid in Pb-Acid battery
7. Preparation of a polymer
8. Verify Lambert-Beer's law
9. Thin layer chromatography
10. Identification of simple organic compounds by IR
11. Separation of Organic mixtures by paper chromatography.
12. Preparation of Nano materials

TEXT BOOKS:

1. Vogel's Text book of Quantitative Chemical Analysis, Sixth Edition – J. Mendham et al, Pearson Education.
2. Chemistry Practical – Lab Manual by Chandra Sekhar, GV Subba Reddy and Jayaveera

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I B.TECH – II SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A10508	**Data Structures Lab**	0	0	3	1.5

Course Objectives:

1. To introduce to the different data structures
2. To elucidate how the data structure selection influences the algorithm complexity
3. To explain the different operations that can be performed on different data structures
4. To introduce to the different search and sorting algorithms.

Laboratory Experiments

Week 1:

1. Searching Algorithms (With the Number of Key Comparisons)Sequential, Binary search.

Week 2:

2. Sorting Algorithms: Insertion Sort, Selection Sort, Shell Sort, and Bubble Sort.

Week 3:

3. Sorting Algorithms:, Quick Sort, Heap Sort,Merge Sort.

Week 4:

4. Implementation of Singly Linked List, Doubly Linked List, Circular Linked List

Week 5:

5. Stack implementation using arrays and Linked list.

Week 6:

6. Queue implementation using arrays and Linked list.

Week 7:

7. Implement Circular linked list using arrays and Linked list.

Week 8:

8. Implement double ended Queue using linked list.

Week 9:

9. Creation of binary search tree, performing operations insertion, deletion, and traversal.

Week 10:

10. Implement Breadth first and Depth first search techniques in graphs.

Week 11:

11. Implement file operations (Create, Read, append, close).

Week 12:

12. Convert infix expression into post fix expression.
13. Evaluate post fix expression.

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II B.TECH – I SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A20605	**Number theory and its Applications**	3	0	0	3

Course Objective:

This course enables the students to learn the concepts of number theory and its applications to information security.

Unit-I-Integers, Greatest common divisors and prime Factorization

The well-ordering property-Divisibility- Representation of integers-Computer operations with integers-Prime numbers-Greatest common divisors-The Euclidean algorithm -The fundamental theorem of arithmetic-Factorization of integers and the Fermat numbers-Linear Diophantine equations

Learning Outcomes:

Students will be able to

1. Understand basics of number theory concepts.
2. Solve problems on prime numbers.
3. Understand euclidean algorithm and its applications.

Unit-II-Congruences

Introduction to congruences -Linear congruences-The Chinese remainder theorem-Systems of linear congruences

Learning Outcomes:

Students will be able to

1. Understand Congruences and its basic properties.
2. Understand Chinese remainder theorem and its applications.

Unit-III Applications of Congruences

Divisibility tests-The perpetual calendar-Round-robin tournaments-Computer file storage and hashing functions. Wilson's theorem and Fermat's little theorem- Pseudo primes- Euler's theorem- Euler's p hi-function- The sum and number of divisors- Perfect numbers and Mersenne primes.

Learning Outcomes:

Students will be able to

1. Understand divisibility tests.
2. Apply the concept of congruences to various applications.
3. Understand various theorems on number theory and its applications.

Unit-IV- Finite fields & Primality, factoring

Finite fields- quadratic residues and reciprocity-Pseudo primes-rho method-fermat factorization and factor bases.

Learning outcomes:

Students will be able to

1. Understand the terminology of finite fields.
2. Understand rho method and fermat factorization.

Unit-V- Cryptology

Basic terminology-complexity theorem-Character ciphers-Block ciphers-Exponentiation ciphers- Public-key cryptography-Discrete logarithm-Knapsack ciphers- RSA algorithm-Some applications to computer science.

Learning Outcomes:

Students will be able to

1. Understand the terminology of cryptology.
2. Understand different encryption mechanisms.

Text books:

1. Elementary number theory and its applications, kenneth h rosen, at & t information systems & bell laboratories.
2. A course in Number theory & Cryptography, Neal Koblitz, Springer.

Reference Books:

1. An Introduction To The Theory Of Numbers, Herbert S. Zuckerman, Hugh L. Montgomery, Ivan Niven, wiley publishers
2. Introduction to Analytic number theory-Tom M Apostol, springer
3. Elementary number theory, VK Krishnan, Universities press

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Course Outcomes:

After the completion of course, student will be able to

1. Understand number theory and its properties.
2. Understand principles on congruences
3. Develop the knowledge to apply various applications

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II B.TECH – I SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A20501	**DIGITAL LOGIC DESIGN**	3	0	0	3

Course Objectives:

- Understanding basic number systems, codes and logical gates.
- Acquiring the skills to manipulate and examine Boolean algebraic expressions, logical operations, and Boolean functions
- Acquainting with classical hardware design for both combinational and sequential logic circuits
- Experiencing about synchronous circuits.
- Obtaining the knowledge about various types of memories.

UNIT - I

Digital Systems and Binary Numbers: Digital Systems, Binary Numbers, Number base conversions, Octal, Hexadecimal and other base numbers, complements, signed binary numbers, binary codes, binary storage and registers, binary logic.

Boolean algebra and logic gates: Basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, Digital Logic Gates.

Unit Outcomes:

- Summarize the binary number system
- Illustrate various binary codes
- Describe the basic postulates of Boolean Algebra
- Develop a logic diagram using gates from a Boolean function

UNIT - II

Gate–Level Minimization: The Map Method, Four-Variable K-Map, sum of products, product of sums simplification, Don’t care conditions, Simplification by Quine- McClusky Method, NAND and NOR implementation and other two level implementations, Exclusive-OR function.

Unit Outcomes:

- Student is able to Apply the map method for simplifying Boolean Expressions.
- Apply don’t care conditions to simplify a Karnaugh map.
- Design two-level Boolean functions with NAND gates and NOR gates

UNIT - III

Combinational Logic: Combinational Circuits, Analysis of Combinational Circuits, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers and Demultiplexers.

Unit Outcomes:

Student is able to

- Select fundamental combinational logic circuits.
- Analyze and design combinational circuits.
- Design Boolean function with a multiplexer.

UNIT - IV

Synchronous Sequential Circuits: Latches, Flip-flops, analysis of clocked sequential circuits, Register and Counters: Registers, Shift registers, Ripple counters, Synchronous counters and other counters.

Unit Outcomes:

Student is able to

- Explain the functionalities of latch and different flip-flops.
- Analyze and design clocked sequential circuits. Describe the use of sequential circuit components in complex digital systems.

UNIT - V

Memory and Programmable Logic: Random-Access memory, Memory decoding, ROM, Programmable Logic Array, Programmable Array Logic, Sequential programmable devices.

Digital Integrated Circuits: RTL and DTL Circuits, Transistor-Transistor Logic (TTL), EmitterCoupled Logic (ECL), MOS, CMOS Logic, Comparisons of Logic Families

Unit Outcomes:

Student is able to

- Interpret the types of memories.
- Construct the Boolean functions with PLA and PAL.
- Describe the most common integrated circuit digital logic families.

Course Outcomes:

Students should be able to

- Analyze the number systems and codes.
- Decide the Boolean expressions using Minimization methods.
- Design the sequential and combinational circuits.
- Apply state reduction methods to solve sequential circuits.
- Describe various types of memories.

TEXT BOOKS:

1. M. Morris Mano, M.D. Ciletti, “Digital Design”, 5th edition, Pearson, 2018.

REFERENCE BOOKS:

1. Donald P Leach, Albert Paul Malvino, Goutam Saha, “Digital Principles and applications”, Mc Graw Hill , 8th Edition,2015.

2. David J. Comer, “Digital Logic & State Machine Design”, Oxford University Press, 3rd Reprinted Indian Edition, 2012

3. R.D. Sudhakar Samuel, “Digital Logic Design”, Elsevier Publishers.

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II B.TECH – I SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A20502	**OOPS Through JAVA**	2	0	0	2

Course Objectives:

- To understand object oriented concepts and problem solving techniques
- To obtain knowledge about the principles of inheritance and polymorphism
- To implement the concept of packages, interfaces, exception handling and concurrency mechanism.
- To design the GUIs using applets and swing controls.
- To understand the Java Database Connectivity Architecture

UNIT - I

Introduction: Introduction to Object Oriented Programming, The History and Evolution of Java, Introduction to Classes, Objects, Methods, Constructors, this keyword, Garbage Collection, Data Types, Variables, Type Conversion and Casting, Arrays, Operators, Control Statements, Method Overloading, Constructor Overloading, Parameter Passing, Recursion, String Class and String handling methods.

Unit Outcomes:

Student should be able to

- Understand the syntax, semantics and features of Java Programming Language.
- Learn object oriented features and understanding type conversion and casting.
- Understand different types of string handling functions and its usage.

UNIT - II

Inheritance: Basics, Using Super, Creating Multilevel hierarchy, Method overriding, Dynamic Method Dispatch, Using Abstract classes, Using final with inheritance, Object class,

Packages: Basics, Finding packages and CLASSPATH, Access Protection, Importing packages.

Interfaces: Definition, Implementing Interfaces, Extending Interfaces, Nested Interfaces, Applying Interfaces, Variables in Interfaces.

Unit Outcomes:

Student should be able to

- Implement types of Inheritance and developing new classes based on existing classes

- Distinguish between system packages and user defined packages.
- Demonstrate features of interfaces to implement multiple inheritances.

UNIT - III

Exception handling - Fundamentals, Exception types, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built- in exceptions, creating own exception sub classes.

Stream based I/O (java.io) – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and writing Files, Random access file operations, The Console class, Serialization, Enumerations, Autoboxing, Generics.

Unit Outcomes:

Student should be able to

- Learn what exceptions are and how they are handled.
- Learn when to use exception handling and how to create user defined exceptions
- Learn the difference between various files and streams.

UNIT - IV

Multithreading: The Java thread model, Creating threads, Thread priorities, Synchronizing threads, Interthread communication.

The Collections Framework (java.util): Collections overview, Collection Interfaces The Collection classes- Array List, Linked List, Hash Set, Tree Set, Priority Queue, Array Deque. Hashtable, Properties, Stack, Vector, String Tokenizer, Bit Set, Date, Calendar, Random, Formatter, Scanner.

Unit Outcomes:

Student should be able to

- Understand concurrency, parallelism and multithreading
- Learn the importance of collections and use prebuilt generic data structures from framework.

UNIT – V

Applet: Basics, Architecture, Applet Skeleton, requesting repainting, using the status window, passing parameters to applets

GUI Programming with Swings – The origin and design philosophy of swing, components and containers, layout managers, event handling, using a push button, jtextfield, jlabel and image icon, the swing buttons, jtext field, jscrollpane, jlist, jcombobox, trees, jtable, An overview of jmenubar, jmenuand jmenuitem, creating a main menu, showmessagedialog, showconfirmdialog, showinputdialog, showoptiondialog, jdialog, create a modeless dialog.

Accessing Databases with JDBC:

Types of Drivers, JDBC Architecture, JDBC classes and Interfaces, Basic steps in developing JDBC applications, Creating a new database and table with JDBC.

Unit Outcomes:

Student should be able to

- Learn how to use the Nimbus look-and-feel
- Understand the GUI programming.
- Understand basic steps in developing JDBC applications,

Course Outcomes:

After the completion of the course the student will be able

- To solve real world problems using OOP techniques.
- To apply code reusability through inheritance, packages and interfaces
- To solve problems using java collection framework and I/O classes.
- To develop applications by using parallel streams for better performance.
- To develop applets for web applications.
- To build GUIs and handle events generated by user interactions.
- To use the JDBC API to access database

Text Books:

1. Herbert Schildt "Java The complete reference", 9th edition, McGraw Hill Education (India) Pvt. Ltd.

2. Paul Dietel, Harvey Dietel "Java How to Program", 10th Edition, Pearson Education.

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II B.TECH – I SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A20503	**DESIGN AND ANALYSIS OF ALGORITHMS**	**3**	0	0	3

Course Objectives:

- To demonstrate the importance of algorithms in computing.
- To explain the analysis of algorithms
- To illustrate the method of finding the complexity of algorithms
- To explain the advanced algorithm design and analysis techniques.
- To introduce special classes of algorithms NP – completeness and the classes P and NP.

UNIT- I

Introduction: Algorithm, Algorithm specification, Performance analysis.

Divide and Conquer: General method, Binary Search, Finding the maximum and minimum, Merge sort, Quick Sort, Selection, Strassen's matrix multiplication.

At the end of the unit, students will be able to:

- Understand growth functions and Asymptotic notations
- Derive the recurrence equation for running time of a given algorithm and solve.
- Understand the general principle of Divide and Conquer and identify suitable problems to apply Divide and Conquer paradigm
- Analyze the time complexities of Binary Search, Finding the maximum and minimum, and Strassen's matrix multiplication algorithms.
- Compare complexities of Merge sort, Quick sort and Selection sort techniques

UNIT -II

Greedy Method General method, Knapsack problem, Job Scheduling with Deadlines, Minimum cost Spanning Trees, Optimal storage on tapes, Single-source shortest paths.

Dynamic programming: General Method, Multistage graphs, All-pairs shortest paths, Optimal binary search trees, 0/1 knapsack, the traveling salesperson problem.

At the end of the unit, students will be able to:

- Understand optimization problems and the general principles of Greedy and Dynamic Programming paradigms to solve them.
- Apply subset and ordering paradigms of greedy strategy for Knapsack problem, Job Scheduling with Deadlines, Minimum cost Spanning Trees, Optimal storage on tapes, and finding Single-source shortest paths.
- Define Principle of optimality with examples.
- Differentiate Greedy and Dynamic programming paradigms.
- Apply dynamic programming strategy for Optimal binary search trees, Multistage graphs, All-pairs shortest paths, 0/1 knapsack, the traveling salesperson problem.

UNIT -III

Basic Traversal and Search Techniques: Techniques for binary trees, Techniques for Graphs, Connected components and Spanning trees, Bi-connected components and DFS

Back tracking: General Method, 8 – queens problem, Sum of subsets problem, Graph coloring and Hamiltonian cycles, Knapsack Problem.

At the end of the unit, students will be able to:

- Define solution space tree.
- Illustrate graph search strategies: BFS, DFS and D-Search .
- Determine articulation points and bi-connected components in a given graph using Depth First Spanning Trees.
- Demonstrate the recursive and iterative backtracking algorithms.
- Apply backtracking strategy to solve N – queens problem, Sum of subsets problem and Knapsack problem.
- Apply backtracking to solve m-colorability optimization problem.
- Determine all possible Hamiltonian Cycles in a graph using backtracking algorithm.

UNIT- IV

Branch and Bound: The method, Travelling salesperson, 0/1 Knapsack problem, Efficiency considerations

Lower Bound Theory: Comparison trees, Lower bounds through reductions – Multiplying triangular matrices, inverting a lower triangular matrix, computing the transitive closure.

At the end of the unit, students will be able to:

- Illustrate the state space search techniques; FIFO, LIFO and LC.
- Analyze the advantage of bounding functions in Branch and Bound technique to solve the Travelling Salesperson problem.
- Compare the LC and FIFO branch and bound solutions for 0/1 knapsack problem.
- Understand lower bound theory concept in solving algebraic problems.

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UNIT- V

NP – Hard and NP – Complete Problems: NP Hardness, NP Completeness Consequences of being in P, Cook‘s Theorem, Reduction Source Problems, Reductions: Reductions for some known problems

At the end of the unit, students will be able to:

- Differentiate deterministic and Non-deterministic algorithms.
- Define P, NP, NP –hard and NP-complete classes of problems.
- Understand the satisfiability problem.
- State Cook’s Theorem.
- Understand the reduction techniques.

Course outcomes

- Determine the time complexity of an algorithm by solving the corresponding recurrence equation
- Apply the Divide and Conquer strategy to solve searching, sorting and matrix multiplication problems. Analyze the efficiency of Greedy and Dynamic Programming design techniques to solve the optimization problems.
- Apply Backtracking technique for solving constraint satisfaction problems.
- Analyze the LC and FIFO branch and bound solutions for optimization problems, and compare the time complexities with Dynamic Programming techniques.
- Define and Classify deterministic and Non-deterministic algorithms; P, NP, NP –hard and NP-complete classes of problems.

Text Books

1. Ellis Horowitz, SartajSahni and Rajasekaran, “Fundamentals of Computer Algorithms”, 2nd Edition, 2012, University Press.

2. ParagHimanshu Dave and HimanshuBhalchandra Dave, “Design and Analysis of Algorithms”, Second Edition, Pearson Education.

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II B.TECH – I SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A22451	**Basic Electrical and Electronics Engineering**	3	0	0	3

Electrical Engineering

Course Objectives:

To make the students learn about:

1	The basics of AC & DC Circuits, DC generators &motors.
2	The construction and operation of Transformers, Induction motors and their performance aspects will be studied.

Course Outcomes:

After completing the course, the student should be able to :

CO1	understand the basics of AC & DC circuits and AC & DC machines
CO2	analyze the circuit elements, various AC and DC machines

Mapping of Course outcomes with Program outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												

Syllabus:

UNIT – I Introduction to DC & AC Circuits

Ohm's Law, Basic Circuit Components, Kirchhoff's Laws, Resistive Networks, Series Parallel Circuits, Star-Delta and Delta-Star Transformation. Principle of AC Voltages, Waveforms and Basic Definitions, Root Mean Square and Average Values of Alternating Currents and Voltage, Form Factor and Peak

Factor, Phasor Representation of Alternating Quantities, The 'j'Operator and Phasor Algebra, Basic concepts of AC series circuits.

Unit Outcomes : After the completion of the unit the students will be able to
1. Perceive and analyze the basic laws of electrical circuits
2. Apply to basic laws to solve real life problems

UNIT-II: DC Machines

Constructional details of DC Machines

DC Generators: Principle of Operation, EMF equation, Types, O.C.C. of a DC Shunt Generator

DC Motors:Principle of Operation, Types, Torque Equation, Losses and Efficiency Calculation, Swinburne's Test, concepts of speed control.

Unit Outcomes : After the completion of the unit the students will be able to
1. Apprehend and interpret basic principles of DC machines
2. Evaluate the performance of DC machines

UNIT-III AC Machines

Transformers: Principles of Operation, Constructional Details, Losses and Efficiency, Regulation of Transformer, Testing: OC & SC Tests.

Three Phase Induction Motors: Principle of Operation, Slip and Rotor Frequency, Torque (Simple Problems)..

Alternators: Principle of Operation, Constructional Details, EMF Equation, Voltage Regulation by Synchronous Impedance Method.

Unit Outcomes: After the completion of the unit the students will be able to
1. Identify different types of AC machines
2. Analyze the performance of various AC machines

TEXT BOOKS:

1. Basic Electrical Engineering - By M.S.Naidu and S. Kamakshiah – TMH.
2. Basic Electrical Engineering –By T.K.Nagasarkar and M.S. Sukhija Oxford University Press.
3. Electrical and Electronic Technology-By Hughes – Pearson Education.

REFERENCES:

1. Theory and Problems of Basic Electrical Engineering by D.P.Kothari& I.J. Nagrath PHI.
2. Principles of Electrical Engineering by V.K Mehta, S.Chand Publications.
3. Fundamentals of Electrical Electronics Engineering by T.Thyagarajan, SCITECH Publications 5th Edition-2007

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Basic electrical and Electronics Engineering

COURSE OBJECTIVES

1. Understand principles and terminology of electronics.
2. Familiar with the theory, construction, and operation of electronic devices.
3. Learn about biasing of BJTs and MOSFETs.
4. Design and construct amplifiers.

UNIT- I

P-N Junction Diode: Diode equation, Energy Band diagram, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Load line analysis, Diffusion and Transition Capacitances.

Rectifiers and Filters: P-N junction as a rectifier – Half Wave Rectifier, Ripple Factor – Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L- section Filters, π- section Filters.

UNIT- II

Bipolar Junction Transistor (BJT): Construction, Principle of Operation, Symbol, Amplifying Action, Common Emitter, Common Base and Common Collector configurations. Transistor Biasing and Stabilization – Operating point, DC and AC load lines, Biasing – Fixed Bias, Emitter Feedback Bias, Collector to Emitter feedback bias, Voltage divider bias, Bias stability, Stabilization against variations in V_{BE} and β, Bias Compensation using Diodes and Transistors.

BJT Amplifiers: Classification of Amplifiers, Analysis of CE, CC, and CB Amplifiers and CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors, Design of single stage RC coupled amplifier.

UNIT- III

Junction Field Effect Transistor: JFET/MOSFET Construction, Principle of Operation, Symbol, Volt-Ampere Characteristic, Comparison of BJT and FET, Small Signal Model, Biasing FET/MOSFET.

Special Purpose Devices: Breakdown Mechanisms in Semi-Conductor Diodes, Zener diode characteristics, Use of Zener diode as simple regulator, Principle of operation and Characteristics of Tunnel Diode (With help of Energy band diagram) and Varactor Diode, Principle of Operation of SCR.

TEXT BOOKS:

1. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, PEI/PHI, 9^{th} Ed, 2006.
2. Electronic Devices and Circuits – J.Millman and C.C.Halkias, Satyabratajit, TMH, 2/e, 1998.

REFERENCES:

1. Introduction to Electronic Devices and Circuits-Rober T. Paynter, Pearson Education.
2. Electronic Devices and Circuits – Anil K. Maini, VarshaAgarwal – Wiley India Pvt. Ltd. 1/e 2009.
3. Electronic Devices and Circuits – Muhammad H.Rashid, 2nd Edition, Cengage Learning.

COURSE OUTCOMES:

After the completion of the course students will able to

CO1: Explain the theory, construction, and operation of electronic devices.
CO2: Apply the concept of science and mathematics to explain the working of diodes and its applications, working of transistor and its characteristics.
CO3: Design and analyze small signal amplifier circuits applying the biasing techniques.
CO4: Design simple amplifier circuits. Analyze the small signal equivalent circuits of transistors.
CO5: Correlate the fundamental concepts to various Real life applications of today.

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II B.TECH – I SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A20504	**Database Management Systems**	3	0	0	3

Course objectives:

This course is designed to:

- Train in the fundamental concepts of database management systems, database modeling and design, SQL, PL/SQL and system implementation techniques.
- Enable students to model ER diagram for any customized application
- Inducting appropriate strategies for optimization of queries.
- Provide knowledge on concurrency techniques
- Demonstrate the organization of Databases

UNIT-I: Introduction: Database systems applications, Purpose of Database Systems, view of Data, Database Languages, Relational Databases, Database Design, Data Storage and Querying, Transaction, Management Database Architecture, Data Mining and Information Retrieval, Specialty Databases, Database users and Administrators,

Introduction to Relational Model: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations

At the end of the Unit, students will be able to:

- Distinguish between Database and File System
- Categorize different kinds of data models
- Define functional components of DBMS

UNIT-II: Introduction to SQL: Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Sub-queries, Modification of the Database. Intermediate SQL: Joint Expressions, Views, Transactions, Integrity Constraints, SQL Data types and schemas, Authorization.

Advanced SQL: Accessing SQL from a Programming Language, Functions and Procedures, Triggers, Recursive Queries, OLAP, Formal relational query languages.

At the end of the Unit, students will be able to:

- Outline the elements of the relational model such as domain, attribute , tuple, relation and entity

- Distinguish between various kinds of constraints like domain, key and integrity
- Define relational schema
- Develop queries using Relational Algebra and SQL
- Perform DML operations on databases

UNIT-III: Database Design and the E-R Model: Overview of the Design Process, The EntityRelationship Model, Constraints, Removing Redundant Attributes in Entity Sets, EntityRelationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues.

Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional-Dependency Theory, Algorithms for Decomposition, Decomposition Using Multivalued Dependencies, More Normal Forms

At the end of the Unit, students will be able to:

- Develop E-R model for the given problem
- Derive tables from E-R diagrams
- Differentiate between various normal forms based on functional dependency
- Apply normalization techniques to eliminate redundancy

UNIT-IV: Query Processing: Overview, Measures of Query cost, Selection operation, sorting, Join Operation, other operations, Evaluation of Expressions. Query optimization: Overview, Transformation of Relational Expressions, Estimating statistics of Expression results, Choice of Evaluation Plans, Materialized views, Advanced Topics in Query Optimization.

At the end of the Unit, students will be able to:

- Identify variety of methods for effective processing of given queries.
- Obtain knowledge related to optimization techniques.

UNIT V: Transaction Management: Transactions: Concept, A Simple Transactional Model, Storage Structures, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Isolation and Atomicity, Transaction Isolation Levels, Implementation of Isolation Levels, Transactions as SQL Statements. Concurrency Control: Lock based Protocols, Deadlock Handling, Multiple granularity, Timestamp based Protocols, Validation based Protocols. Recovery System: Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with Loss of Nonvolatile Storage, Early Lock Release and Logical Undo Operations.

At the end of the Unit, students will be able to:

1. Understand various properties of transaction.
2. Design atomic transactions for an application.
3. Gain the knowledge about log mechanism and check pointing techniques for system recovery.

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Course Outcomes, Students will be able to :

- Design a database for a real world information system
- Define transactions which preserve the integrity of the database
- Generate tables for a database
- Organize the data to prevent redundancy
- Pose queries to retrieve the information from database.

TEXT BOOKS:

1. A.Silberschatz, H.F.Korth, S.Sudarshan, “Database System Concepts”, 6/e, TMH 2019

REFERENCE BOOKS:

1. Shamkant B. Navathe, “Database Management System” 6/e RamezElmasri PEA
2. “Database Principles Fundamentals of Design Implementation and Management”, Carlos Coronel, Steven Morris, Peter Robb, Cengage Learning.
3. Raghurama Krishnan, Johannes Gehrke, “Database Management Systems”, 3/e, TMH

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II B.TECH – I SEMESTER

SubjectCode	TitleoftheSubject	L	T	P	C
19A20901	**Universal Human Values**	2	0	0	2

Course Objectives:

- Exposure to the value of life, society and harmony
- Leading towards holistic perspective based on self-exploration about themselves (human being), family, and society and nature/existence.
- Bringing transition from the present state to Universal Human Order
- Instill commitment and courage to act.
- Know about appropriate technologies and management patterns

Course Outcomes:

CO1: Analyze the terms like Natural Acceptance, Happiness and Prosperity
CO2: Understand awareness of oneself, and one's surroundings (family, society nature)
CO3: Apply what they have learnt to their own self in different day-to-day settings in real life
CO4: Relate human values with human relationship and human society.
CO5: Justify the need for universal human values and harmonious existence
CO6: Develop as socially and ecologically responsible engineers

CO & PO Attainments:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3								3					
CO2							3			2	3		3		
CO3		2						3			3		2		
CO4		2						3		2					3
CO5		2						2		2					2
CO6			3				3							3	

UNIT – I: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

Universal Human Values-I – Self-Exploration- content and process; 'Natural Acceptance' and Experiential Validation – self-exploration - Continuous Happiness and Prosperity - Human Aspirations - current scenario - Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT – II: Understanding Harmony among Human Beings & Self Harmony!

Human being as a co-existence of the sentient 'I' and the material' Body' - the needs - happiness and physical facility -the Body as an instrument of 'I' - the characteristics and activity of 'I' and harmony in 'I' - the harmony of I with the Body

UNIT – III:Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship
Values in human relationship; meaning of Justice; Trust and Respect; Difference between intention and competence; the other salient values in relationship - the harmony in the society: Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals – Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

UNIT – IV: **Understanding Harmony in the Nature and Existence - Whole existence as Coexistence**
The harmony in the Nature - Interconnectedness and mutual fulfillment among the four orders of nature-recyclability and self-regulation in nature - Understanding Existence as Co-existence of mutually interacting units in all- pervasive space - Holistic perception of harmony at all levels of existence.

UNIT – V: Implications of the above Holistic Understanding of Harmony on Professional Ethics
Humanistic Education - Competence in professional ethics: professional competence - people friendly and eco-friendly production systems - appropriate technologies and management patterns for above production systems. Individuals as socially and ecologically responsible engineers, technologists and managers.

Textbooks:
1. A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
2. Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

Reference Books:
1. JeevanVidya: EkParichaya, ANagaraj, JeevanVidyaPrakashan, Amarkantak, 1999
2. HumanValues, A.N.Tripathi, NewAgeIntl.Publishers, NewDelhi,2004.
3. The Story of Stuff (Book).
4. Economy of Permanence - J C Kumarappa 8. Bharat Mein Angreji Raj - PanditSunderlal 9. Rediscovering India - byDharampal
5. Hind Swaraj or Indian Home Rule - by Mohandas K.Gandhi
6. India Wins Freedom - Maulana Abdul Kalam Azad 12. Vivekananda - Romain Rolland (English)

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II B.TECH – I SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A20505	**OOPS Through Java Lab**	0	0	3	1.5

Course Objectives

- To introduce the concepts of Java.
- To Practice object-oriented programs and build java applications.
- To implement java programs for establishing interfaces.
- To implement sample programs for developing reusable software components.
- To establish database connectivity in java and implement GUI applications.

Week-1

a. Installation of Java software, study of any integrated development environment, Use Eclipse or Netbean platform and acquaint with the various menus. Create a test project, add a test class and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with java program to find prime numbers between 1 to n.

b. Write a Java program that prints all real solutions to the quadratic equation ax2+bx+c=0. Read in a, b, c and use the quadratic formula.

c. Develop a Java application to generate Electricity bill. Create a class with the following members: Consumer no., consumer name, previous month reading, current month reading, and type of EB connection (i.e domestic or commercial). Commute the bill amount using the following tariff.

If the type of the EB connection is domestic, calculate the amount to be paid as follows:

- First 100 units - Rs. 1 per unit
- 101-200 units - Rs. 2.50 per unit
- 201 -500 units - Rs. 4 per unit
- > 501 units - Rs. 6 per unit

If the type of the EB connection is commercial, calculate the amount to be paid as follows:

- First 100 units - Rs. 2 per unit
- 101-200 units - Rs. 4.50 per unit
- 201 -500 units - Rs. 6 per unit
- > 501 units - Rs. 7 per unit

d. Write a Java program to multiply two given matrices.

Week-2

a. Write Java program on use of inheritance, preventing inheritance using final, abstract classes.

b. Write Java program on dynamic binding, differentiating method overloading and overriding.

c. Develop a java application to implement currency converter (Dollar to INR, EURO to INR, Yen) using Interfaces.

Week-3

a. Write Java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it's not a duplicate of any number already read display the complete set of unique values input after the user enters each new value.

b. Write a Java Program to create an abstract class named Shape that contains two integers and an empty method named print Area(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

c. Write a Java program to read the time intervals (HH:MM) and to compare system time if the system Time between your time intervals print correct time and exit else try again to repute the same thing. By using String Toknizer class.

Week-4

a. Write a Java program to implement user defined exception handling.

b. Write java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it‘s not a duplicate of any number already read. Display the complete set of unique values input after the user enters each new value.

Week-5

a. Write a Java program that creates a user interface to perform integer division. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 and Num2 were not integers, the program would throw a Number Format Exception. If Num2 were zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

b. Write a Java program that creates three threads. First thread displays ―Good Morning‖ every one second, the second thread displays ―Hello‖ every two seconds and the third thread displays ―Welcome‖ every three seconds.

Week-6

a. Write a java program to split a given text file into n parts. Name each part as the name of the original file followed by .part where n is the sequence number of the part file.

b. Write a Java program that reads a file name from the user, displays information about whether the file exists, whether the file is readable, or writable, the type of file and the length of the file in bytes.

Week-7

a. Write a java program that displays the number of characters, lines and words in a text file.

b. Write a java program that reads a file and displays the file on the screen with line number before each line.

Week-8

a. Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.

b. Develop a Java application for stack operation using Buttons and JOptionPane input and Message dialog box.

c. Develop a Java application to perform Addition, Division, Multiplication and substractionusingJOption Pane dialog Box and Text fields.

Week-9

a. Develop a Java application for the blinking eyes and mouth should open while blinking.

b. Develop a Java application that simulates a traffic light. The program lets the user select one of three lights: Red, Yellow or Green with radio buttons. On selecting a button an appropriate message with ―STOP‖ or ―READY‖ or ‖GO‖ should appear above the buttons in selected color. Initially, there is no message shown.

Week-10

a. Develop a Java application to implement the opening of a door while opening man should present before hut and closing man should disappear.

b. Develop a Java application by using JtextField to read decimal value and converting a decimal number into binary number then print the binary value in another JtextField.

Week-11

a. Develop a Java application that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. Use adapter classes.

b. Develop a Java application to demonstrate the key event handlers.

Week-12

a. Develop a Java application to find the maximum value from the given type of elements using a generic function.

b. Develop a Java application that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result.

c. Develop a Java application for handling mouse events.

Week-13

a. Develop a Java application to establish a JDBC connection, create a table student with properties name, register number, mark1, mark2, mark3. Insert the values into the table by using the java and display the information of the students at front end.

Course Outcomes:

On successful completion of this laboratory students will be able to:

- Recognize the Java programming environment.
- Develop efficient programs using multithreading.
- Design reliable programs using Java exception handling features.
- Extend the programming functionality supported by Java.
- Select appropriate programming construct to solve a problem.

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II B.TECH – I SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A22552	**Basic Electrical Electronics-Lab**	0	0	3	1.5

PART – A: BASIC ELECTRICAL ENGINEERING LAB

Course Objectives: To make the student learn about:

1	The DC motors, DC Generators and know various characteristics, performance analysis of DC machines and speed control techniques of DC machines.
2	Various test conditions of single phase transformers.

Course Outcomes:

After completing the course, the student should be able to do the following:

CO1	Learn about DC motors, DC Generators and know various characteristics, performance analysis of DC machines and speed control techniques of DC machines.
CO2	Various test conditions of single phase transformers.

Mapping of Course outcomes with Program outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												

Syllabus:

The following experiments are required to be conducted as compulsory experiments:

1. Swinburne’s Test on DC Shunt Machine (Predetermination of Efficiency of a Given DC Shunt Machine Working as Motor and Generator).
2. OC & SC Tests on Single-Phase Transformer (Predetermination of Efficiency and Regulation at Given Power Factors and Determination of Equivalent Circuit).
3. Brake Test on 3-Phase Induction Motor (Determination of Performance Characteristics)

4. Regulation of Alternator by Synchronous Impedance Methods.
5. Speed Control of D.C.ShuntMotor by
   a) Armature Voltage Control B) Field Flux Control Method
6. Brake Test on D.C Shunt Motor

ELECTRONICS ENGINEERING LAB

COURSE OBJECTIVES:

The students will be able to

1. Understand the characteristics of PN junction diode and zener diode.
2. Understand the characteristics of BJT in CE and CB configurations and FET in CS configuration.
3. Understand the application of diode as rectifier.
4. Learn the fundamental principles of amplifier circuits and need of Bias in Amplifier circuits.

LIST OF EXPERIMENTS:

1. PN Junction diode characteristics A) Forward bias B) Reverse bias.
2. Zener diode characteristics and Zener as voltage Regulator
3. Full Wave Rectifier with & without filter
4. Input & Output characteristics of Transistor in CB / CE configuration.
5. Input and Output characteristics of FET in CS configuration
6. Measurement of h-parameters of transistor in CB, CE, CC configurations
7. Frequency response of CE amplifier.
8. Frequency response of CS amplifier.

LAB REQUIREMENTS:

1. Cathode Ray Oscilloscopes (30MHz)
2. Signal Generator /Function Generators (3 MHz)
3. Dual Regulated Power Supplies (0 – 30V)
4. Bread Boards
5. Electronic Components

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COURSE OUTCOMES:

At the end of this course the student will be able to,

CO1: Learn and plot the characteristics of electronic devices Like PN junction diode, Zener diode and SCR.
CO2: Design and analyze the application of diode as rectifiers.
CO3: Learn and plot the characteristics of BJT & FET in Various configurations.
CO4: Measure the h-parameters experimentally.
CO5: Design and construct BJT & FET amplifiers and plot frequency response.

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II B.TECH – I SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A20506	**Database Management Systems Lab**	0	0	3	1.5

Course Objectives:

- To implement the basic knowledge of SQL queries and relational algebra.
- To construct database models for different database applications.
- To apply normalization techniques for refining of databases.
- To practice various triggers, procedures, and cursors using PL/SQL.
- To design and implementation of a database for an organization

Week-1: CREATION OF TABLES

1. Create a table called Employee with the following structure.

Name	**Type**
Empno	Number
Empname	Varchar2(20)
Job	Varchar2(20)
Mgr	Number
Sal	Number

a) Add a column commission with domain to the Employee table.
b) Insert any five records into the table.
c) Update the column details of job
d) Rename the column of Employ table using alter command.
e) Delete the employee whose empno is19.

2. Create department table with the following structure.

Name	**Type**

Deptno	Number
Deptname	Varchar2(20)
location	Varchar2(20)

a) Add column designation to the department table.
b) Insert values into the table.
c) List the records of emp table grouped by dept no.
d) Update the record where dept no is9.
e) Delete any column data from the table

3. Create a table called Customer table

Name	**Type**
Cust name	Varchar2(20)
Cust street	Varchar2(20)
Cust city	Varchar2(20)

a) Insert records into the table.
b) Add salary column to the table.
c) Alter the table column domain.
d) Drop salary column of the customer table.
e) Delete the rows of customer table whose ust_city is ‘hyd’.
f) Create a table called branch table.

Name	**Type**
Branch name	Varchar2(20)
Branch city	Varchar2(20)
asserts	Number

4. Increase the size of data type for asserts to the branch.

a) Add and drop a column to the branch table.
b) Insert values to the table.
c) Update the branch name column
d) Delete any two columns from the table

5. Create a table called sailor table

Name	**Type**
Sid	Number
Sname	Varchar2(20)
rating	Varchar2(20)

a) Add column age to the sailor table.
b) Insert values into the sailor table.
c) Delete the row with rating>8.
d) Update the column details of sailor.
e) Insert null values into the table.

6. Create a table called reserves table

Name	**Type**
Boat id	Integer
sid	Integer
day	Integer

a) Insert values into the reserves table.
b) Add column time to the reserves table.
c) Alter the column day data type to date.
d) Drop the column time in the table.`
e) Delete the row of the table with some condition.

Week-2: QUERIES USING DDL AND DML

1. a. Create a user and grant all permissions to the user.
   b. Insert the any three records in the employee table and use rollback. Check the result.
   c. Add primary key constraint and not null constraint to the employee table.
   d. Insert null values to the employee table and verify the result.

2. a. Create a user and grant all permissions to the user.
   b. Insert values in the department table and use commit.
   c. Add constraints like unique and not null to the department table.
   d. Insert repeated values and null values into the table.
3. a. Create a user and grant all permissions to the user.

b. Insert values into the table and use commit.
c. Delete any three records in the department table and use rollback.
d. Add constraint primary key and foreign key to the table.

4. a. Create a user and grant all permissions to the user.
   b. Insert records in the sailor table and use commit.
   c. Add save point after insertion of records and verify save point.
   d. Add constraints not null and primary key to the sailor table.
5. a. Create a user and grant all permissions to the user.
   b. Use revoke command to remove user permissions.
   c. Change password of the user created.
   d. Add constraint foreign key and not null.
6. a. Create a user and grant all permissions to the user.
   b. Update the table reserves and use save point and rollback.
   c. Add constraint primary key , foreign key and not null to the reserves table
   d. Delete constraint not null to the table column

Week-3:QUERIES USING AGGREGATE FUNCTIONS

1. a. By using the group by clause, display the names who belongs to dept no 10 along with average salary.
   b. Display lowest paid employee details under each department.
   c. Display number of employees working in each department and their department number.
   d. Using built in functions, display number of employees working in each department and their department name from dept table. Insert dept name to dept table and insert dept name for each row, do the required thing specified above.
   e. List all employees which start with either B or C.
   f. Display only these ename of employees where the maximum salary is greater than or equal to 5000.
2. a. Calculate the average salary for each different job.

   b. Show the average salary of each job excluding manager.

   c. Show the average salary for all departments employing more than three people.

   d. Display employees who earn more than the lowest salary in department 30

   e. Show that value returned by sign (n)function.

   f. How many days between day of birth to current date

3. a. Show that two substring as single string.

b. List all employee names, salary and 15% rise in salary.

c. Display lowest paid emp details under each manager

d. Display the average monthly salary bill for each deptno.

e. Show the average salary for all departments employing more than two people.

f. By using the group by clause, display the eid who belongs to dept no 05 along with a verage salary.

4. a. Count the number of employees in department20

   b. Find the minimum salary earned by clerk.

   c. Find minimum, maximum, average salary of all employees.

   d. List the minimum and maximum salaries for each job type.

   e. List the employee names in descending order.

   f. List the employee id, names in ascending order by empid.

5. a. Find the sids , names of sailors who have reserved all boats called “INTERLAKE Find the age of youngest sailor who is eligible to vote for each rating level with at least two such sailors.

   b. Find the sname, bid and reservation date for each reservation.

   c. Find the ages of sailors whose name begin and end with B and has at least 3characters.

   d. List in alphabetic order all sailors who have reserved red boat.

   e. Find the age of youngest sailor for each rating level.

6. a. List the Vendors who have delivered products within 6 months from or derdate.

   b. Display the Vendor details who have supplied both Assembled and Subparts.

   c. Display the Sub parts by grouping the Vendor type (Local or Non Local).

   d. Display the Vendor details in ascending order.

   e. Display the Sub part which costs more than any of the Assembled parts.

   f. Display the second maximum cost Assembled part

Week-4: PROGRAMS ON PL/SQL

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1. a. Write a PL/SQL program to swap two numbers.

   b. Write a PL/SQL program to find the largest of three numbers.

2. a. Write a PL/SQL program to find the total and average of 6 subjects and display the grade.

   b. Write a PL/SQL program to find the sum of digits in a given umber.

3. a. Write a PL/SQL program to display the number in reverse order.

   b. Write a PL/SQL program to check whether the given number is prime or not.

4. a. Write a PL/SQL program to find the factorial of a given number.

   b. Write a PL/SQL code block to calculate the area of a circle for a value of radius varying from 3 to 7. Store the radius and the corresponding values of calculated area in an empty table named areas, consisting of two columns radius and area.

5. a. Write a PL/SQL program to accept a string and remove the vowels from the string. (When 'hello' passed

to the program it should display 'Hll' removing e and o from the worldHello).

   b. Write a PL/SQL program to accept a number and a divisor. Make sure the divisor is less than or equal to

   10. Else display an error message. Otherwise Display the remainder in words.

Week-5: PROCEDURES AND FUNCTIONS

1. Write a function to accept employee number as parameter and return Basic +HRA together as single column.

2. Accept year as parameter and write a Function to return the total net salary spent for a givenyear.

3. Create a function to find the factorial of a given number and hence find NCR.

4. Write a PL/SQL block o pint prime Fibonacci series using local functions.

5. Create a procedure to find the lucky number of a given birth date.

6. Create function to the reverse of given number

Week-6: TRIGGERS

1. Create a row level trigger for the customers table that would fire for INSERT or UPDATE or DELETE operations performed on the CUSTOMERS table. This trigger will display the salary difference between the old values and new values:

CUSTOMERS table:

ID	NAME	AGE	ADDRESS	SALARY
1	Alive	24	Khammam	2000
2	Bob	27	Kadapa	3000
3	Catri	26	Guntur	4000
4	Dena	28	Hyerabad	5000
5	Eeshwar	27	Kurnool	6000
6	Farooq	28	Nellore	7000

2. Creation of insert trigger, delete trigger, update trigger practice triggers using the

passenger database. Passenger(Passport_ id INTEGER PRIMARY KEY, Name VARCHAR (50) NotNULL, Age Integer Not NULL, Sex Char, Address VARCHAR (50) NotNULL);

a. Write aInsert Trigger to check the Passport_id is exactly six digits ornot.

b. Write a trigger on passenger to display messages ‘1 Record is inserted’, ‘1 record is deleted’, ‘1 record is

updated’ when insertion, deletion and updation are done on passenger respectively.

3. Insert row in employee table using Triggers. Every trigger is created with name any trigger have same name must be replaced by new name. These triggers can raised before insert, update or delete rows on data base. The main difference between a trigger and a stored procedure is that the former is attached to a table and is only fired when an INSERT, UPDATE or DELETE occurs.

4. Convert employee name into uppercase whenever an employee record is inserted or updated. Trigger to fire

before the insert or update.

5. Trigger before deleting a record from emp table. Trigger will insert the row to be deleted into table called

delete _emp and also record user who has deleted the record and date and time of delete.

6. Create a transparent audit system for a table CUST_MSTR. The system must keep track of the records that

are being deleted or updated

Week-7: PROCEDURES

1. Create the procedure for palindrome of given number.

2. Create the procedure for GCD: Program should load two registers with two Numbers and then apply the logic for GCD of two numbers. GCD of two numbers is performed by dividing the greater number by the smaller number till the remainder is zero. If it is zero, the divisor is the GCD if not the remainder and the divisors of the previous division are the new set of two numbers. The process is repeated by dividing greater of the two numbers by the smaller number till the remainder is zero and GCD is found.

3. Write the PL/SQL programs to create the procedure for factorial of given number.

4. Write the PL/SQL programs to create the procedure to find sum of N natural number.

5. Write the PL/SQL programs to create the procedure to find Fibonacci series.

6. Write the PL/SQL programs to create the procedure to check the given number is perfect or not

Week-8: CURSORS

1. Write a PL/SQL block that will display the name, dept no, salary of fist highest paid employees.

2. Update the balance stock in the item master table each time a transaction takes place in the item transaction table. The change in item master table depends on the item id is already present in the item master then update operation is performed to decrease the balance stock by the quantity specified in the item transaction in case the item id is not present in the item master table then the record is inserted in the item master table.

3. Write a PL/SQL block that will display the employee details along with salary using cursors.

4. To write a Cursor to display the list of employees who are working as a Managers or Analyst.

5. To write a Cursor to find employee with given job and dept no.

6. Write a PL/SQL block using implicit cursor that will display message, the salaries of all the employees in the ‘employee’ table are updated. If none of the employee’s salary are updated we geta message 'None of the salaries were updated'. Else we get a message like for example, 'Salaries for 1000 employees are updated' if there are 1000 rows in ‘employee’ table

Week-9: CASE STUDY: BOOK PUBLISHING COMPANY

A publishing company produces scientific books on various subjects. The books are written by authors who specialize in one particular subject. The company employs editors who, not necessarily being specialists in a particular area, each take sole responsibility for editing one or more publications. A publication covers essentially one of the specialist subjects and is normally written by a single author. When writing a particular book, each author works with on editor, but may submit another work for publication to be supervised by other editors. To improve their competitiveness, the company tries to employ a variety of authors, more than one author being a specialist in a particular subject for the above case study, do the following:

1. Analyze the data required.

2. Normalize the attributes.

Create the logical data model using E-R diagrams

Week-10: CASE STUDY GENERAL HOSPITAL

A General Hospital consists of a number of specialized wards (such as Maternity, Pediatric, Oncology, etc). Each ward hosts a number of patients, who were admitted on the recommendation of their own GP and confirmed by a consultant employed by the Hospital. On admission, the personal details of every patient are recorded. A separate register is to be held to store the information of the tests undertaken and the results of a prescribed treatment. A number of tests may be conducted for each patient. Each patient is assigned to one leading consultant but may be examined by another doctor, if required. Doctors are specialists in some branch of medicine and may be leading consultants for a number of patients, not necessarily from the same ward. For the above case study, do the following.

1. Analyze the data required.

2. Normalize the attributes.

Create the logical data model using E-R diagrams

Week-11: CASE STUDY: CAR RENTAL COMPANY

A database is to be designed for a car rental company. The information required includes a description of cars, subcontractors (i.e. garages), company expenditures, company revenues and customers. Cars are to be described by such data as: make, model, year of production, engine size, fuel type, number of passengers, registration number, purchase price, purchase date, rent price and insurance details. It is the company policy not to keep any car for a period exceeding one year. All major repairs and maintenance are done by subcontractors (i.e. franchised garages), with whom CRC has long-term agreements. Therefore the data about garages to be kept in the database includes garage names, addresses, range of services and the like. Some garages require payments immediately after a repair has been made; with others CRC has made arrangements for credit facilities. Company expenditures are to be registered for all outgoings connected with purchases, repairs, maintenance, insurance etc. Similarly the cash inflow coming from all sources: Car hire, car sales, insurance claims must be kept of file. CRC maintains a reasonably stable client base. For this privileged category of customers special credit card facilities are provided. These customers may also book in advance a particular car. These reservations can be made for any period of time up to one month. Casual customers must pay a deposit for an estimated time of rental, unless they wish to pay by credit card. All major credit cards are accepted. Personal details such as name, address, telephone number, driving license, number about each customer are kept in the database.

For the above case study, do the following:

1. Analyze the data required.

2. Normalize the attributes.

Create the logical data model using E-R diagrams

Week-12: CASE STUDY: STUDENT PROGRESS MONITORING SYSTEM

A database is to be designed for a college to monitor students' progress throughout their course of study. The students are reading for a degree (such as BA, BA (Hons) M.Sc., etc) within the framework of the modular system. The college provides a number of modules, each being characterized by its code, title, credit value, module leader, teaching staff and the department they come from. A module is coordinated by a module leader who shares teaching duties with one or more lecturers. A lecturer may teach (and be a module leader for) more than one module. Students are free to choose any module they wish but the following rules must be observed: Some modules require pre- requisites modules and some degree programs have compulsory modules. The database is also to contain some information about students including their numbers, names, addresses, degrees they read for, and their past performance.

i.e. modules taken and examination results. For the above case study, do the following:

1. Analyze the datarequired.

2. Normalize theattributes.

3. Create the logical data model i.e., ERdiagrams.

4. Comprehend the data given in the case study by creating respective tables with primary keys and foreign keys whereverrequired.

5. Insert values into the tables created (Be vigilant about Master- Slavetables).

6. Display the Students who have taken M.Sccourse

7. Display the Module code and Number of Modules taught by eachLecturer.

8. Retrieve the Lecturer names who are not Module Leaders.

9. Display the Department name which offers ‘English’module.

10. Retrieve the Prerequisite Courses offered by every Department (with Departmentnames).

11. Present the Lecturer ID and Name who teaches‘Mathematics’.

12. Discover the number of years a Module istaught.

13. List out all the Faculties who work for ‘Statistics’Department.

14. List out the number of Modules taught by each ModuleLeader.

15. List out the number of Modules taught by a particularLecturer.

16. Create a view which contains the fields of both Department and Module tables. (Hint- The fields like Module code, title, credit, Department code and itsname).

17. Update the credits of all the prerequisite courses to 5. Delete the Module ‘History’ from the Moduletable.

Unit Outcomes:

Students should be able to

1. Design database for any real world problem

2. Implement PL/SQL programs

3. Define SQL queries

4. Decide the constraints

5. Investigate for data inconsistency

Reference Books:

1. RamezElmasri, Shamkant, B. Navathe, “Database Systems”, Pearson Education, 6th Edition, 2013.

2. Peter Rob, Carles Coronel, “Database System Concepts”, Cengage Learning, 7th Edition, 2008.

Web References: http://www.scoopworld.in

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II B.TECH – I SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A28801	**Biologyforengineers**	3	0	0	0

Course Objectives: To provide basic understanding about life and life Process. Animal an plantsystems.Tounderstandwhatbimolecules,are,theirstructuresarefunctions.Applicationofcertainbimolecules inIndustry.

- Briefintroductionabouthumanphysiologyandbioengineering.
- Tounderstandhereditaryunits,i.e.DNA(genes)andRNAandtheirsynthesisinlivingorganism.
- HowbiologyPrinciplescanbeappliedinourdailylifeusingdifferenttechnologies.
- Briefintroductiontotheproductionoftransgenicmicrobes,Plantsandanimals.

UnitI:IntroductiontoBasicBiology

Cell as Basic unit of life, cell theory, Cell shapes, Cell structure, Cell cycle. Chromosomes.Prokaryotic and eukaryotic Cell. Plant Cell, Animal Cell, Plant tissues and Animal tissues, Briefintroductiontofivekingdomsofclassification.

UnitOutcomes:

After completingthisunit,thestudentwillbeableto

- Summarizethebasisoflife.(L1)
- Understandthedifferencebetweenlowerorganisms(prokaryotes)fromhigherorganisms(eukaryotes).(L2)
- Understandhoworganismsareclassified.(L3)

UnitII:IntroductiontoBiomolecules

Carbohydrates, lipids, proteins, Vitamins and minerals, Nucleic acids (DNA and RNA) and theirtypes.Enzymes,EnzymeapplicationinIndustry.LargescaleproductionofenzymesbyFermentation.

UnitOutcomes:

After completingthisunit,thestudentwillbeableto

- Understandwhatarebiomolecules?theirroleinlivingcells,theirstructure,functionandhowtheyareproduced.(L1)
- Interprettherelationshipbetweenthestructureandfunctionofnucleicacids.(L2)
- Summarizetheapplicationsofenzymesinindustry.(L3)
- Understandwhatisfermentationanditsapplicationsoffermentationinindustry.(L4)

UnitIII:HumanPhysiology

Nutrition:Nutrientsorfoodsubstances.Digestivesystem,Respiratorysystem,(aerobicandanaerobic Respiration).Respiratoryorgans,respiratorycycle.Excretorysystem.

UnitOutcomes:

Aftercompletingthisunit,thestudentwillbeableto

- Understandwhatnutrientsare(L1)
- Understandthemechanismandprocessofimportanthumanfunctions(L2&L3)

UnitIV:IntroductiontoMolecularBiologyandrecombinantDNATechnology

ProkaryoticgeneandEukaryoticgenestructure.DNAreplication,TranscriptionandTranslation.rDNAtechnology. Introductiontogenecloning.

UnitOutcomes:

After completingthisunit,thestudentwillbeableto

- Understandandexplainaboutgenestructureandreplicationinprokaryotes andEukaryotes (L1)
- Howgeneticmaterial isreplicatedandalsounderstandshowRNAandproteinsaresynthesized.(L2)
- UnderstandaboutrecombinantDNAtechnologyanditsapplicationindifferentfields.(L3)
- Explainwhatiscloning.(L4)

UnitV:ApplicationofBiology

Brief introduction to industrial Production of Enzymes, Pharmaceutical and therapeutic Proteins,Vaccines andantibodies. Basics of biosensors, biochips, Biofuels, andBioEngineering. BasicsofProductionofTransgenicplants andanimals.

UnitOutcomes:

Aftercompletingthisunit,thestudentwillbeabletoUnderstand.

- Howbiologyisappliedforproductionofusefulproductsformankind.(L1)
- Whatarebiosensors,biochipsetc.(L2)
- Understandtransgenicplantsandanimalsandtheirproduction(L3)

CourseOutcomes:

After studyingthecourse,thestudentwillbeableto:

- Explainaboutcellsandtheir structureandfunction. Differenttypesofcellsandbasicsforclassificationoflivingorganisms.
- Explainaboutbiomolecules, theirstructureandfunctionandtheirroleinthelivingorganisms.Howbiomoleculesareusef ulinIndustry.
- Brieflyabouthumanphysiology.
- Explainaboutgeneticmaterial,DNA,genesandRNAhowtheyreplicate, passandpreservevitalinformationinlivingOrganisms.
- Know aboutapplicationofbiologicalPrinciplesindifferenttechnologiesfortheproductionofmedic inesandPharmaceuticalmoleculesthroughtransgenicmicrobes,plantsandanimals.

Textbooks:

1. P.K.Gupta,CellandMolecularBiology,5thEdition,RastogiPublications-
2. U.Satyanarayana.Biotechnology,Books&AlliedLtd2017

ReferenceBooks:

1. N.A.Campbell,J.B.Reece,L.Urry,M.L.CainandS.A.Wasserman,“Biology:AGlobalApproa ch”, PearsonEducationLtd,2018.
2. TJohnson,BiologyforEngineers,CRCpress,2011
3. J.M.WalkerandE.B.Gingold,MolecularBiologyandBiotechnology2nded..PanimaPublicatio ns.PP434.
4. DavidHames,InstantNotesinBiochemistry–2016
5. PhilTunner,A.Mctennan,A.Bates&M.White,InstantNotes–MolecularBiology –-2014

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II B.TECH – II SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A20507	**Computer Organization**	3	0	0	3

Course Objectives:

1. To learn the fundamentals of computer organization and its relevance to classical and modern problems of computer design.
2. To understand the structure and behaviour of various functional modules of a computer.
3. To learn the techniques that computers use to communicate with I/O devices.
4. To acquire the concept of pipelining and exploitation of processing speed.
5. To learn the basic characteristics of multiprocessors.

Unit – 1: Introduction

Basic Structure of Computer: Computer Types, Functional Units, Basic operational Concepts, Bus Structure, Software, Performance, Multiprocessors and Multicomputer. Machine Instructions and Programs: Numbers, Arithmetic Operations and Programs, Instructions and Instruction Sequencing, Addressing Modes, Basic Input/output Operations, Stacks and Queues, Subroutines, Additional Instructions.

Learning Outcomes:

1. Identify the basic functional units and different ways of interconnecting to form a computer system.
2. Illustrate various addressing modes for accessing register and memory operands.
3. Describe the instruction sequencing and various types of instructions.

Unit – 2Arithmetic:

Addition and Subtraction of Signed Numbers, Design of Fast Adders, Multiplication of Positive Numbers, Signed-operand Multiplication, Fast Multiplication, Integer Division, Floating-Point Numbers and Operations.

Basic Processing Unit: Fundamental Concepts, Execution of a Complete Instruction, Multiple BusOrganisation , Hardwired Control, Multi programmed Control.

Learning outcomes: Student should be able to

1. Outline the arithmetic operations on signed numbers.
2. Describe the operations performed on floating point numbers.
3. Distinguish between hardwired and micro programmed control units.

Unit – 3: The Memory System:
Basic Concepts, Semiconductor RAM Memories, Read-Only Memories, Speed, Size and Cost, Cache Memories, Performance Considerations, Virtual Memories, Memory Management, Requirements, Secondary Storage.

Learning outcomes: Student should be able to

1. Recognize the various types of memories.
2. Analyze the performance of cache memory.
3. Apply effective memory management strategies.

Unit – 4 :Input/output Organization:
Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces. Hashing: Introduction to Hash Table, Static Hashing, Dynamic Hashing.

Learning outcomes: Student should be able to

a. Examine the basics of I/O data transfer synchronization.
b. Analyze the interrupt handling mechanisms of various processors.
c. Describe various techniques for I/O data transfer methods.

Unit – 5 Pipelining:
Basic Concepts, Data Hazards, Instruction Hazards, Influence on Instruction Sets. Large Computer Systems: Forms of Parallel Processing, Array Processors, The Structure of General-Purpose multiprocessors, Interconnection Networks.

Learning outcomes: Student should be able to

1. Investigate the use of pipelining and multiple functional units in the design of high-performance processors.
2. Design and analyze a high performance processor.
3. Describe the interconnection networks for multiprocessors.

TEXT BOOKS: 1. Carl Hamacher, ZvonkoVranesic, SafwatZaky, “Computer Organization”, 5th Edition, McGraw Hill Education, 2013.

REFERENCE BOOKS:

1. M.Morris Mano, “Computer System Architecture”, 3rd Edition, Pearson Education.
2. Themes and Variations, Alan Clements, “Computer Organization and Architecture”, CENGAGE Learning.
3. Smruti Ranjan Sarangi, “Computer Organization and Architecture”, McGraw Hill Education.
4. John P.Hayes, “Computer Architecture and Organization”, McGraw Hill Education

Course Outcomes:

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Students should be able to

1. Understand computer architecture concepts related to design of modern processors, memories and I/Os Identify the hardware requirements for cache memory and virtual memory
2. Design algorithms to exploit pipelining and multiprocessors
3. Understand the importance and tradeoffs of different types of memories.
   Identify pipeline hazards and possible solutions to those hazards

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II B.TECH – II SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A20508	**Operating Systems**	3	0	0	3

Course Objectives:

1. Understand basic concepts and functions of operating systems
2. Understand the processes, threads and scheduling algorithms.
3. Provide good insight on various memory management techniques
4. Expose the students with different techniques of handling deadlocks
5. Explore the concept of file-system and its implementation issues
6. Familiarize with the basics of Linux operating system
7. Implement various schemes for achieving system Protection

Unit – 1: Operating Systems Overview:

Introduction: What operating system Do, Operating System Structure, Resource Management, Protection and Management, History of Operating Systems.

System Structures: Operating System Services, User and Operating-System Interface, Systems Calls, System Services, Operating system Design and Implementation, Operating System Structure.

Processes: Process Concept, Process scheduling, Operations on Processes, Inter-process Communication, Communication in Client Server Systems.

Learning Outcomes: Student should be able to

1. Identify major components of operating systems
2. Understand how the operating systems are used in various computing Environments.
3. Understand the services and howsystem calls are used to provide operating system services.
4. Choose suitable operating system architecture.
5. Understand how processes are created and IPC, client–server communication using Sockets and remote procedurecalls.

Unit – 2:

Multithreaded Programming: Multithreading models, Thread libraries, threading issues.

ProcessScheduling: Basic concepts, Scheduling criteria, Scheduling algorithms, Multiprocessor Scheduling, Thread scheduling.

Inter-process Communication: Race conditions, Critical Regions, Mutual exclusion with busy waiting, Sleep and Wakeup, Semaphores, Mutexes, Monitors, Message passing.

Classical IPC Problems: Dining Philosopher's problem, Readers and writers problem.

Learning outcomes: Student should be able to

1. Understand the importance, features of a process and methods of communication between processes.
2. Improving CPU utilization through Process Scheduling, multithreaded programming.
3. Examine several classical synchronization problems.

Unit – 3: Memory-Management Strategies:
Main Memory: Introduction, Contiguous memory allocation, Paging, Structure of the Page Table, Swapping, Segmentation.

Virtual Memory Management: Introduction, Demand paging, Copy on-write, Page Replacement, Allocation of Frames, Thrashing, Memory-mapped files, Allocating Kernel Memory.

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Learning outcomes: Student should be able to

1. Examine the various techniques of allocating memory to processes
2. Summarize how paging works in contemporary computer systems
3. Understanding the benefits of virtual memory systems.
4. Understand how deadlock can occur, conditions that characterize deadlock, different approaches for preventing deadlocks and how to recover.

Unit – 4:
File Systems: File concept, Access Methods, Directory Structure, Memory mapped files,
File system Structure, File System Operations, Directory Implementation, Allocation Methods.

Secondary-Storage Structure: Disk Scheduling, Disk-scheduling Criteria, Disk-scheduling Algorithms, RAID structure.

CASE STUDY1: History of UNIX and LINUX, Overview of LINUX, Processes in LINUX, Memory Management in LINUX, Input/ Output in LINUX, The LINUX File System.

Learning outcomes: Student should be able to

1. Understand the function of file systems, the interfaces to file systems.
2. Understand the file-system design tradeoffs, including access methods, file sharing, file locking, and directory structures.
3. Examine file systems and its interface in various operating systems
4. Analyze different disk scheduling algorithms.
5. Examine the history and evolution of UNIX andLINUX, Processes, Memory management, I/O, the file system, and security in Linux.

Unit – 5:

Android: Android and Google, History of Android, Design Goals, Android Architecture, Linux Extensions, Dalvik, Android Applications.

CASE STUDY 2: History of Windows through 8.1, System Structure, Processes and Threads in Windows, Memory Management

Operating System Design: The nature of the Design, Interface Design, Implementation, Trends in Operating System.

Protection: Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix.

Learning outcomes: Student should be able to

1. Understand the Android new concepts to the Linux kernel using most of theLinux facilities.
2. Understand the Operating System Design, Implementation and Trends of Operating Systems
3. Examine various aspects of Windows 8, starting with a brief history, then moving on to its architecture.
4. Understand how protection domains, combined with an access matrix, are used to specify the resources a process may access.

Text Books:

1. Silberschatz A, Galvin P B, and Gagne G, Operating System Concepts, 9th edition, Wiley, 2016.
2. Tanenbaum A S, Modern Operating Systems, 4th edition, Pearson Education, 2006.

Reference Books:

1. William Stallings, Operating Systems internals and design principles, 9th edition, Pearson Education, 2018
2. Dhamdhere D M, Operating Systems A Concept Based Approach, 3rd edition, Tata McGraw-Hill, 2012.
3. Nutt G, Operating Systems, 3rd edition, Pearson Education, 2004

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SubjectCode	TitleoftheSubject	L	T	P	C
19A20509	**Computer Graphics**	3	0	0	3

Course objectives:

1. To Learn graphics hardware devices and software.
2. To understand the two-dimensional graphics and their transformations.
3. To Design computer animations
4. To Understand systems and formats
5. To Learn multimedia compression and transmission.

Unit-I: Graphic Systems: Video Display Devices, Raster-Scan System, Random-Scan Systems, Graphics Monitors and Workstations, Input Devices, Hard-Copy Devices, Graphics Software
2-D Transformations: Basic Transformations Matrix Representations, Other Transformations.
2D Viewing: The Viewing Pipeline, Viewing Coordinate Reference Frame, Window-to viewport Coordinate Transformation.
3-D Concepts: Three-Dimensional Display Methods, Three-Dimensional Graphics

Learning outcomes:

1. Understand Graphics hardware and software (L1)
2. Describe 2D transformations and 3D Graphics (L1)

Unit-II: 3D Object Representations: Polygon Surfaces, Curved Lines and Surfaces, Quadric Sutiaces, Super quadrics, Blobby Objects, Spline Representations, Particle Systems, Physically Based Modeling.
3D Transformations: Translation, Rotation, Scaling and Other Transformations, Viewing Pipeline, Viewing Coordinates, Projections.

Learning outcomes:

1. Learn surfaces and representations.(L1)
2. Use viewing when designing graphics. (L3)

Unit-III: Classification of Visible-Surface Detection Algorithms, Ray-Casting Method, Light Sources, Basic Illumination Models,
Light: Properties of Light, Standard Primaries and theChromaticity Diagram, Intuitive Color Concepts, Design of Animation Sequences, General Computer-Animation, Functions, Raster Animations, Computer-Animation Languages.

Learning outcomes:

1. Classify surface detection algorithms. (L3)
2. Understand Illumination models. (L1)

Unit-IV: Introduction to Multimedia: Historical Perspective, Multimedia Data and Multimedia Systems, A Multimedia System Today ,The Multimedia Revolution, A Possible Future.

Media Representation and Media Formats Digital Images, Digital Video, Digital Audio, Graphics.

Color Theory: The Color Problem, TrichromacityTheory,ColorCalibrationColorSpaces,Gamma Correction and Monitor Calibration.

Learning outcomes:

1. Recognize different media types in multimedia (L1)
2. Understand media representation and formats (L2)

Unit-V :Compression:A Taxonomy of Compression, Practical Issues Related to Compression Systems, The Need for Audio Compression, The Need for Graphics Compression,2D Graphics Objects:Points,Regions, Curves

Types of Predictions: I Frames,PFrames,BFrames, Multi-frame Prediction, Video Structure—Group of Pictures , Video-Coding Standards:

Multimedia Communication: Modes of Communication, Multimedia Traffic Control, Multimedia Networking Performance and Quality of Service.

Learning outcomes:

1. Understand need of compression (L1)
2. Experience the quality of service for multimedia applications(L4)

Textbooks:

1. Donald Hearn and Pauline Baker M, ―Computer Graphics - C Version", Prentice Hall, New Delhi, 2007 [UNIT I – III]
2. Parag Havaldar, Gerard Medioni "Multimedia Systems: Algorithms, Standards, and Industry Practices" Course Technology ISBN: 1418835943, 9781418835941 [Unit IV- V]

References:

1. Andleigh, P. K and Kiran Thakrar, ―Multimedia Systems and Design‖, PHI, 2003.
2. Foley, Vandam, Feiner and Hughes, ―Computer Graphics: Principles and Practice, 2nd Edition, Pearson Education, 2003.
3. Jeffrey McConnel, ―Computer Graphics: Theory into Practice, Jones and Bartlett Publishers,2006.
4. Peter Shirley, Michael Ashikhmin, Michael Gleicher, Stephen R Marschner, Erik Reinhard, KelvinSung, and AK Peters, ―Fundamentals of Computer Graphics, CRC Press, 2010.
5. Hill F S Jr., "Computer Graphics", Maxwell Macmillan , 1990.

Course outcomes:

1. Design two dimensional graphics. (L6)
2. Apply two dimensional transformations. (L3)
3. Apply Illumination and color models. (L3)
4. Apply viewing techniques to graphics (L3)
5. Experience the quality of service for multimedia applications(L4)

II B.TECH – II SEMESTER(R-19)

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SubjectCode	TitleoftheSubject	L	T	P	C
19A20510	**Discrete Mathematics**	3	0	0	3

Course Objectives:

1. To explain about the Boolean algebra, Graph theory and Recurrence relations.
2. To demonstrate the application of basic methods of discrete mathematics in Computer Science problem solving.
3. To elucidate solving mathematical problems from algorithmic perspective.
4. To introduce the mathematical concepts which will be useful to study advanced courses Design and Analysis of Algorithms, Theory of Computation, Cryptography and Software Engineering etc.
5. To reveal how solutions of graph theory can be applied to computer science problems

Unit –1: Statements and Notation, Connectives- Negation, Conjunction, Disjunction, Conditional and Bi-conditional, Statement formulas and Truth Tables. Well-formed formulas, Tautologies, Equivalence of Formulas, Duality Law, Tautological Implications.
Normal Forms: Disjunctive Normal Forms, Conjunctive Normal Forms, Principal Disjunctive Normal Forms (PDNF), Principal Conjunctive Normal Forms (PCNF), Ordering and Uniqueness of Normal Forms. **The Theory of Inference for the Statement Calculus:** Rules of Inference, Consistency of Premises and Indirect Method of Proof. The predicate Calculus, Inference theory of the Predicate Calculus.

Learning Outcomes: Student should be able to

1. Describe logical sentences in terms of predicates, quantifiers, and logical connectives (L1).
2. Evaluate basic logic statements using truth tables and the properties of logic (L5).
3. Apply rules of inference to test the consistency of premises and validity of arguments (L3).
4. Verify the equivalence of two formulas and their duals (L4).
5. Find the Principal Conjunctive and Principal Disjunctive Normal Forms of a statement formula (L1).

Unit – 2: Set Theory: Basic concepts of Set Theory, Representation of Discrete structures, Relations and Ordering, Functions, Recursion.

Lattices and Boolean algebra: Lattices as Partially Ordered Sets, Boolean algebra, Boolean Functions, Prepresentation and Minimization of Boolean Functions.

Algebraic Structures: Algebraic Systems: Examples and General Properties, Semi Groups and Monoids, Groups.

Learning outcomes: Student should be able to

1. Describe equivalence, partial order and compatible relations (L1).
2. Compute Maximal Compatibility Blocks (L3).
3. Identify the properties of Lattices (L2).
4. Evaluate Boolean functions and simplify expression using the properties of Boolean algebra (L5).
5. Infer Homomorphism and Isomorphism (L4).
6. Describe the properties of Semi groups, Monoids and Groups (L1).

Unit – 3:Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with repetitions, Enumerating Permutations and Combinations with constrained Representations Binomial Coefficients, The Binomial and Multinomial Theorems, The Principle of Inclusion and Exclusion

Learning outcomes: Student should be able to

1. Explain fundamental principle of counting (L2).
2. Examine the relation between permutation and combination (L4).
3. Solve counting problems by applying elementary counting techniques using the product and sum rules (L3).
4. Apply permutations, combinations, the pigeon-hole principle, and binomial expansion to solve counting problems (L3).

Unit – 4:Recurrence Relations:

Generating Functions of Sequences, Calculating Coefficients of Generating Functions, Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, The method of Characteristic Roots, Solution of Inhomogeneous Recurrence Relations.

Learning outcomes: Student should be able to

1. Find the generating functions for a sequence (L1).
2. Design recurrence relations using the divide-and-conquer algorithm (L6).
3. Solve linear recurrence relations using method of Characteristic Roots (L3).
4. Outline the general solution of homogeneous or Inhomogeneous Recurrence Relations using substitution and method of generating functions (L2).
5. Solve problems using recurrence relations and recursion to analyze complexity of algorithms (L3).

Unit – 5:Graphs:

Basic Concepts, Isomorphism and Sub graphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multi graphs and Euler Circuits, Hamiltonian Graphs, Chromatics Number, The Four-Color Problem

Learning outcomes: Student should be able to

1. Investigate if a given graph is simple or a multi graph, directed or undirected, cyclic or acyclic (L4).
2. Describe complete graph and complete bipartite graphs (L1).
3. Identify Euler Graphs, Hamilton Graph and Chromatic Number of a graph (L2).
4. Apply the concepts of functions to identify the Isomorphic Graphs (L3).
5. Apply depth-first and breadth-first search (L3).
6. Apply Prim's and Kruskal's algorithms to find a minimum spanning tree (L3).

Text Books:

1. Joe L. Mott. Abraham Kandel and Theodore P.Baker, "Discrete Mathematics for Computer Scientists & Mathematicians", 2nd Edition, Pearson, 2008 (For Units III to V).

2. J P Trembly and R Manohar, "Discrete Mathematical Structures with Applications to Computer Science", 1st Edition, McGraw Hill, 2017(For Unit I&II).

Reference Text Books:

1. Ralph P. Grimaldi and B.V. Ramana, "Discrete and Combinatorial Mathematics, an Applied Introduction", 5th Edition, Pearson, 2016.

2. Narsingh Deo, "Graph Theory with Applications to Engineering", Prentice Hall, 1979.

3. D.S. Malik and M.K. Sen "Discrete Mathematics theory and Applications", 1 st Edition, Cenegage Learning, 2012.

4. C L Liu and D P Mohapatra, "Elements of Discrete Mathematics, A computer Oriented approach by", 4 th edition, MCGRAW-HILL, 2018.

Course Outcomes:

Students should be able to

1. Evaluate elementary mathematical arguments and identify fallacious reasoning (L5).
2. Understand the properties of Compatibility, Equivalence and Partial Ordering relations, Lattices and Hassee Diagrams (L1).
3. Understand the general properties of Algebric Systems, Semi Groups, Monoids and Groups (L1).
4. Design solutions for problems using breadth first and depth first search techniques (L6)
5. Solve the homogeneous and non-homogeneous recurrence relations (L3).
6. Apply the concepts of functions to identify the Isomorphic Graphs (L2).
7. Identify Euler Graphs, Hamilton Graph and Chromatic Number of a graph (L2).

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II B.TECH – II SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A20511	**Entrepreneurship**	2	0	0	2

SEMESTER: IV

Course Objectives:

- To inculcate the Entrepreneurial qualities in students
- To train the students for Entrepreneurship
- To introduce the business model and business plan
- To teach about the methods of attracting investment in start-ups

Unit-I:**Entrepreneurship: Evolution and Revolution:**Entrepreneurs facing the unknown, Are you a business or social entrepreneur, Entrepreneurs have a particular enterprising mind-set, The evolution of the Under-taking, Entrepreneurship through the ages, Early definitions of Entrepreneurship, Approaches to Entrepreneurship, The entrepreneurial revolution: a global phenomenon.

The Entrepreneurial Mind-Set-Cognition And Career: The entrepreneurial mind, behaviour and career, Who are entrepreneurs, The dark side of entrepreneurship, The entrepreneur's confrontation with risk, Stress and the entrepreneur, The entrepreneurial ego, Pathways to your entrepreneurial career.

Entrepreneurship and Sustainable Development: Entrepreneurship as if the planet mattered, Entrepreneurship in times of crisis, Climate change effects for entrepreneurs, Climate chance economics for entrepreneurs, entrepreneurial ecology.

Learning outcomes

- Understand the entrepreneur qualities (L2)
- Developing entrepreneurial mind-set (L3)

Unit- II: Social And Ethical Entrepreneurship: Entrepreneurial Edge: Social Entrepreneurship, The mind-set of social entrepreneurs, Ecopreneurs, Ethics and Entrepreneurs, Defining entrepreneurial ethics, Ethics in the cross-cultural business world, Entrepreneurship and organized crime, Environmental criminal entrepreneurs, Entrepreneurship an disadvantaged groups, Indigenous entrepreneurs.

Pathways To Entrepreneurial Ventures: Walking entrepreneurship pathways, Bootstrapping, The classical pathway: Disruptive new venture creation, Acquiring an established entrepreneurial venture, Franchising one's way into entrepreneurship, Social venturing as a pathway to entrepreneurship.

Learning outcomes

- Compare Social and Commercial Entrepreneurship (L4)
- Design a path way to entrepreneurship (L6)

Unit- III :Opportunity And The Creative Pursuit Of Innovative Ideas: Ideas and the search for opportunity, four models of market-based opportunities, Entrepreneurial imagination and creating, Arenas of creativity, Creating the right setting for creativity, Innovation and the entrepreneur, The innovation process, Innovation in the era of climate change.

Developing Entrepreneurship Within Organisations: The entrepreneurial mind-set inorganisations, Re-engineering organizational thinking, Not for business only: public sector entrepreneurship, Intrapreneurial strategy, social intrapreneurship bycreating shared value,

Learning outcomes

- Evaluate the opportunities (L5)
- Develop entrepreneurship environment in an organization (L3)

Unit –IV:**The Assessment Of Entrepreneurial Opportunities:** The elements of an opportunity assessment, How do we model the entrepreneurial process, How to assess an opportunity, When is an idea not an opportunity, The evaluation process, The emergence of entrepreneurial ecosystems.

Marketing For Entrepreneurial Ventures: Entrepreneurial marketing is essential, Entrepreneurial marketing defined, The components of effective marketing, Developing a marketing plan, Marketing research, Marketing on the Internet, Green entrepreneurial marketing, Pricing strategies.

Learning outcomes

- Outline the strategies for marketing (L2)
- Critique opportunities (L4)

Unit –V:Legal And Regulatory Challenges For Entrepreneurial Ventures: Legal and regulatory challenges, Understanding Asia-Pacific regulatory environments, International protections for intellectual property, Patents, Copyrights,, Trademarks, Domain names, Trade secrets, Opportunities from changing intellectual, Property attitudes, Identifying legal structures for entrepreneurial ventures, Incorporated companies, Unincorporated businesses, Other business forms, Insolvency and Bankruptcy, The legal framework regulating climate change.

Sources Of Capital For Entrepreneurial Ventures: The times they are a-changing, What are the forms of entrepreneurial capital, Sources of financial capital, Debt Vs Equity, Equity financing The venture capital market, Angel financing, New forms of Entrepreneurial capital, Peer-to-peer lending.

Learning outcomes

- Understand the Loss of the Land (L2)
- Develop sources of Capital (L3)

Textbook:

1. Howard Fredrick, Allan O Conner, and Donald F.Kuratko, "Entrepreneurship Theory/Process/Practices" 4th Edition, Cengage Learning, 2016.

References:

1. Bill Aulet, "Disciplined Entrepreneurship Workbook" Willey Publishers
2. William Bygrave, A.Zacharakis, " Entrepreneurship" 2nd Edition, Willey Publishers
3. Alexander Osterwalder, and Yves Pigneur – Business Model Generation – Wiley, 2011

Course Outcomes:

Students should be able to

- Design business model and business plan (L6)
- Demonstrate the Venture infront of investors (L2)
- Build the team for a strartup (L6)
- Illustrate successful cases of start-ups (L3)
- Develop strategies for market survey (L6)

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II B.TECH – II SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A20512	**Software Engineering**	3	0	0	3

Course Objectives:

1. To learn the basic concepts of software engineering and life cycle models
2. To explore the issues in software requirements specification and enable to write SRS documents for software development problems
3. To elucidate the basic concepts of software design and enable to carry out procedural and object oriented design of software development problems
4. To understand the basic concepts of black box and white box software testing and enable to design test cases for unit, integration, and system testing
5. To reveal the basic concepts in software project management

Unit – 1: Basic concepts in software engineering and software project management Basic concepts: abstraction versus decomposition, evolutionof software engineering techniques, Software development life cycle (SDLC) models: Iterative waterfall model, Prototype model, Evolutionary model, Spiral model, RAD model, Agile models, software project management: project planning, project estimation, COCOMO, Halstead's Software Science, project scheduling, staffing, Organization and team structure, risk management, configuration management.

Learning Outcomes: Student should be able to

1. Recognize the basic issues in commercial software development.

2. Summarize software lifecycle models.

3. Infer Workout project cost estimates using COCOMO and schedules using PERT and GANTT charts.

Unit – 2: Requirements analysis and specification

The nature of software, The Unique nature of Webapps, Software Myths, Requirements gathering and analysis, software requirements specification, Traceability, Characteristics of a Good SRS Document, IEEE 830 guidelines, representing complex requirements using decision tables and decision trees, overview of formal system development techniques. axiomatic specification, algebraic specification.

Learning outcomes: Student should be able to

1. Identify basic issues in software requirements analysis and specification.
2. Develop SRS document for sample problems using IEEE 830 format.
3. Develop algebraic and axiomatic specifications for simple problems.

Unit – 3:Software Design

Good Software Design, Cohesion and coupling, Control Hierarchy: Layering, Control Abstraction, Depth and width, Fan-out, Fan-in, Software design approaches, object oriented vs. function oriented design. Overview of SA/SD methodology, structured analysis, Data flow diagram, Extending DFD technique to real life systems, Basic Object oriented concepts, UML Diagrams, Structured design, Detailed design, Design review, Characteristics of a good user interface, User Guidance and Online Help, Mode-based Vs Mode-less Interface, Types of user interfaces, Component-based GUI development, User interface design methodology: GUI design methodology.

Learning outcomes: Student should be able to

1. Identify the basic issues in software design.

2. Apply the structured, object oriented analysis and design (SA/SD) technique.

3. Recognize the basic issues in user interface design.

Unit – 4:Coding and Testing

Coding standards and guidelines, code review, software documentation, Testing, Black Box Testing, White Box Testing, debugging, integration testing, Program Analysis Tools, system testing, performance testing, regression testing, Testing Object Oriented Programs.

Learning outcomes: Student should be able to

1. Identify the basic issues in coding practice.
2. Recognize the basic issues in software testing.
3. Design test cases for black box and white box testing.

Unit – 5:Software quality, reliability, and other issues

Software reliability, Statistical testing, Software quality and management ISO 9000, SEI capability maturity model (CMM), Personal software process (PSP), Six sigma, Software quality metrics, CASE and its scope, CASE environment, CASE support in software life cycle, Characteristics of software maintenance, Software reverse engineering, Software maintenance processes model, Estimation maintenance cost. Basic issues in any reuse program, Reuse approach, Reuse at organization level.

Learning outcomes: Student should be able to

1. Summarize various methods of software quality management.
2. Instruct the quality management standards ISO 9001, SEI CMM, PSP, and Six Sigma.
3. Outline software quality assurance, quality measures, and quality control.
4. Identify the basic issues in software maintenance, CASE support, and software reuse

Text Books:

1. Rajib Mall, “Fundamentals of Software Engineering”, 5th Edition, PHI, 2018.

2. Pressman R, “Software Engineering- Practioner Approach”, McGraw Hill.

Reference Text Books:

1. Somerville, “Software Engineering”, Pearson 2.

2. Richard Fairley, “Software Engineering Concepts”, Tata McGraw Hill.

3. Jalote Pankaj, “An integrated approach to Software Engineering”, Narosa

Course Outcomes: Students should be able to

1. Obtain basic software life cycle activity skills.
2. Design software requirements specification for given problems.
3. Implement structure, object oriented analysis and design for given problems.
4. Design test cases for given problems.
5. Apply quality management concepts at the application level.

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II B.TECH – II SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A20513	**Operating Systems Lab**	0	0	2	1

Course Objectives:

1. To familiarize students with the architecture of OS.
2. To provide necessary skills for developing and debugging CPU Scheduling algorithms.
3. To elucidate the process management and scheduling and memory management.
4. To explain the working of an OS as a resource manager, file system manager, process manager, memory manager, and page replacement tool.
5. To provide insights into system calls, file systems and deadlock handling.

List of Experiments

1. Practicing of Basic UNIX Commands.

2. Write programs using following UNIX operating system calls

Fork, exec, getpid, exit, wait, close, stst, opendir and readdir

3. Simulate UNIX commands like cp, ls, grep, etc.,

4. Simulate the following CPU scheduling algorithms

a) Round Robin b) SJF c) FCFS d) Priority

5. Implement dynamic priority scheduling algorithm.

6. Assume that there are five jobs with different weights ranging from 1 to 5. Implement round robin algorithm with time slice equivalent to weight.

7. Implement priority scheduling algorithm. While executing, no process should wait for more than 10 seconds. If waiting time is more than 10 seconds that process has to be executed for at least 1 second before waiting again.

8. Control the number of ports opened by the operating system with

a) Semaphore b) Monitors.

9. Simulate how parent and child processes use shared memory and address space.

10. Simulate sleeping barber problem.

11. Simulate dining philosopher's problem

12. Simulate producer and consumer problem using threads.

13.Implement the following memory allocation methods for fixed partition

a) First fit b) Worst fit c) Best fit

14. Simulate the following page replacement algorithms

a) FIFO b) LRU c) LFU etc.,

15. Simulate Paging Technique of memory management

16. Simulate Bankers Algorithm for Dead Lock avoidance and prevention

17. Simulate following file allocation strategies

a) Sequential b) Indexed c) Linked

18. Simulate all File Organization Techniques

a) Single level directory b) Two level c) Hierarchical d) DAG

Reference Books:

1. Abraham Silberchatz, Peter B. Galvin, Greg Gagne, "Operating System Concepts", Eighth Edition, John Wiley.

2. "Operating Systems: Internals and Design Principles", Stallings, Sixth Edition–2009, Pearson Education 3. Andrew S Tanenbaum "Modern Operating Systems", Second Edition, PHI.

4. S. Haldar, A.A. Aravind, "Operating Systems", Pearson Education.

5. B.L.Stuart, "Principles of Operating Systems", Cengage learning, India Edition.2013-2014

6. A.S.Godbole "Operating Systems", Second Edition, TMH. 7. P.C.P. Bhatt, "An Introduction to Operating Systems", PHI.

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Course Outcomes: Students should be able to

1. Trace different CPU Scheduling algorithm (L2).
2. Implement Bankers Algorithms to Avoid and prevent the Dead Lock (L3).
3. Evaluate Page replacement algorithms (L5).
4. Illustrate the file organization techniques (L4).
5. Illustrate shared memory process (L4).
6. Design new scheduling algorithms (L6)

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II B.TECH – II SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A20514	**Software Engineering Lab**	0	0	2	1

Course Objectives:

1. To Learn and implement the fundamental concepts of software Engineering.
2. To explore functional and non functional requirements through SRS.
3. To practice the various design diagrams through appropriate tool.
4. To learn to implement various software testing strategies.

List of Experiments:

1. Draw the Work Breakdown Structure for the system to be automated.
2. Schedule all the activities and sub-activities using the PERT/CPM charts.
3. Define use cases and represent them in use-case document for all the stakeholders of the System to be automated.
4. Identify and analyze all the possible risks and its risk mitigation plan for the system to be automated.
5. Diagnose any risk using Ishikawa Diagram (Can be called as Fish Bone Diagram or Cause & Effect Diagram).
6. Define Complete Project plan for the system to be automated using Microsoft Project Tool.
7. Define the Features, Vision, Business objectives, Business rules and stakeholders in the vision document.
8. Define the functional and non-functional requirements of the system to be automated by using Use cases and document in SRS document.
9. Define the following traceability matrices:
    1. Use case Vs. Features
    2. Functional requirements Vs.Usecases
10. Estimate the effort using the following methods for the system to be automated:
    1. Function point metric
    2. Use case point metric
11. Develop a tool which can be used for quantification of all the non-functional requirements.
12. Write C/C++/Java/Python program for classifying the various types of coupling.
13. Write a C/C++/Java/Python program for classifying the various types of cohesion.

14. Write a C/C++/Java/Python program for object oriented metrics for design proposed Chidamber and kremer . (Popularly called as CK metrics) Explain the concept of a tree (L2).
15. Convert the DFD into appropriate architecture styles.
16. Draw complete class diagram and object diagrams using Rational tools.
17. Define the design activities along with necessary artifacts using Design Document.
18. Reverse Engineer any object-oriented code to an appropriate class and object diagrams.
19. Test a piece of code which executes a specific functionality in the code to be tested and asserts a certain behavior or state using J unit.
20. Test the percentage of code to be tested by unit test using any code coverage tools.
21. Define an appropriate metrics for at least 3 quality attributes for any software application of your interest.
22. Define a complete call graph for any C/C++ code. (Note: The student may use any tool that Generate call graph for source code).

Unit Outcomes: Students should be able to

1. Acquaint with historical and modern software methodologies
2. Understand the phases of software projects and practice the activities of each phase
3. Practice clean coding
4. Take part in project management
5. Adopt skills such as distributed version control, unit testing, integration testing, build management, and deployment

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II B.TECH – II SEMESTER(R-19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A20515	**Computer Graphics Lab**	0	0	2	1

At the end of the course the student will have

- the generic skills to design algorithms for Computer Graphics
- Understand the need of developing graphics application
- Learn algorithmic development of graphics primitives like: line, circle, polygon etc.
- Learn the representation and transformation of graphical images and pictures.

1. Write a program to draw a line using Digital Differential Analyzer (DDA) Algorithm
2. Write a program to draw a line using Bresenham's Line Algorithm (BLA) for lines with slopes negative and less than 1.
3. Write a program to draw a line using Bresenham's Line Algorithm (BLA) for lines with slopes positive and less than 1.
4. Write a program to draw a line using Bresenham's Line Algorithm (BLA) for lines with slopes positive and greater than 1.
5. Write a program to draw a line using Bresenham's Line Algorithm (BLA) for lines with slopes negative and greater than 1.
6. Write a program to draw a circle using Bresenham's Circle Algorithm.
7. Write a program to draw a circle using MidPoint Circle Algorithm
8. Write a program to draw a circle using Trigonometric Method.
9 Write a program to draw a circle using Polynomial Method.
10. Write a program to draw an ellipse using MidPoint Ellipse Algorithm.
11. Write a program to draw an ellipse using Trigonometric Method.
12. Write a program to draw an ellipse using Polynomial Method.
13. Write a program to fill different types of geometric shapes using Flood Fill Algorithm
14. Write a program to fill different types of geometric shapes using Boundary Fill Algorithm
15. Write a program to draw a C-Curve of nth order.

Course outcomes:

- Draw Geometric primitives (L5)
- Execute scan line polygon filling(L4)
- Implement basic transformations on objects (L6)
- Implement clipping algorithm on lines using OpenGL(L6)

Text Books

Interactive Computer Graphics A Top-Down Approach with OpenGL, Edward Angel, Pearson, 5th Edition, 2009.

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SubjectCode	TitleoftheSubject	L	T	P	C
19A20516	**CONSTITUTION OF INDIA (Mandatory course for Semester III/IV)**				

COURSE OBJECTIVES : The objective of this course is	
1	To Enable the student to understand the importance of constitution
2	To understand the structure of executive, legislature and judiciary
3	To understand philosophy of fundamental rights and duties
4	To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of India and Election Commission of India.
5	To understand the central-state relation in financial and administrative control

Syllabus

UNIT-I Introduction to Indian Constitution – Constitution -Meaning of the term - Indian Constitution-Sources and constitutional history - Features– Citizenship – Preamble - Fundamental Rights and Duties - Directive Principles of State Policy.

LEARNING OUTCOMES:-After completion of this unit student will

- Understand the concept of Indian constitution
- Apply the knowledge on directive principle of state policy
- Analyze the History and features of Indian constitution
- Learn about Preamble, Fundamental Rights and Duties

UNIT-II Union Government and its Administration Structure of the Indian Union - Federalism - Centre-State relationship – President's Role, power and position - PM and Council of ministers - Cabinet and Central Secretariat –Lok Sabha - Rajya Sabha - The Supreme Court and High Court - Powers and Functions

LEARNING OUTCOMES:-After completion of this unit student will

- Understand the structure of Indian government
- Differentiate between the state and central government
- Explain the role of President and Prime Minister
- Know the Structure of supreme court and High court

UNIT-III State Government and its Administration - Governor - Role and Position -CM and Council of ministers - State Secretariat-Organization Structure and Functions

LEARNING OUTCOMES:-After completion of this unit student will

- Understand the structure of state government
- Analyze the role of Governor and Chief Minister
- Explain the role of State Secretariat
- Differentiate between structure and functions of state secretariat

UNIT-IV Local Administration - District's Administration Head - Role and Importance - Municipalities - Mayor and role of Elected Representatives -CEO of Municipal Corporation Pachayati Raj - Functions– PRI –Zilla Parishath - Elected officials and their roles – CEO,ZillaParishath - Block level Organizational Hierarchy - (Different departments) - Village level - Role of Elected and Appointed officials - Importance of grass root democracy

LEARNING OUTCOMES:-After completion of this unit student will

- Understand the local Administration
- Compare and contrast district administration's role and importance
- Analyze the role of Mayor and elected representatives of Municipalities
- Learn about the role ofZillaParishath block level organization

UNIT-V Election Commission - Election Commission- Role of Chief Election Commissioner and Election Commissionerate - State Election Commission -Functions of Commissions for the welfare of SC/ST/OBC and Women

LEARNING OUTCOMES:-After completion of this unit student will

- Know the role of Election Commission
- Contrast and compare the role of Chief Election commissioner and Commissionerate
- Analyze the role of state election commission
- Evaluate various commissions viz SC/ST/OBC and women

TEXT BOOKS

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt.Ltd.. New Delhi

2. Subash Kashyap, Indian Constitution, National Book Trust

REFERENCES:

1. J.A. Siwach, Dynamics of Indian Government & Politics,

2. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)

3. .J.C. Johari, Indian Government andPolitics, Hans India

4. M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd.. New Delhi

E-RESOURCES: 1.nptel.ac.in/courses/109104074/8 2.nptel.ac.in/courses/109104045/

3.nptel.ac.in/courses/101104065/

4.www.hss.iitb.ac.in/en/lecture-details

5.www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution

COURSE OUTCOMES: At the end of the course, students will be able to	
CO1	Understand historical background of the constitution making and its importance for building a democratic India.
CO2	Understand the functioning of three wings of the government ie., executive, legislative and judiciary.
CO3	Understand the value of the fundamental rights and duties for becoming good citizen of India.
CO4	Analyze the decentralization of power between central, state and local self-government
CO5	Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.

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III B.TECH–I SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A50501	**Formal Languages and Automata Theory**	3	0	0	3

Course Objectives:
This course is designed to:

- Introduce languages, grammars, and computational models
- Explain the Context Free Grammars
- Enable the students to use Turing machines
- Demonstrate decidability and un-decidability for NP Hard problems

Course Outcomes:
Upon completion of the course, the students should be able to:

1. Apply formal machines, languages and computations
2. Design finite state machines for acceptance of strings
3. Develop context free grammars for formal languages
4. Build pushdown automata for context free grammars
5. Validate decidability and undesirability

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3			2									3	2	
CO2	3	3	3						1				3	3	
CO3		3	3						2					3	
CO4				2								2			
CO5		2										1	2		

UNIT – I: Finite Automata
Why Study Automata Theory? The Central Concepts of Automata Theory, Automation, Finite Automation, Transition Systems, Acceptance of a String by a Finite Automation, DFA, Design of DFAs, NFA, Design of NFA, Equivalence of DFA and NFA, Conversion of NFA into DFA, Finite Automata with E-Transition, Minimization of Finite Automata, Mealy and Moore Machines, Applications and Limitation of Finite Automata.

Learning Outcomes: At the end of the unit, students will be able to:

1. Distinguish DFA and NFA. (L4)
2. Construct DFA for an input string. (L6)
3. Perform minimization of Automata.(L5)
4. Compare Moore and Mealy Machines.(L2)

UNIT – II: Regular Expressions

Regular Expressions, Regular Sets, Identity Rules, Equivalence of two Regular Expressions, Manipulations of Regular Expressions, Finite Automata, and Regular Expressions, Inter Conversion, Equivalence between Finite Automata and Regular Expressions, Pumping Lemma, Closers Properties, Applications of Regular Expressions, Finite Automata and Regular Grammars, Regular Expressions and Regular Grammars.

Learning Outcomes: At the end of the unit, students will be able to:
1. Construct regular expression for the given Finite Automata.(L6)
2. Construct finite automata for the given regular expression.(L6)
3. Apply closure properties on regular expressions.(L3)

UNIT – III: Context Free Grammars
Formal Languages, Grammars, Classification of Grammars, Chomsky Hierarchy Theorem, Context Free Grammar, Leftmost and Rightmost Derivations, Parse Trees, Ambiguous Grammars, Simplification of Context Free Grammars-Elimination of Useless Symbols, E-Productions and Unit Productions, Normal Forms for Context Free Grammars-Chomsky Normal Form and Greibach Normal Form, Pumping Lemma, Closure Properties, Applications of Context Free Grammars.

Learning Outcomes: At the end of the unit, students will be able to:
1. Define Context Free Grammar. (L1)
2. Distinguish Chomsky Normal Form and Greibach Normal form.(L4)
3. Apply Pumping Lemma theorem on Context Free Grammar.(L3)

UNIT – IV: Pushdown Automata
Pushdown Automata, Definition, Model, Graphical Notation, Instantaneous Description Language Acceptance of pushdown Automata, Design of Pushdown Automata, Deterministic and Non – Deterministic Pushdown Automata, Equivalence of Pushdown Automata and Context Free Grammars Conversion, Two Stack Pushdown Automata, Application of Pushdown Automata.

Learning Outcomes: At the end of the unit, students will be able to:
1. List the applications of Pushdown Automata. (L1)
2. Construct Pushdown Automata for context free grammar.(L6)

UNIT – V: Turing Machine
Turing Machine, Definition, Model, Representation of Turing Machines-Instantaneous Descriptions, Transition Tables and Transition Diagrams, Language of a Turing Machine, Design of Turing Machines, Techniques for Turing Machine Construction, Types of Turing Machines, Church's Thesis, Universal Turing Machine, Restricted Turing Machine.
Decidable and Undecidable Problems: NP, NP-Hard and NP-Complete Problems.

Learning Outcomes: At the end of the unit, students will be able to:
1. List types of Turing Machines.(L1)
2. Design Turing Machine.(L6)
3. Formulate decidability and undecidability problems. (L6)

Text Books:

1. Introduction to Automata Theory, Languages and Computation, J.E.Hopcroft, R.Motwani and J.D.Ullman, 3rd Edition, Pearson, 2008.
2. Theory of Computer Science-Automata, Languages and Computation, K.L.P.Mishra and N.Chandrasekaran, 3rd Edition, PHI, 2007.

Reference Books:

1. Formal Language and Automata Theory, K.V.N.Sunitha and N.Kalyani, Pearson, 2015.
2. Introduction to Automata Theory, Formal Languages and Computation, ShyamalenduKandar, Pearson, 2013.
3. Theory of Computation, V.Kulkarni, Oxford University Press, 2013.

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III B.TECH–I SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A50502	**Computer Networks**	3	0	0	3

Course Objectives:

This course is designed to:

- Introduce the basic concepts of Computer Networks.
- Introduce the layered approach for design of computer networks
- Expose the network protocols used in Internet environment
- Explain the format of headers of IP, TCP and UDP
- Familiarize with the applications of Internet
- Elucidate the design issues for a computer network

Course Outcomes:

Students will be able to:

CO1: Identify the software and hardware components of a Computer network
CO2: Design software for a Computer network
CO3: Develop new routing, and congestion control algorithms
CO4: Analyze the functionality of each layer of a computer network
CO5: Employ the appropriate transport protocol based on the application requirements

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3								1	2			3	
CO2			3	2						1					
CO3			3				2						2		
CO4		3		2							2			2	
CO5	3				3	2		2					2	2	

Unit – 1: Computer Networks and the Internet

What is the Internet?, The Network Edge, The Network Core, Delay, Loss, and Throughput in Packet-Switched Networks, Protocol Layers and their Service Models, Networks under attack, History of Computer Networking and the Internet

Learning Outcomes: Student should be able to

1. Enumerate the hardware components of a computer network (L1)

2. List the layers of a Computer Network (L1)
3. Identify the performance metrics of a computer network (L2)

Unit – 2: Application Layer

Principles of Network Applications, The web and HTTP, Electronic mail in the internet, DNS-The Internet's Directory Service, Peer-to-Peer Applications, Video Streaming and Content Distribution Networks.

Learning outcomes: Student should be able to

1. Design new applications of a computer network (L6)
2. Analyze the application protocols (L4)
3. Extend the existing applications (L3)

Unit – 3 : Transport Layer

Introduction and Transport-Layer Services, Multiplexing and De-multiplexing, Connectionless Transport: UDP, Principles of Reliable Data transfer, Connection-Oriented Transport: TCP, Principles of Congestion Control, TCP Congestion Control

Learning outcomes: Student should be able to

1. Design Congestion control algorithms (L6)
2. Select the appropriate transport protocol for an application (L2)
3. Identify the transport layer services (L1)

Unit – 4: The Network Layer

Data Plane: Overview of Network Layer, the Internet Protocol (IP): IPv4, Addressing, IPv6, Generalized Forwarding and SDN,

Control Plane: Introduction, Routing Algorithms, Intra-AS Routing in the Internet: OSPF, Routing Among the ISPs: BGP, The SDN Control Plane, ICMP: The Internet Control Message Protocol, Network Management and SNMP,

Learning outcomes: Student should be able to

1. Analyze routing algorithms for computing least cost paths in a graph (L4)
2. Implementing data-plane forwarding functions (L3)
3. Implementing control-plane functions (L3)

Unit – 5: The Link Layer and LANs

Introduction to the Link Layer, Error-Detection and – Correction Techniques, Multiple Access Links and Protocols, Switched Local Area Networks, Link Virtualization: A Network as a link Layer, Data Center Networking, Retrospective: A Day in the life of a Web Page Request.

Learning outcomes: Student should be able to

1. Analyze Error-Detection and -Correction Techniques (L4)
2. Operating the access of multiple sending and receiving nodes to a shared broadcast channel(L3)

Text Books:

1. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach", 6th edition, Pearson, 2019.

References:

1. Forouzan, Datacommunications and Networking, 5th Edition, McGraw Hill Publication.
2. Andrew S.Tanenbaum, David j.wetherall, Computer Networks, 5th Edition, PEARSON.
3. YouluZheng, ShakilAkthar, "Networks for Computer Scientists and Engineers", Oxford Publishers, 2016.

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B.Tech (R19 Regulation)

III B.TECH–I SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A55501	**English Language Skills**	3	0	0	3

Course Description:
English Language Skills aims to enable the engineering students to meet the demands of the modern job market through thorough training in LSRW skills, presentation skills, interview skills, academic writing etc. Students of our region have knowledge of their respective subjects, but the surveys make it clear that they are lagging behind in expressing themselves effectively in a professional setting. So this course will enable them to hone these skills and excel in their respective fields.

Course Objectives:
- To develop awareness in students of the relevance and importance of technical communication and presentation skills.
- To prepare the students for placements
- To sensitize the students to the appropriate use of non-verbal communication
- To train students to use language appropriately for presentations and interviews
- To enhance the documentation skills of the students with emphasis on formal and informal writing

Course Outcomes:

CO1: To recall and memorize the basic concepts of effective communication
CO2: To understand the various components of effective communication.
CO3: To apply writing skills in order to meet the demands of work place environment.
CO4: To analyze verbal and non-verbal interpretations in multicultural context.
CO5: To evaluate different aspects of verbal and linguistic competence to become effective presenters.
CO6: To design and develop an effective written document in technical domain.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1									3	3		2			3
CO2									3	3		3			3
CO3									3	3					3
CO4									3	3					3
CO5									3	3					2
CO6									3	3		2			3

UNIT 1: LSRW SKILLS

Introduction to LSRW Skills – Definition – Importance of LSRW Skills - Advantages and Disadvantages of Oral and Written Skills – Advantages and disadvantages of Written & Speaking skills - Barriers to effective communication

Learning Outcomes:

- To recall and memorize the basic concepts of LSRW skills
- To understand the various components of oral and written skills
- To apply English language skills to avoid barriers to effective communication

UNIT II: VERBAL & NON-VERBAL SKILLS

Informal and Formal Conversation - Non-verbal Skills–Kinesics, Proxemics, Chronemics, Haptics, Oculesics , Paralinguistic features – Body language for interviews

Learning Outcomes:

- To understand the basic components of non-verbal communication.
- To apply the knowledge of the difference between informal and formal conversation in order to meet the demands of work place environment.
- To analyze non-verbal interpretations in multicultural context.

UNIT III: ACADEMIC WRITING SKILLS

Writing Skills–Art of condensation- summarizing and paraphrasing - Abstract Writing, Synopsis Writing – Formal Letter Writing - Report Writing

Learning Outcomes:

- To understand the basic components of written communication.
- To apply knowledge of different formats of written communication needed in work place environment.
- To analyze the structure of letters, reports etc.

UNIT IV: CREATIVE WRITING SKILLS

Film Review Writing – Creative Writing- Short Story Writing – Speeches for academic settings – Writing Skits – Script for Short Films/Web Series

Learning Outcomes:

- To apply writing skills in creative writing to meet the demands of documentation in professional life
- To analyze different figures of speech in creative writing
- To evaluate different aspects creative and academic writing to become effective at written communication

UNIT V: PROFESSIONAL SPEAKING SKILLS

Job Interviews –Types of Job Interviews – Characteristics of a job interview - Interview Preparation Techniques –How to overcome Stage fright
Group Discussions(GD): Importance of Group Discussion- Characteristics of a GD - GD as a tool for selection – GD Strategies – Do's & Don't of GD - GD Vs Debates

Learning Outcomes:

- To analyze the different aspects of interviews and group discussions
- To evaluate the group dynamics to excel in group discussions
- To design and develop strategies to answer effectively in interviews

Text Books:

1. Effective Technical Communication, Ashrif Rizvi, TataMcGrahill, 2011
2. Technical Communication by Meenakshi Raman & Sangeeta Sharma,3rd Edition, O U Press 2015

References:

1. Communication Skills by Pushpalatha& Sanjay Kumar, Oxford Univsesity Press

2. Books on TOEFL/GRE/GMAT/CAT/IELTS by Barron's/DELTA/Cambridge University Press.2012.

3. Soft Skills for Everyone, Butterfield Jeff, Cengage Publications, 2011.

4. Management Shapers Series by Universities Press (India) Pvt Ltd., Himayatnagar, Hyderabad 2008.

5. Successful Presentations by John Hughes & Andrew Mallett, Oxford.

6. Winning at Interviews by Edgar Thorpe and Showick Thorpe, Pearson

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III B.TECH–I SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A50503	**Software Testing (Professional Elective – I)**	3	0	0	3

Course Objectives:

- Finding defects which may get created by the programmer while developing the software.
- Gaining confidence in and providing information about the level of quality.
- To prevent defects.
- To make sure that the end result meets the business and user requirements.
- Execute specific software tests with well-defined objectives and targets.

Course Outcomes:
Upon completion of the course, the students should be able to:

CO1: Acquire knowledge on distinct types of testing methodologies.
CO2: Describe the principles and procedures for designing test cases.
CO3: Understand the stages of testing from Development to acceptance testing
CO4: Formulate test cases for testing different programming constructs.
CO5: Test the applications using different testing methods and automation tools.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2						2			3		2		
CO2	3				2						2	1		1	
CO3		3	1									2			2
CO4		3		2	1	1			1	2					
CO5				2				1			3				2

UNIT I

Introduction: Purpose of Testing, Dichotomies, Model for Testing, Consequences of Bugs, Taxonomy of Bugs.
Flow graphs and Path testing: Basics Concepts of Path Testing, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Application of Path Testing.
Learning Outcomes:
At the end of the unit, students will be able to:

1. Explain the purpose of Testing. (L2)

2. Interpret the need of testing (L2)
3. Classify different types of Bugs. (L4)

UNIT II

Transaction Flow Testing: Transaction Flows, Transaction Flow Testing Techniques.

Dataflow testing: Basics of Dataflow Testing, Strategies in Dataflow Testing, Application of Dataflow Testing.

Learning Outcomes:

At the end of the unit, students will be able to:
1. Apply data flow testing (L3)
2. Design Transaction flow testing (L6)
3. Outline the strategies of dataflow testing. (L2)
4. List the applications of dataflow testing. (L1)

UNIT III

Domain Testing: Domains and Paths, Nice & Ugly Domains, Domain testing, Domains and Interfaces Testing, Domain and Interface Testing, Domains and Testability.

Learning Outcomes:

At the end of the unit, students will be able to:
1. Apply testing in various domains. (L3)

UNIT IV

Paths, Path products and Regular expressions: Path Products &Path Expression, Reduction Procedure, Applications, Regular Expressions & Flow Anomaly Detection.

Logic Based Testing: Overview, Decision Tables, Path Expressions, KV Charts, Specifications.

Learning Outcomes:

At the end of the unit, students will be able to:
1. Analyze the paths in testing.(L4)
2. Design testing for checking the logic (L6)

UNIT V:

State, State Graphs and Transition Testing: State Graphs, Good & Bad State Graphs, State Testing, Testability Tips.

Graph Matrices and Application: Motivational Overview, Matrix of Graph, Relations, Power of a Matrix, Node Reduction Algorithm, Building Tools.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Use state graphs for testing. (L3)
2. Create algorithms for node reduction (L6)

Text Books:

1. Boris Beizer, "Software testing techniques", Dreamtech, second edition, 2002.

Reference Books :

1. Brian Marick, "The craft of software testing", Pearson Education.

2. Yogesh Singh, "Software Testing", Camebridge

3. P.C. Jorgensen, "Software Testing" 3rd edition, Aurbach Publications (Dist.by

SPD).

4. N.Chauhan, "Software Testing", Oxford University Press.

5. P.Ammann&J.Offutt, "Introduction to Software Testing" , Cambridge Univ.

Press.

6. Perry, "Effective methods of Software Testing", John Wiley, 2nd Edition, 1999.

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III B.TECH–I SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A50504	**Data Mining and Warehousing (Professional Elective – I)**	3	0	0	3

Course Objectives:

- Familiarize with mathematical foundations of data mining tools.
- Introduce classical models and algorithms in data warehouses and data mining.
- Investigate the kinds of patterns that can be discovered by association rule mining, classification and clustering.
- Explore data mining techniques in various applications like social, scientific and environmental context.

Course Outcomes:

Upon completion of the course, the students should be able to:

CO1: Apply suitable pre-processing and visualization techniques for data analysis
CO2: Apply frequent pattern and association rule mining techniques for data analysis
CO3: Design appropriate classification and clustering techniques for data analysis
CO4: Infer knowledge from raw data

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO 2	PSO 3
CO1	2	2								2	2				
CO2			3	2							2		2		
CO3			2		1			2		2	3		2	3	
CO4		2			3						3		2		

UNIT I:

Basic Concepts – Data Warehousing Components – Building a Data Warehouse – Database Architectures for Parallel Processing – Parallel DBMS Vendors – Multidimensional Data Model – Data Warehouse Schemas for Decision Support, Concept Hierarchies -Characteristics of OLAP Systems – Typical OLAP Operations, OLAP and OLTP.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Identify the component of Data warehouse (L1)

2. Create the architecture of Data warehouse (L6)
3. Apply different types of OLAP operations (L3)

UNIT II:

Introduction to Data Mining Systems – Knowledge Discovery Process – Data Mining Techniques – Issues – applications- Data Objects and attribute types, Statistical description of data, Data Preprocessing – Cleaning, Integration, Reduction, Transformation and discretization, Data Visualization, Data similarity and dissimilarity measures.

Learning Outcomes:

At the end of the unit, students will be able to:
1. Summarize the data processing steps (L2)
2. Apply data cleaning process (L3)

UNIT III:

Mining Frequent Patterns, Associations and Correlations – Mining Methods- Pattern Evaluation Method – Pattern Mining in Multilevel, Multi Dimensional Space – Constraint Based Frequent Pattern Mining, Classification using Frequent Patterns.

Learning Outcomes:

At the end of the unit, students will be able to:
1. Understand Association Rules(L2)
2. Apply different Mining Methods (L3)
3. Review Classification using Frequent Patterns (L2)

UNIT IV:

Decision Tree Induction – Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines –– Lazy Learners – Model Evaluation and Selection-Techniques to improve Classification Accuracy. Clustering Techniques – Cluster analysis-Partitioning Methods – Hierarchical Methods – Density Based Methods – Grid Based Methods – Evaluation of clustering – Clustering high dimensional data- Clustering with constraints, Outlier analysis-outlier detection methods.

Learning Outcomes:

At the end of the unit, students will be able to:
1. Creating Decision Tree (L6)
2. Evaluate Classification techniques (L5)

UNIT V: WEKA TOOL

Datasets – Introduction, Iris plants database, Breast cancer database, Auto imports database – Introduction to WEKA, The Explorer – Getting started, Exploring the explorer, Learning algorithms, Clustering algorithms, Association–rule learners.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Investigate WEKA tool (L4)
2. Explain learning, clustering algorithms (L2)

Text Book:

1.Jiawei Han and Micheline Kamber, ―Data Mining Concepts and Techniques, Third Edition, Elsevier, 2012.

References:

1.Alex Berson and Stephen J.Smith, ―Data Warehousing, Data Mining & OLAP, Tata McGraw – Hill Edition, 35th Reprint 2016.

2.K.P. Soman, Shyam Diwakar and V. Ajay, ―Insight into Data Mining Theory and Practice, Eastern Economy Edition, Prentice Hall of India, 2006.

3.Ian H.Witten and Eibe Frank, ―Data Mining: Practical Machine Learning Tools and Techniques, Elsevier, Second Edition.

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III B.TECH–I SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A50505	**Principles of Programming Language (Professional Elective – I)**	3	0	0	3

Course Objectives:

- Understand the salient features in the landscape of programming languages.
- Understand the essence of defining concepts of programming languages, so to allow critical choice about the level of abstraction.
- Develop, analyze, and compare programs written in the various Programming Paradigms
- Choose an appropriate programming language solution for a given programming task.

Course Outcomes:

CO1: Student able to analyze basic concepts of programming and syntax of programming languages.
CO2: Student able to analyzing semantic issues associated with function implementations, including variable binding, scoping rules, parameter passing, and exception handling.
CO3: Student able to implement object oriented programming concepts using subprograms.
CO4: Student able to analyzing design issues of object - oriented and functional languages.
CO5: Student able to apply principles of programming to various programming languages.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2											3	2	
CO2		2		2					2					1	
CO3			2										2		
CO4	1		2	1					2						
CO5	1	2	1	2					1				1		

UNIT-I: Preliminary Concepts: Reasons for studying concepts of programming languages, programming domains, language evaluation criteria, influences on language design, language categories, language design trade-offs, implementation methods, programming environments, Evolution of Major Programming Languages. Syntax and Semantics: General problem of describing syntax, formal methods of describing syntax, attribute grammars, describing the meanings of programs

Learning Outcomes:

1. Student is able to study basic knowledge on programming principles and syntaxes (L1)

UNIT-II: Names, Bindings, and Scopes: Introduction, names, variables, concept of binding, scope, scope and lifetime, referencing environments, named constants Data types: Introduction, primitive, character, string types, user defined ordinal types, array, associative arrays, record, tuple types, list types, union types, pointer and reference types, type checking, strong typing, type equivalence Expressions and Statements: Arithmetic expressions, overloaded operators, type conversions, relational and boolean expressions, short- circuit evaluation, assignment statements, mixed-mode assignment Control Structures – introduction, selection statements, iterative statements, unconditional branching, guarded commands.

Learning Outcomes:

1. Student is able to understand how to use data types in programming languages (L1)
2. Student is able to understand type conversions, conditional and loop control statements (L1)

UNIT-III: Subprograms: Fundamentals of subprograms, design issues for subprograms, local referencing environments, parameter passing methods, parameters that are subprograms, calling subprograms indirectly, overloaded subprograms, generic subprograms, design issues for functions, user defined overloaded operators, closures, co routines Implementing subprograms: General semantics of calls and returns, implementing simple subprograms, implementing subprograms with stack-dynamic local variables, nested subprograms, blocks, implementing dynamic scoping Abstract Data types: The concept of abstraction, introductions to data abstraction, design issues, language examples, parameterized ADT, encapsulation constructs, naming encapsulations

Learning Outcomes:

1. Student is able to learn how to communicate with one function to other functions (Parameter passing methods) (L1)
2. Student is able to understand variable scope, abstraction and encapsulation concepts (L1)

UNIT-IV: Object Oriented Programming: Design issues for OOP, OOP in Smalltalk, C++, Java, Ada 95, Ruby, Implementation of Object-Oriented constructs. Concurrency: introduction, introduction to subprogram level concurrency, semaphores, monitors, message passing, Ada support for concurrency, Java threads, concurrency in functional languages, statement level concurrency. Exception Handling and Event Handling: Introduction, exception handling in Ada, C++, Java, introduction to event handling, event handling with Java and C#.

Learning Outcomes:

1. Student is able to understand object oriented concepts with various programming languages(L1)
2. Student is able to learn concepts of Exception handlings and Event handling (L1)

UNIT-V: Functional Programming Languages: Introduction, mathematical functions, fundamentals of functional programming language, LISP, support for functional programming in primarily imperative languages, comparison of functional and imperative languages Logic Programming Language: Introduction, an overview of logic programming, basic elements of prolog, deficiencies of prolog, applications of logic programming. Scripting Language: Pragmatics, Key Concepts, Case Study : Python

– Values and Types, Variables , Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library. (Text Book 2)

Learning Outcomes:

1. Student study the functional programming LISP (L3)
2. Student able to understand python programming using Case Study (L1)

Text Books:

1. Concepts of Programming Languages, Robert .W. Sebesta 10th edition, Pearson Education.
2. Programming Language Design Concepts, D. A. Watt, Wiley India Edition.

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III B.TECH–I SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A50507	**Artificial Intelligence (Open Elective – I)**	3	0	0	3

Course Objectives:

- Define Artificial Intelligence and establish the cultural background for study
- Understand various learning algorithms
- Explore the searching and optimization techniques for problem solving
- Provide basic knowledge on Natural Language Processing and Robotics

Course outcomes:

Upon completion of the course, the students should be able to:

CO1: Apply searching techniques for solving a problem
CO2: Design Intelligent Agents
CO3: Develop Natural Language Interface for Machines
CO4: Design mini robots
CO4: Summarize past, present and future of Artificial Intelligence

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1									3	2	3
CO2	3	3	2	1									3	2	3
CO3	3	3	2	2		1	1	2					3	2	3
CO4	3	3	3	3	2	1	1	2	1	1	1	2	3	2	3
CO5	3	3	3	3	2	1	1	2	1	1	1	2	3	3	3

Unit – I: **Introduction**: What is AI, Foundations of AI, History of AI, The State of Art.

Intelligent Agents: Agents and Environments, Good Behaviour: The Concept of Rationality, The Nature of Environments, The Structure of Agents.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Recognize the importance of Artificial Intelligence (L1)
2. Identify how intelligent agent is related to its environment (L2)

3. Build an Intelligent agent (L3)

Unit – II: **Solving Problems by searching**: Problem Solving Agents, Example problems, Searching for Solutions, Uninformed Search Strategies, Informed search strategies, Heuristic Functions, Beyond Classical Search: Local Search Algorithms and Optimization Problems, Local Search in Continues Spaces, Searching with Nondeterministic Actions, Searching with partial observations, online search agents and unknown environments.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Explain how an agent can formulate an appropriate view of the problem it faces. (L2)
2. Solve the problems by systematically generating new states (L2)
3. Derive new representations about the world using process of inference (L5)

Unit – III: **Reinforcement Learning**: Introduction, Passive Reinforcement Learning, Active Reinforcement Learning, Generalization in Reinforcement Learning, Policy Search, applications of RL

Natural Language Processing: Language Models, Text Classification, Information Retrieval, Information Extraction.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Examine how an agent can learn from success and failure, reward and punishment. (L5)
2. Develop programs that make queries to a database, extract information from texts, and Retrieve relevant documents from a collection using Natural Language Processing. (L6)

Unit-IV: **Natural Language for Communication**: Phrase structure grammars, Syntactic Analysis, Augmented Grammars and semantic Interpretation, Machine Translation, Speech Recognition

Perception: Image Formation, Early Image Processing Operations, Object Recognition by appearance, Reconstructing the 3D World, Object Recognition from Structural information, Using Vision.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Develop programs that translate from one language to another, or recognize spoken words. (L6)
2. Explain the techniques that provide robust object recognition in restricted context.(L2)

Unit-V: Robotics: Introduction, Robot Hardware, Robotic Perception,Planning to move, Planning uncertain movements, Moving, Robotic software architectures, application domains

Philosophical foundations: Weak AI,Strong AI, Ethics and Risks of AI, Agent Components, Agent Architectures, Are we going in the right direction, What if AI does succeed.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Explain the role of Robot in various applications. (L2)
2. List the main philosophical issues in AI. (L1)

Textbook:

1. Stuart J.Russell, Peter Norvig, “Artificial Intelligence A Modern Approach”, 3rd Edition, Pearson Education, 2019.

References:

1. Nilsson, Nils J., and Nils Johan Nilsson. Artificial intelligence: a new synthesis. Morgan Kaufmann, 1998.
2. Johnson, Benny G., Fred Phillips, and Linda G. Chase. "An intelligent tutoring system for the accounting cycle: Enhancing textbook homework with artificial intelligence." Journal of Accounting Education 27.1 (2009): 30-39.

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III B.TECH–I SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A50508	**Web Technologies (Open Elective – I)**	3	0	0	3

Course Objectives:

- Familiarize the tags of HTML.
- Understand different Client side Scripting.
- Learn -specific web services of server side Programming.
- Connect different applications using PHP & XML.
- Connect XHTML, Java Scripting, Servlet Programming, Java Server Pages.

Course Outcomes:

At the end of the course, the students should be able to:

CO1: Construct a basic website using HTML and Cascading Style Sheets.

CO2: Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.

CO3: Develop server side programs using Servlets and JSP.

CO4: Construct simple web pages in PHP and represent data in XML format.

CO5: Utilize AJAX and web services to develop interactive web applications.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2	3		2					2				3	
CO2	3	2				2			2			1	2	3	1
CO3	2				3	2			2					3	
CO4	2				3	1				3				3	
CO5	3					2			1		1		3	2	

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UNIT I

WEBSITE BASICS, HTML 5, CSS 3, WEB 2.0

Web Essentials: Clients, Servers and Communication – The Internet – Basic Internet protocols – World wide web – HTTP Request Message – HTTP Response Message – Web Clients – Web Servers – HTML5 – Tables – Lists – Image – HTML5 control elements – Semantic elements – Drag and Drop – Audio – Video controls - CSS3 – Inline, embedded and external style sheets – Rule cascading – Inheritance – Backgrounds – Border Images – Colors – Shadows – Text – Transformations – Transitions – Animations.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Create standard tags of HTML tags and Knowing the features of designing static webpages. (L6)
2. List different types of CSS to design webpage attractively. (L1)
3. Utilize different tools like Adobe Dream weaver and Microsoft Frontpage.(L3)

UNIT II

CLIENT SIDE PROGRAMMING

Java Script: An introduction to JavaScript–JavaScript DOM Model-Date and Objects,-Regular Expressions- Exception Handling-Validation-Built-in objects-Event Handling - DHTML with JavaScript- JSON introduction – Syntax – Function Files – Http Request – SQL.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Explain different types of client side scripting. (L2)
2. Construct dynamic webpages using DHTML.(L6)
3. Illustrate validation for webpages.(L2)

UNIT III

SERVER SIDE PROGRAMMING

Servlets: Java Servlet Architecture- Servlet Life Cycle- Form GET and POST actions-Session Handling-Understanding Cookies- Installing and Configuring Apache Tomcat Web Server- DATABASE CONNECTIVITY: JDBC perspectives, JDBC program example - JSP: Understanding Java Server Pages-JSP Standard Tag Library (JSTL)-Creating HTML forms by embedding JSP code.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Analyze the importance of Server side scripting. (L4)
2. Demonstrate deployment of the application using Tomcat Server.(L2)
3. Experiment with Storing and Retrieving data from JDBC. (L3)

UNIT IV

PHP and XML

An introduction to PHP: PHP- Using PHP- Variables- Program control- Built-in functions-Form Validation- Regular Expressions - File handling – Cookies - Connecting to Database. XML: Basic XML- Document Type Definition- XML Schema DOM and Presenting XML, XML Parsers and Validation, XSL and XSLT Transformation, News Feed (RSS and ATOM).

Learning Outcomes:

At the end of the unit, students will be able to:

1. Understand how XML interacts with different applications. (L1)
2. Develop PHP Programs using WAMP and XAMPP Server.(L3)
3. Examine background applications using XSL and XSLT.(L4)

UNIT V
INTRODUCTION TO AJAX and WEB SERVICES

AJAX: Ajax Client Server Architecture-XML Http Request Object-Call Back Methods; Web Services: Introduction- Java web services Basics – Creating, Publishing, Testing and Describing a Web services (WSDL)-Consuming a web service, Database Driven web service from an application –SOAP.

Learning Outcomes:

1. Explain the importance of AJAX Architecture.(L2)
2. Integrate and test web services.(L4)

Text Books:

1. Deitel and Deitel and Nieto, ―Internet and World Wide Web - How to Program‖,Prentice Hall, 5th Edition, 2011.
2. Web Technologies, Uttam K. Roy, Oxford Higher Education., 1st edition, 10th impression, 2015.
3. The Complete Reference PHP by Steven Holzner, MGH HILL Education, Indian Edition, 2008.

References

1. Stephen Wynkoop and John Burke ―Running a Perfect Website‖, QUE, 2nd Edition,1999.
2. Chris Bates, Web Programming – Building Intranet Applications, 3rd Edition, WileyPublications, 2009.
3. Jeffrey C and Jackson, ―Web Technologies A Computer Science PerspectivePearson Education, 2011.
4. Gopalan N.P. and Akilandeswari J., ―Web Technology, Prentice Hall of India, 2011.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGEOFENGINEERING(Autonomous),ANANTHAPURAMU

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

B.Tech (R19 Regulation)

III B.TECH–I SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A50508	**Distributed Computing (Open Elective – I)**	3	0	0	3

Course Objectives:

This course is designed to:

- Study the fundamentals of distributed computing systems
- Study the concepts of IPC,PRC and distributed shared memory
- Provide the knowledge on clock synchronization and scheduling algorithms
- Study different file models, DCE directory services and work on different case studies

Course Outcomes:

At the end of the course, the students should be able to:

CO1: Understand different distributed systems and apply different Message Passing Techniques

CO2: Design distributed shared memory and implement RPC mechanism

CO3: Get knowledge in synchronization and apply scheduling algorithms

CO4: Analyze distributed file system access and Compare NFS & AFS

CO5: Develop case studies on Mach & Chorus effectively as a team work

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1											3		
CO2			3			1								3	
CO3	3				2		1							1	
CO4		3		3									2		
CO5			3		3		2	1	3	2	1	2	2	2	3

UNIT I: Fundamentals

Evolution of Distributed Computing Systems, System models, issues in design of Distributed Systems, Distributed- computing environment, web based distributed model, computer networks related to distributed systems and web based protocols.

Message Passing: Inter process Communication, Desirable Features of Good Message-Passing Systems, Issues in IPC by Message, Synchronization, Buffering, Multi datagram Messages, Encoding and Decoding of Message Data, Process Addressing, Failure Handling, Group Communication.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Understand evolution of distributed computing systems (L2)
2. Analyze design issues in inter process Communication (L4)
3. Apply Encoding and Decoding of Message Data(L3)

UNIT II:Remote Procedure Calls

The RPC Model, Transparency of RPC, Implementing RPC Mechanism, Stub Generation, RPC Messages, Marshaling Arguments and Results, Server Management, Communication Protocols for RPCs, Complicated RPCs, Client-Server Binding, Exception Handling, Security, Some Special Types of RPCs, Lightweight RPC, Optimization for Better Performance.

Distributed SharedMemory: Design and Implementation issues of DSM, Granularity, Structure of Shared memory Space, Consistency Models, replacement Strategy, Thrashing, Other Approaches to DSM, Advantages of DSM.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Design RPC mechanism (L6)
2. Apply exception handling and security mechanism (L3)
3. Discuss different approaches to DSM (L2)
4. Analyze distributed shared memory (L4)

UNIT III: Synchronization

Clock Synchronization, Event Ordering, Mutual Exclusion, Election Algorithms

Resource and ProcessManagement

Desirable Features of a good global scheduling algorithm, Task assignment approach, Load Balancing approach, Load Sharing Approach, Process Migration, Threads, Processor allocation, Real time distributed Systems.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Discuss Clock Synchronization, Event Ordering (L2)
2. Apply different scheduling algorithms (L4)
3. Use Process Migration and Threads concepts (L3)
4. Understand Real time distributed Systems (L2)

UNIT IV:DistributedFileSystems

Desirable Features of a good Distributed File Systems, File Models, File Accessing Models, File-sharing Semantics, File- caching Schemes, File Replication,Fault Tolerance, Design Principles, Sun's network file system, Andrews file system, comparison of NFS and AFS.

Naming: Desirable Features of a Good Naming System, Fundamental Terminologies and Concepts, Systems-Oriented Names, Name caches, Naming &security, DCE directory services.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Analyze distributed file system access (L2)
2. Discover Fault Tolerance (L3)
3. Compare NFS and AFS (L4)
4. Evaluate Fundamental Terminologies and Concepts on Naming (L5)

UNIT V: Case Studies: Mach & Chorus (Keep case studies as tutorial)

Term work/ Practical: Each candidate will submit assignments based on the above syllabus along with the flow chart and program listing will be submitted with the internal test paper.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Develop case studies on Mach & Chorus effectively (L6)
2. Write an assignments and construct flow chart and program listing (L6)

Text Books:

1. Distributed OS by Pradeep K. Sinha(PHI)

References:

1. Tanenbaum S: Distributed Operating Systems, Pearson Education
2. Tanenbaum S. Maarten V.S.: Distributed Systems Principles and Paradigms, (PearsonEducation)
3. George Coulouris, Jean Dollimore. Tim Kindberg: Distributed Systems concepts anddesign.

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

B.Tech (R19 Regulation)

III B.TECH–I SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A50509	**Object Oriented Analysis and Design**	2	0	0	2

Course Objectives:

- Understand the basic concepts of object-oriented techniques
- Build the Model of the software system using UML diagrams
- Elucidate design patterns as templates for good design
- Learn the object-oriented methodology in software design
- Demonstrate activity diagram and their modelling techniques.

Course outcomes:

Upon completion of the course, the students should be able to:

CO1: Analyze the problem from object oriented perspective
CO2: Model complex systems using UML Diagrams
CO3: Determine the suitable design patterns in software design
CO4: Adapt Object-Oriented Design Principles
CO5: Apply basic structural modeling concepts for designing real-time applications

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3		1	2				1			3		
CO2		1		1					1		1		1		
CO3	2		1				1							2	
CO4	3								3			1	3		
CO5	3		3			2			2				2	2	

Unit – 1: Basic concepts

Basic concepts: objects, classes, abstract classes, data types, ADT, encapsulation and information hiding, inheritance, association, aggregation, composition, polymorphism, dynamic binding, object-oriented principles.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Recognize basic issues of object-orientation (L1)
2. Identify class relations from problem statements (L4)
3. Construct basic principles of object-orientation (L6)

Unit – 2:

Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams. Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

Learning outcomes:
At the end of the unit, students will be able to:

1. Describe the basic syntax and semantics of UML (L2)
2. Design class diagram and object-diagrams (L6)

Unit – 3: Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams
Basic Behavioral Modeling-I: Interactions, Interaction diagrams.
Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams.
Learning outcomes
At the end of the unit, students will be able to:

1. Develop modeling of the user's view using use case diagrams (L6)
2. Summarize behavioral modeling of a given problem using sequence diagram, collaboration diagram, and state chart diagram (L2)

Unit – 4: Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams. Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

Learning outcomes:

At the end of the unit, students will be able to:

1. Interpret domain modeling (L2)
2. Develop sequence diagram for any given use case (L6)

Unit – 5: Patterns and Frameworks, Artifact Diagrams. Case Study: The Unified Library application

Learning outcomes:

At the end of the unit, students will be able to:
1.Describe Design patterns(L1)
2.Create Unified library application(L6)

Text Book:

1. Rajib Mall, "Fundamentals of Software Engineering", 5th Edition, PHI, 2018

Reference Books:

1. Rumbaugh and Blaha, Object-oriented Modeling and design with UML, Pearson, 2007
2. Bernd Bruegge and, Allen H. Dutoit, Object-Oriented Software Engineering Using UML, Patterns, and Java, Pearson, 2009

III B.TECH–I SEMESTER (R19)

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

B.Tech (R19 Regulation)

SubjectCode	TitleoftheSubject	L	T	P	C
19A50510	**Computer Networks Lab**	0	0	3	1.5

Course Objectives:

- Understand the different types of networks
- Discuss the software and hardware components of a network
- Enlighten the working of networking commands supported by operating system
- Impart knowledge of Network simulator 2/3
- Familiarize the use of networking functionality supported by JAVA
- Familiarize with computer networking tools.

Course outcomes:

Upon completion of the course, the students should be able to:

CO1: Design scripts for Wired network simulation (L6)
CO2: Design scripts of static and mobile wireless networks simulation (L6)
CO3: Analyze the data traffic using tools (L4)
CO4: Design JAVA programs for client-server communication (L6)
CO5: Construct a wired and wireless networks using the real hardware (L3)

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3		3	2		1	3	2	3		3	3	
CO2				1	3	2					3			3	
CO3	3	3	3		3				3				3	3	
CO4	3	3	3		3				3		3	2	3	3	
CO5	3				3	2			3		3	2	3	3	2

List of Experiments

1.

- Study different types of Network cables (Copper and Fiber) and prepare cables (Straight and Cross) to connect Two or more systems. Use crimping tool to connect jacks. Use LAN tester to connect
  the cables.
- Install and configure Network Devices: HUB, Switch and Routers. Consider both manageable and non-manageable switches. Do the logical configuration of the system. Set the bandwidth of Different ports.

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- Install and Configure Wired and Wireless NIC and transfer files between systems in Wired LAN AndWireless LAN. Consider both adhoc and infrastructure mode of operation.

2. Work with the commands Ping, Tracert, Ipconfig, pathping, telnet, ftp, getmac, ARP, Hostname, Nbtstat, netdiag, and Nslookup

3. Use Sniffers for monitoring network communication (Ethereal)

4. Find all the IP addresses on your network. Unicast, Multicast, and Broadcast on your network.

5. Use Packet tracer software to build network topology and configure using Distance vector routing protocol.

6. Use Packet tracer software to build network topology and configure using Link State routing protocol.

7. Using JAVA RMI Write a program to implement Basic Calculator

8. Implement a Chatting application using JAVA TCP and UDP sockets.

9. Hello command is used to know whether the machine at the other end is working or not.

Echo command is used to measure the round trip time to the neighbour. Implement Hello and Echo commands using JAVA.

10. Use Ethereal tool to capture the information about packets.

11. Install Network Simulator 2/3. Create a wired network using dumbbell topology. Attach agents, generate both FTP and CBR traffic, and transmit the traffic. Vary the data rates and evaluate the performance using metric throughput, delay, jitter and packet loss.

12. Create a static wireless network. Attach agents, generate both FTP and CBR traffic, and transmit the traffic. Vary the data rates and evaluate the performance using metric throughput, delay, jitter and packet loss.

13. Create a mobile wireless network. Attach agents, generate both FTP and CBR traffic, and transmit the traffic. Vary the data rates and evaluate the performance using metric throughput, delay, jitter and packet loss.

Reference Books:

1. **Shivendra S.Panwar, Shiwen Mao, Jeong-dong Ryoo, and Yihan Li, "TCP/IP Essentials A Lab-Based Approach", Cambridge University Press, 2004.**
2. **Cisco Networking Academy, "CCNA1 and CCNA2 Companion Guide", Cisco Networking Academy Program, 3rd edition, 2003.**
3. Ns Manual, Available at: https://www.isi.edu/nsnam/ns/ns-documentation.html, 2011.
4. Elloitte Rusty Harold, "Java Network Programming", 3rd edition, O'REILLY, 2011.

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III B.TECH–I SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A55502	**English Language Skills Lab**	0	0	3	1.5

Course Description:

English Language Skills Lab aims to enable the engineering students to meet the demands of the modern job market through group activities, individual presentations, mock interviews and group discussions. Students of our region have knowledge of their respective subjects, but the surveys make it clear that they are lagging behind in expressing themselves effectively in a professional setting. So, this course will enable them to hone these skills and excel in their respective fields.

Course Objectives:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.
- To initiate them into greater use of the computer in resume preparation, report writing, format making etc.
- To train them to use language effectively to face interviews, group discussions, public speaking.

Course Outcomes:

CO1: To recall and memorize tips to communicate effectively
CO2: To understand various listening components that includes listening comprehension of gist and detailed information.
CO3: To apply extensive and intensive reading methods for specific reading and voracious reading of vast material.
CO4: To analyze different descriptive and technical writing material.
CO5: To evaluate and develop, academic research paper with appropriate citations, quotations, and references when needed.
CO6: To develop communicative competency and make the students job ready

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1									3	3		1			2
CO2									3	3		1			2
CO3									3	3		2			2
CO4											2				

CO5											3				
CO6									3	3					3

UNIT-I: COMMUNICATIVE COMPETENCY

1. Reading Comprehension
2. Listening comprehension
3. Vocabulary for competitive purpose

Learning Outcomes:

1. To recall and memorize the basic concepts of reading and listening skills
2. To understand the various components to build up vocabulary
3. To apply English language skills to avoid barriers to effective reading and listening

UNIT-II: TECHNICAL WRITING

1. Email Writing
2. CV/Resume Writing
3. Mini Project Writing

Learning Outcomes:

1. To understand the basic components of writing Emails
2. To apply the knowledge of writing eye catching resumes
3. To analyze different ways of writing a mini project

UNIT-III: ORAL PRESENTATION SKILLS

1. Self-Introduction – Introducing Others – Welcome Speech – Vote of Thanks
2. Oral Presentation-Individual/Impromptu Speeches/ JAM
3. Stage Dynamics– Barriers to Effective Presentation

Learning Outcomes:

1. To understand the basic components of speeches
2. To apply knowledge of different forms of presentation.
3. To analyze stage dynamics for effective presentation

UNIT-IV: TECHNICALPRESENTATION SKILLS

1. Information Transfer
2. PPT Presentation
3. Poster Presentation

Learning Outcomes:

1. To apply knowledge of different types of pictograms to transfer the information
2. To analyze the techniques of preparing PPTs
3. To evaluate different skills in poster presentation

UNIT-V: PROFESSIONAL SKILLS

1. Group discussions-II
2. Interview skills
3. Answering Strategies

Learning Outcomes:

1. To analyze the different aspects of interviews and group discussions
2. To evaluate the group dynamics to excel in group discussions
3. To design and develop strategies to answer effectively in interviews

MINIMUM REQUIREMENT FOR ELCS LAB:

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 60 students in the lab:

- Spacious room with appropriate acoustics.
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ
- T. V, a digital stereo & Camcorder
- Headphones of High quality

SUGGESTED SOFTWARE:

1. Orell: Language Lab Software
2. Clarity Pronunciation Power – Part I (Sky Pronunciation)
3. Clarity Pronunciation Power – part II
4. LES(Learn English Select) by British council
5. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
6. English Pronunciation in Use (Elementary, Intermediate, Advanced) CUP
7. Cambridge Advanced Learners' English Dictionary with CD.

The software consisting of the prescribed topics elaborated above should be procured and used.

Reference Books:

1. DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
2. TOEFL &GRE(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
3. Train2success.com

1. Objective English for Competitive Exams, Hari Mohana Prasad, 4th edition, Tata Mc Graw Hill.
2. Technical Communication by Meenakshi Raman & Sangeeta Sharma, O U Press 2009.
3. Books on TOEFL/GRE/GMAT/CAT/IELTS by Barron's/DELTA/Cambridge University Press.2012.
4. Handbook for Technical Writing by David A McMurrey& Joanne Buckely CENGAGE Learning 2008.
5. English for Technical Communication for Engineering Students, AyshaVishwamohan, Tata Mc Graw-Hill 2009.
6. Word Power Made Handy, Shalini Verma, S Chand Publications, 2011.
7. Effective Technical Communication, Ashrif Rizvi, TataMcGrahill, 2011.

WEB LINKS

1.https://www.slideshare.net/ruschellecossid/reading-comprehension-56872438

2.https://www.slideshare.net/FiveEEE/listening-comprehension-40031081

3.https://www.slideshare.net/shrutisalunkhe2/english-for-competitive-exams

4.https://www.slideshare.net/nidhipandey16/email-writing-52942112

5.https://www.slideshare.net/aamirmuhammadaamir77/resume-writing-ppt

6.https://www.powershow.com/view/1d8cf2-OWFhN/Mini_Project_Report_Writing_Workshop_powerpoint_ppt_presentation

7.https://www.slideshare.net/8788902/oral-presentations-28994496

8.https://www.slideshare.net/nandapalit/presentation-skills-33500438

9.https://www.slideshare.net/ritikadhameja/group-discussion-46255658

10.https://www.slideshare.net/vikkerkar/interview-skills-presentation

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III B.TECH–I SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A50511	**Object Oriented Analysis and Design Lab**	0	0	3	1.5

Course Objectives:

1. Findsolutionstotheproblemsusingobjectoriented approach
2. Understand and define the context and the external interaction with the System
3. Identify the principle objects in the system
4. Develop the design models
5. Familiarize with usage of open source UML Case tools

Course Outcomes:

CO1: Perform OO analysis and design for a given problem specification.
CO2: Identify and map basic software requirements in UML mapping.
CO3: Improve the software quality using design patterns and to explain the rationale behind Applying specific design patterns.
CO4: Test the compliance of the software with the SRS.
CO5: Construct projects using UML diagrams

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3		1	2				1			3		
CO2	3	1							2		1		3		
CO3	3						1			1				2	
CO4		1	2	1					2		1	1	3		
CO5	3		3			2			2				3	2	

Laboratory Experiments

Students are divided into batches of 5 each and each batch has to draw the following diagrams using UML for an ATM system whose description is given below. UML diagrams to be developed are:

1. Use Case Diagram.
2. Class Diagram.
3. Sequence Diagram.

4. Collaboration Diagram.
5. State Diagram
6. Activity Diagram.
7. Component Diagram
8. Deployment Diagram.
9. Test Design.

Description for an ATM System –
The software to be designed will control a simulated automated teller machine (ATM) having a magnetic stripe reader for reading an ATM card, a customer console (keyboard and display) for interaction with the customer, a slot for depositing envelopes, a dispenser for cash (in multiples of Rs. 100, Rs. 500 and Rs. 1000), a printer for printing customer receipts, and a key-operated switch to allow an operator to start or stop the machine. The ATM will communicate with the bank's computer over an appropriate communication link. (The software on the latter is not part of the requirements for this problem.)

The ATM will service one customer at a time. A customer will be required to insert an ATM card and enter a personal identification number (PIN) - both of which will be sent to the bank for validation as part of each transaction. The customer will then be able to perform one or more transactions. The card will be retained in the machine until the customer indicates that he/she desires no further transactions, at which point it will be returned - except as noted below.

The ATM must be able to provide the following services to the customer:

1. A customer must be able to make a cash withdrawal from any suitable account linked to the card, in multiples of Rs. 100 or Rs. 500 or Rs. 1000. Approval must be obtained from the bank before cash is dispensed.
2. A customer must be able to make a deposit to any account linked to the card, consisting of cash and/or checks in an envelope. The customer will enter the amount of the deposit into the ATM, subject to manual verification when the envelope is removed from the machine by an operator. Approval must be obtained from the bank before physically accepting the envelope.
3. A customer must be able to make a transfer of money between any two accounts linked to the card.
4. A customer must be able to make a balance inquiry of any account linked to the card.
5. A customer must be able to abort a transaction in progress by pressing the Cancel key instead of responding to a request from the machine.

The ATM will communicate each transaction to the bank and obtain verification that it was allowed by the bank. Ordinarily, a transaction will be considered complete by the bank once it has been approved. In the case of a deposit, a second message will be sent to the bank indicating that the customer has deposited the envelope. (If the customer fails to deposit the envelope within the timeout period, or presses cancel instead, no second message will be sent to the bank and the deposit will not be credited to the customer.)

If the bank determines that the customer's PIN is invalid, the customer will be required to reenter the PIN before a transaction can proceed. If the customer is unable to successfully enter the PIN after three tries, the card will be permanently retained by the machine, and the customer will have to contact the bank to get it back.

If a transaction fails for any reason other than an invalid PIN, the ATM will display an explanation of the problem, and will then ask the customer whether he/she wants to do another transaction. The ATM will provide the customer with a printed receipt for each successful transaction

The ATM will have a key-operated switch that will allow an operator to start and stop the servicing of customers. After turning the switch to the "on" position, the operator will be required to verify and enter the total cash on hand. The machine can only be turned off when it is not servicing a customer. When the switch is moved to the "off" position, the machine will shut down, so that the operator may remove deposit envelopes and reload the machine with cash, blank receipts, etc.

List of Tasks for which students have to design all UML diagrams:

1. Banking system
2. Online bookshop system
3. University Systems
4. Library management system
5. Hospital management system
6. Result processing system

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III B.TECH–II SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A60501	**Compiler Design**	3	0	0	3

Course Objectives:

- This course in Computer Science, as it combines skills in software design, programming, data structures and algorithms, theory of computing, documentation, and machine architecture to produce a functional compiler
- Realize that computing science theory can be used as the basis for real
- Applications
- Introduce the major concept areas of language translation and compiler design.
- Learn how a compiler works
- Know about the powerful compiler generation tools and techniques, which are
- useful to the other non-compiler applications
- Know the importance of optimization and learn how to write programs that execute faster

Course Outcomes:

CO1: Able to understand the various phases of compiler and analyze the lexical tool.

CO2: Students should be in a position to understand the different types of parsing Techniques and apply Lex tool & YAAC tools.

CO3: Design syntax directed translations for semantic analysis of various language features and produce intermediate code.

CO4: Students should be able to understand and design different code generation techniques and algorithms.

CO5: Apply various optimization techniques to the intermediate code/machine code.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		1													
CO2	1	3		1									2		
CO3	2	2	1	2	1	1							2		
CO4	3	3	1	3	1								2	2	
CO5	1	2	2	3	2	1			1				1		

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UNIT-I

Introduction: Language processors, Phases of a compiler, Pass and phase, Bootstrapping, Compiler construction tools, Applications of compiler technology.

Lexical Analysis: Role and Responsibility, Input buffering, Specification of tokens, Recognition of tokens, LEX tool.

At the end of the unit, Students will be able to:

1. Study phases of compiler(L1)
2. Define Bootstrapping(L1)
3. Explain Role of Lexical analysis(L5)
4. construct the tokens(L6)

UNIT-II

Syntax Analysis: Role of the parser, Context Free Grammars: Definition, Derivations, Parse trees, Ambiguity, Eliminating ambiguity, Left recursion, Left factoring.

TOP Down Parsing: Recursive descent parsing, Non-recursive predictive parsing, LL(1) grammars, Error recovery in predictive parsing.

Bottom up Parsing: Handle pruning, Shift-Reduce parsing, Conflicts during shifts- reduce parsing, SLR Parsing, Canonical LR (1) parsers, LALR parsers, Using ambiguous grammars, YACC tool.

At the end of the unit, Students will be able to:

1. Describe the Role ofParser.(L2)
2. Define ambiguity and how eliminatingambiguity(L1)
3. Compare top down parsing and top downparsing.(L5)

UNIT-III

Syntax Directed Translation: Syntax Directed Definitions, Evaluation orders for SDD‘s,Application of SDT, SDT schemes

Intermediate Code Generation: Need for intermediate code, Types of intermediate code, Three address code, Quadruples, Triples, Type expressions, Type equivalence, Type checking, Translation of expressions, control flow statements, switch statement, procedures, back patching.

At the end of the unit, Students will be able to:

1. List the Applications of SDT(L1)
2. Categorize Types of intermediate code(L6)
3. Define type checking and type expressions. (L1)

UNIT-IV

Run Time Storage Organization: Storage Organization, Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management, Symbol table organization.

Code Generation: Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code, A Simple Code Generator.

At the end of the unit, Students will be able to:

1. How to create symbol table(L6)
2. Define Heap management(L1)

UNIT-V

Code Optimization: Principle source of Optimization, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, Introduction to Data-Flow Analysis, Constant Propagation, Partial-Redundancy Elimination, Loops in Flow Graphs.

At the end of the unit, Students will be able to:

1. How to Create flow graph(L6)
2. Construct Loops in flow graphs (L3)
3. Describe code optimization(L1)

Text Books:

1. –CompilersPrinciples, Techniques and Tools‖, Second Edition,AlfredV.Aho, Monica S.Lam, Ravi Sethi, Jeffrey D. Ullman.Pearson

Reference Books:

1. CompilerConstruction‖,K.V.NSunitha, Pearson, 2013
2. EngineeringACompiler‖,SecondEdition,KeithD.Cooper&LindaTorczon,MK(Morgan Kaufmann)(ELSEVIER)
3. CompilersPrinciplesandPractice‖, ParagH. Dave, Himanshu B. Dave,PEARSON
4. CompilerDesign‖,SandeepSaxena,RajkumarSinghRathore,S.Chandpublication
5. Compiler Design‖, SantanuChattopadhyay., PHI
6. Principals of CompilerDesign‖, NadhniPrasad, Elsevier

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III B.TECH–II SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A60502	**Cryptography and network Security**	3	0	0	3

Course Objectives:

- Introduce the basic categories of threats to computers and networks
- Illustrate various cryptographic algorithms.
- Demonstrate public-key cryptosystem.
- Discuss the fundamental ideas of public-key cryptography.
- Explore Web security threats and protection mechanisms

Course Outcomes

CO1: Identify various type of vulnerabilities of a computer network

CO2: Outline various security algorithms

CO3: Design secure systems

CO4: Investigate the threats and identify the solutions for threats

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2		1	1		3							1	
CO2		1	2				1							3	
CO3				2		1	2							3	
CO4	1	3				2		1					1		

UNIT – I

Attacks on Computers and Computer Security: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

Cryptography: Concepts and Techniques: Introduction, plain text and cipher text,substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

Learning Outcomes

At the end of the unit, students will be able to:

1. Identify different types of Attacks (L3)
2. Interpret various cryptography techniques (L5)
3. Distinguish between cryptography and steganography (L4)

UNIT – II

Symmetric key Ciphers: Block Cipher principles&Algorithms (DES, AES, Blowfish), Differential and Linear Cryptanalysis, Block cipher modes of operation, Stream ciphers, RC4,Location and placement of encryption function, Key distribution

Asymmetric key Ciphers: Principles of public key cryptosystems, Algorithms(RSA, Diffie-Hellman,ECC), Key Distribution

Learning Outcomes

At the end of the unit, students will be able to:

1. Differentiate symmetric and asymmetric ciphers (L4)
2. Explain the principles of public key cryptography (L2)
3. Select the appropriate cryptographic algorithm based on the requirements and applications.(L5)

UNIT – III

Message Authentication Algorithms and Hash Functions: Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures, knapsack algorithm.

Learning Outcomes

At the end of the unit, students will be able to:

1. Summarize authentication techniques (L2)
2. Apply Hash algorithm for generating Digital signatures (L3)

UNIT – IV

E-Mail Security: Pretty Good Privacy, S/MIME

IP Security: IP Security overview, IP Security architecture, Authentication Header, encapsulating security payload, combining security associations, key management.

Learning Outcomes

At the end of the unit, students will be able to:

1. Extend security for emails (L2)
2. Examine IP security mechanisms (L4)

UNIT – V

Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction

Intruders, Virus and Firewalls: Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls

Case Studies on Cryptography and security: Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability, Virtual Elections.

Learning Outcomes

At the end of the unit, students will be able to:
1. Design secure electronic transactions (L6)
2. Explain different types of Firewalls (L2)

Text Books:

1. William Stallings, "Cryptography and Network Security", 5th Edition, Pearson Education, 2011.
2. Atul Kahate, "Cryptography and Network Security", 2nd Edition, Mc Graw Hill, 2010.
3. Bernard Menezes "Network Security and Cryptography", 1stEdition, CENGAGE Learning, 2010.

References:

1. C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, "Cryptography and Network Security",1st Edition, Wiley India Pvt Ltd, 2011.
2. ForouzanMukhopadhyay "Cryptography and Network Security", 2nd Edition , Mc Graw Hill, 2010.
3. Mark Stamp, Wiley India, "Information Security, Principles and Practice", 2nd Edition, Wiley, 2011.

SubjectCode	TitleoftheSubject	L	T	P	C
19A60503	**Machine Learning**	3	0	0	3

Course Objectives:

- Understand the basic theory underlying machine learning
- Formulate machine learning problems corresponding to different applications.
- Illustrate a range of machine learning algorithms along with their strengths and weaknesses
- Apply machine learning algorithms to solve problems of moderate complexity.
- Understand how Machine Learning imbibes the philosophy of Human learning.

Course Outcomes:

CO1: Identify machine learning techniques suitable for a givenproblem.
CO2: Solve the real world problems using various machine learningtechniques.
CO3: Apply Dimensionality reductiontechniques for data preprocessing.
CO4: Explain what is learning and why it is essential in the design of intelligent machines.
CO5: Implement Advanced learning models for language, vision, speech, decision making etc.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3		2	1		1						3		
CO2		3	1	2	1									2	
CO3	2		2	1	2							1	3	2	
CO4	2		3		1								2	3	
CO5		3	2	1					1	1		1	3	2	

UNIT I

Introduction: Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

Learning Outcomes:

1. Explore how to build computer programs that improve their performance at some task through experience. (L6).
2. Interpret Decision tree learning as practical methods for inductive inference. (L2)

UNIT II

NEURAL NETWORKS AND GENETIC ALGORITHMS: Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evolution and Learning.

Learning Outcomes:

1. Appraise artificial neural networks as one of the most effective learning methods currently known to interpret complex real-world sensor data. (L5).
2. Illustrates the use of the genetic algorithm approach, and examine the nature of its hypothesis space search.(L2)

UNIT III

BAYESIAN AND COMPUTATIONAL LEARNING: Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

Learning Outcomes:

1. Illustrate the principles of Probability for classification as an important area of Machine Learning Algorithms. (L2)
2. Analyze sample complexity and computational complexity for several learning Problems (L4)

UNIT IV

INSTANCE BASED LEARNING: K- Nearest Neighbor Learning – Locally weighted Regression – Radial Bases Functions – Case Based Learning.

Learning Outcomes:

1. Infer that the Instance based algorithms can be used to overcome memory complexity and overfitting problems. (L2).

UNIT V

ADVANCED LEARNING : Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm –Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning

Learning Outcomes:

1. Infer that the combined methods outperform both purely inductive and purely analytical learning methods. (L2)
2. Recognize the importance of Reinforcement Learning in the industry.

Text Books:
1. T.M. Mitchell, “Machine Learning”, McGraw-Hill,1997.

Reference Books:

1. EthernAlpaydin, “Introduction to Machine Learning”, MIT Press,2004.

2. Stephen Marsland, “Machine Learning -An Algorithmic Perspective”, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series,2014.

3. Andreas C. Müller and Sarah Guido “Introduction to Machine Learning with Python:A Guide for Data Scientists”,Oreilly.

e-Resources:

Andrew Ng, “Machine Learning Yearning”https://www.deeplearning.ai/machine-learning- yearning/

Shai Shalev-Shwartz , Shai Ben-David, “Understanding Machine Learning: From Theory to Algorithms” , Cambridge University Press
https://www.cse.huji.ac.il/~shais/UnderstandingMachineLearning/index.html

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III B.TECH–II SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A60504	**Virtual Reality and Augmented reality (Professional Elective-II)**	3	0	0	3

Course Objectives:

1. Teach the tools and technologies used by professionals working in VR and AR
2. Train with the skills to quickly and confidently create your own applications using the industry's leading tools
3. Guide the student to strategically move into a career in the VR/AR field

Course Outcomes:

CO1. Recognize how to make your competition irrelevant (L2)
CO2. Create your own blue ocean with Augmented Reality (L6)
CO3. Construct your own new business or integrate AR with your current business with step by step process and projects (L6)
CO4. Extend your sales with strategic marketing plan (L3)
CO5. Build more brand value(L6)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				3		2				2	2	3		
CO2			3		3		2							3	
CO3			3		3		2							3	2
CO4			2					2			2	2		2	
CO5			3		3		2						2	3	

UNIT-I

Computer generated worlds: what is augmented reality?, what is virtual reality?,
Understanding virtual space: defining visual space and content, defining position and orientation in three dimensions, navigation
The Mechanics of Sight: the visual path way, spatial vision, and Depth Cues.
Component Technologies of Head mounted Displays: Display fundamentals, related terminology and concepts, optical Architectures.

Learning outcomes:

1. Understand and define virtual space. (L2)
2. Understand the mechanics of sight like path way, depth, etc.,(L2)

UNIT-II

Augmented Displays: Binocular augmenting displays, Monocular augmenting displays.
Fully immersive Displays: PC-Console driven displays, smartphone based displays, CAVES and Walls, Hemispheres and Domes.
The Mechanics of hearing: Defining sound, the auditory pathway, sound cues and localization, the vestibular system.
Audio displays: Conventional audio

Learning outcomes:
1. Design Augmented displays (L6)
2. Understand the mechanics of Sound(L2)

UNIT-III

The Mechanics of Feeling: The Science of feeling, Anatomy and Composition of the skin.
Tactile and force feedback Devices: Haptic illusions, tactile feedback devices, Force feedback devices.
Sensors for tracking Position, and orientation and motion: introduction to sensor technologies, optical trackers, beacon trackers,electromagnetic trackers, inertial sensors, acoustic sensors.
Devices to enable navigation and interaction: 2D vs 3D interaction and navigation, the importance of a manual interface, hand and gesture tracking, whole body tracking, gaming and entertainment interfaces, navigating with your mind.

Learning outcomes:
1. Understand the mechanics of Feeling.(L2)
2. Use sensors for tracking, orientation and motion.(L3)

UNIT-IV

Gaming and Entertainment: Virtual reality and the arts, gaming, immersive video/ cinematic virtual reality.
Architecture and Construction: Artificial spaces, architectural design: Manage group architectures, Construction management, real estate sales applications, architectural acoustics.
Science and engineering: Simulate and innovate, naval architecture and marine engineering, automotive engineering, aerospace engineering, nuclear engineering and manufacturing.
Health and medicine: advancing the field of medicine, training applications, treatment applications.

Learning outcomes:
1. Design and implementation of an immersive user experience (L6)
2. Apply for Science and engineering and health applications.(L3)

UNIT-V

Aerospace and Defence: Flight simulation and training, mission planning and rehearsal, dismounted soldier situational awareness, advanced cockpit avionics, space operations.
Education: Tangible skills education, theory, knowledge acquisition and concept formation.
Information control and big data visualization: What is big data?, big data analytics and human vision.

Telerobotics and Telepresence: Defining Telerobotics and Telepresence, space applications and robonaut, undersea applications, Terrestrial and airborne applications.

Learning outcomes:

1. Design flight simulation models(L6)
2. Use for Big Data Visualization.(L3)

Text book:

1. Steve Aukstakalnis, “Practical Augmented Reality”, Pearson Education, 2017.

References

Erin Pangilinan, Steve lukas, and Vasanth Mohan, “Creating Augmented& Virtual Realities”, O’REILLY.

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III B.TECH–II SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A60505	**Distributed Systems**	3	0	0	3

Course Objectives:

To learn the fundamental principles of distributed systems, emphasizing on communication, process, naming, synchronization, consistency and replication, and fault tolerance in distributed systems.

Course Outcomes:

CO1: Identify a distributed system that fulfils requirements with regards to key distributed systems properties.
CO2: Analyze various synchronous and asynchronous group communications in distributed systems.
CO3: Apply various distributed algorithms related to clock synchronization, concurrency control, deadlock detection, load balancing, voting etc.
CO4: Discover fault tolerance and recovery in distributed systems and algorithms for the same.
CO5: Develop the current popular distributed systems such as peer-to-peer (P2P) systems.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3											2		
CO2		3											3		
CO3	3			1	3	1								3	
CO4					1	1					1		3		
CO5					3					1				3	

UNIT I

INTRODUCTION : Definition –Relation to computer system components –Motivation –Relation to parallel systems – Message-passing systems versus shared memory systems –Primitives for distributed communication –Synchronous versus asynchronous executions –Design issues and challenges. A model of distributed computations: A distributed program –A model of distributed executions –Models of communication networks –Global state – Cuts –Past and future cones of an event –Models of process communications. Logical Time: A framework for a system of logical clocks –Scalar time –Vector time – Physical clock synchronization: NTP.

Learning Outcomes:

1. Student able to understand fundamental concept in distributed computing environment(L1)

2. Student able to identify design issues and challenges of distributed systems(L2)

UNIT II

MESSAGE ORDERING & SNAPSHOTS 9 Message ordering and group communication: Message ordering paradigms –Asynchronous execution with synchronous communication –Synchronous program order on an asynchronous system –Group communication – Causal order (CO) - Total order. Global state and snapshot recording algorithms: Introduction –System model and definitions –Snapshot algorithms for FIFO channels

Learning Outcomes:

1. Student able to identify the message communication mechanism in distributing environment(L3)
2. Student able to understand global state and snapshot recording algorithms(L4)

UNIT III

DISTRIBUTED MUTEX & DEADLOCK 9 Distributed mutual exclusion algorithms: Introduction – Preliminaries – Lamport's algorithm – Ricart-Agrawala algorithm – Maekawa's algorithm – Suzuki–Kasami's broadcast algorithm. Deadlock detection in distributed systems: Introduction – System model – Preliminaries – Models of deadlocks – Knapp's classification – Algorithms for the single resource model, the AND model and the OR model.

Learning Outcomes:

1. Student able to understand mutual exclusive algorithms in distributed systems(L5)
2. Student able to identify the deadlock detection (L6)
3. Student able to understand how to prevent the deadlock in distributed environment(L7)

UNIT IV

RECOVERY &CONSENSUS Checkpointing and rollback recovery: Introduction – Background and definitions – Issues in failure recovery – Checkpoint-based recovery – Log-based rollback recovery – Coordinated checkpointing algorithm – Algorithm for asynchronous checkpointing and recovery. Consensus and agreement algorithms: Problem definition – Overview of results – Agreement in a failure – free system – Agreement in synchronous systems with failures.

Learning Outcomes:

1. Student able to understand various failures in distributed environment (L4)
2. Student able to identify and recover from failures(L5)

UNIT V

P2P & DISTRIBUTED SHARED MEMORY Peer-to-peer computing and overlay graphs: Introduction – Data indexing and overlays – Chord – Content addressable networks – Tapestry.

Distributed shared memory: Abstraction and advantages – Memory consistency models –Shared memory Mutual Exclusion.

Learning Outcomes:

1. Student able to understand how memory is share in P2P & Distributed environment (L2)
2. Student able to understand memory consistency models and shared memory Mutual Exclusion(L6)

Text Books:

1. Kshemkalyani, Ajay D., and Mukesh Singhal. Distributed computing: principles, algorithms, and systems.Cambridge University Press, 2011.

2. George Coulouris, Jean Dollimore and Tim Kindberg, ―Distribute

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III B.TECH–II SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A60506	**Design Patterns**	3	0	0	3

Course Objectives:

1. Understand design patterns and their underlying objects oriented concepts.
2. Learn the day-to-day problems faced by object-oriented designers and how design patterns solve them
3. Provide an interface for creating families of related objects without specifying their concrete classes.
4. To know the consequences of combining patterns on the overall quality of a system.

Course Outcomes:

Upon completion of the course, the students should be able to:

CO1: Develop own way of working with design patterns. (L6).
CO2: Critique well-known design patterns (L5).
CO3: Distinguish different categories of design patterns (L4).
CO4: Apply common design patterns to incremental/iterative development (L3).
CO5: Identify appropriate patterns for solving a given problem (L3).

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3		2				2		1			2	
CO2		3		2									1		
CO3															
CO4					1								1		
CO5		2											1		

UNIT-I

Introduction to Design Patterns

Design Pattern Definition, Design Patterns in Small Talk MVC, Describing Design Patterns, Catalog of Design Patterns, Organizing the Catalog, Solving of Design Problems using Design Patterns, Selection of a Design Pattern, Use of Design Patterns.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Develop design patterns in Small Talk MVC (L6).

2. How to select and use a Design Pattern (L1).
3. Solve problems using design patterns (L3).

UNIT-II

Designing A Document Editor: A Case Study

Design problems, Document structure, Formatting, Embellishing the User Interface, Supporting Multiple Look and Feel standards, Supporting Multiple Window Systems, User Operations, Spelling Checking and Hyphenation. Creational Patterns: Abstract Factory,Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

Learning Outcomes:
At the end of the unit, students will be able to:

1. Apply eight different patterns to Lexi's design. (L3).
2. Specify the kinds of objects to create new objects using prototype(L4).

UNIT-III

Structural Patterns-1: Adapter, Bridge, Composite.
Structural Patterns-2: Decorator, Facade, Flyweight, Proxy, Discuss of Structural Patterns.

Learning Outcomes:
At the end of the unit, students will be able to:

1. Understand structural patterns (L2).
2. Explain adapter, bridge and composite structural patterns (L2).
3. Create decorator, facade, flyweight and proxy structural patterns (L6).

UNIT-IV

Behavioral Patterns-1: Chain of Responsibility, Command, Interpreter, Iterator.
Behavioral Patterns-2: Mediator, Memento, Observer.

Learning Outcomes:
At the end of the unit, students will be able to:

1. Define behavioral patterns (L1).
2. Demonstrate object scope behavioral patterns (L2).
3. Justify description for different types of behavioral patterns (L5).

UNIT-V

Behavioral Patterns-2(cont'd): State, Strategy, Template Method, Visitor, and Discussion of Behavioral Patterns.
What to Expect from Design Patterns, a Brief History. The Pattern Community An Invitation, A Parting Thought.

Learning Outcomes:
At the end of the unit, students will be able to:

1. Identify behavioural patterns (L6).
2. Justify different types of behavioural patterns (L5).
3. Determine community for patterns (L4).

Text Book:

1. Erich Gamma, “Design Patterns”, Pearson Education.

Reference Books:

1. Mark Grand, “Pattern’s in JAVA” , Vol-I, Wiley DreamTech.
2. Mark Grand, “Pattern’s in JAVA”, Vol-II By, Wiley DreamTech.
3. Mark Grand, “JAVA Enterprise Design Patterns”, Vol-III, Wiley DreamTech.
4. Buschmann& others, “Pattern Oriented Software Architecture”, John Wiley & Sons.

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III B.TECH–II SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A60507	**Game Design and Development** **(Open Elective – II)**	3	0	0	3

Course Objectives:

- Get familiarized with the various components in a game and game engine.
- Explore the leading open source game engine components.
- Elaborate on game physics.
- Introduce to the game animation.
- Expose to network-based gaming issues.

Course Outcomes:
Upon completion of the course, the students should be able to:

CO1: Design games for commercialization
CO2: Predict the trends in game development
CO3: Outline the process carried out in the Game Industry
CO4: Design Game Plan and production cycle
CO5: Dramatize the game playing environment

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3		2									3	
CO2					3					1			3		
CO3	2	3												3	
CO4			3						1					3	
CO5					3		2				1				3

Unit – 1: Introduction to Game
What is a Game? The Birth of Games, The Rise of Arcade Games, The Crash and Recovery, The Console Wars, Online Games and Beyond.

The Game Industry: Game Industry Overview, Game Concept Basics, Pitch Documentation, pitching a Game to a Publisher, Managing the developer-Publisher Relationship, Legal Agreements, Licenses, Console Manufacturers Approval.

Roles on the Team: Production, Art, Engineering, Design, Quality Assurance Testing, Team Organization, Corporate.

Learning Outcomes:

After completing this Unit, students will be able to

1. Demonstrate online games and beyond. [L2]
2. Outline the process carried out in the Game Industry [L2]
3. Inspect the roles on the Team[L4]

Unit – 2: Teams
Project Leadership, Picking Leads, Team Building, Team Buy-in and Motivation.

Effective Communication: Written Communication, Oral Communication, Nonverbal Communication, Establishing Communication Norms, Communication Challenges.

Game Production Overview: Production Cycle, Preproduction, Production, Testing, Postproduction.

Learning Outcomes:

After completing this Unit, students will be able to

1. Build a team and pick a leader. [L6]
2. Develop Effective communication. [L3]
3. Outline the Game Production cycle [L2]

Unit – 3: Game Concept
Introduction, Beginning the Process, Defining the Concept, Game Programming Basics, Prototyping, Risk Analysis, Pitch Idea, Project Kickoff.

Characters, setting, and Story: Story Development, Gameplay, Characters, Setting, Dialogue, Cinematics, Story Documentation.

Game Requirements: Define Game Features, Define Milestones and Deliverables, Evaluate Technology, Define Tools and Pipeline, Documentation, Approval, Game Requirements Outline

Learning Outcomes:

After completing this Unit, students will be able to

1. Design a game. [L6]
2. Demonstrate the game play. [L2]
3. Identify the Game requirements [L3]

Unit – 4 :Game Design
Dependencies, Schedules, Budgets, Staffing, Outsourcing, Middleware, Game Plan Outline.
Production Cycle: Design Production Cycle, Art Production Cycle, Engineering Production Cycle, Working Together.

Voiceover and Music: Planning for Voiceover, choosing a Sound Studio, Casting Actors, Recording Voiceover, Voiceover Checklist, Planning for Music, Working with a Composer, Licensing Music.

Learning Outcomes:

After completing this Unit, students will be able to

1. Outline the Game plan. [L2]
2. Define the production cycle. [L1]
3. Make use of voiceover and music in game development. [L3]

Unit – 5 :Localization
Creating International Content, Localization-Friendly Code, Level of Localization, Localization Plan, Testing, Localization Checklist.

Testing and Code Releasing: Testing Schedule, Test Plans, Testing Pipeline, Testing Cycle, External Testing, Determining Code Release, Code Release Checklist, Gold Masters, Postmortems.

Marketing and Public Relations: Software Age Ratings, Working with Marketing, Packaging, Demos, Marketing Assets, Game Builds, Working with Public Relations, Asset Deliverable Checklist.

Learning Outcomes:

After completing this Unit, students will be able to

1. Explain the importance of localization. [L2]
2. Summarize Testing and code releasing [L2]
3. Illustrate Marketing and public relations. [L2]

Text Book:

1. Heather Maxwell Chandler, and Rafael Chandler, "Fundamentals of Game Development", Jones& Bartlett Learning, 2011.

References:

1. Flint Dille and John ZuurPlatten, The Ultimate guide to Video Game Writing, Loan Eagle publisher, 2008.
2. Adams, Fundamentals of Game Design, 3rd edition, Pearson Education India, 2015.

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III B.TECH–II SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A60508	**Mobile Application Development** **(Open Elective – II)**	3	0	0	3

Course Objectives:

- Facilitate students to understand android SDK
- Help students to gain a basic understanding of Android application development
- Inculcate working knowledge of Android Studio development tool

Course Outcomes:

Upon completion of the course, the students should be able to:

CO1: Identify various concepts of mobile programming that make it unique from programming for other platforms
CO2: Evaluate mobile applications on their design pros and cons.
CO3: Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces.
CO4: Develop mobile applications for the Android operating system that use basic and advanced phone features.
CO5: Demonstrate the deployment of applications to the Android marketplace for distribution.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3						1							
CO2		2											2		
CO3			2	3	2			2					3	3	
CO4			3		2	2		3							
CO5									3						

UNIT-I: Introduction to Android: The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building you First Android application, Understanding Anatomy of Android Application, Android Manifest file.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Make use of the Android platform (L3)
2. Create and Run Android project using SDK (L6)
3. Define the Anatomy of Android Application. (L1)

UNIT-II: Android Application Design Essentials: Anatomy of an Android applications, Android terminologies, Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions

Learning Outcomes:

At the end of the unit, students will be able to:

1. Explain the terminology used in Android applications (L2)
2. Develop first level Android applications that can accept information from the users (L3)
3. Illustrate the Android Manifest File and its common settings (L2)

UNIT-III: Android User Interface Design Essentials: User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Design Android application screen with various elements for improving users experience(L6)
2. Develop Android application with animations (L6)

UNIT-IV: Testing Android applications, Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Demonstrate Testing and publishing of their developed Android applications in the internet. (L2)
2. Explain how to manage Application resources in a hierarchy (L2)

UNIT V: Using Common Android APIs: Using Android Data and Storage APIs, Managing data using Sqlite, Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Develop top end applications that work with data storing and sharing facility.(L6)
2. Interpret and Develop applications based on customer perspective(L5)
3. Utilize various Android API’s for improving users experience(L3)

Text Books:

1. Lauren Darcey and Shane Conder, “Android Wireless Application Development”, PearsonEducation, 2nd ed. (2011)

REFERENCE BOOKS:

1. Reto Meier, “Professional Android 2 Application Development”, Wiley India Pvt Ltd
2. Mark L Murphy, “Beginning Android”, Wiley India Pvt Ltd
3. Android Application Development All in one for Dummies by Barry Burd, Edition: I

III B.TECH–II SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A60509	**Soft Computing** **(Open Elective – II)**	3	0	0	3

Course Objectives:

- Understand Soft Computing concepts, technologies, and applications
- Introduce and use the concepts of Genetic algorithm and its applications to soft computing using some applications.
- familiarize with concepts of Fuzzy techniques , Hybrid and Soft computing techniques

Course Outcomes:

CO1: Apply soft computing techniques and their roles in building intelligent machines
CO2: Recognize the feasibility of applying a soft computing methodology for a particular problem.
CO3: Implement basic Genetic algorithms
CO4: Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems.
CO5: Effectively use Hybrid and Soft computing techniques to evaluate approaches of given problem.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3										3	3	
CO2	2	3	3			2							1	2	
CO3	2	2	3	3									2	3	
CO4	1	1	1										1		
CO5	3	2	2		1										

UNIT–I: INTRODUCTIONTO SOFT COMPUTING AND SUPERVISED LEARNING NETWORKS

Introduction to Soft Computing: Neural networks, Application scope of neural networks, Fuzzy logic, Genetic algorithm, Hybrid systems, Softcomputing.

Artificial Neural Networks: Fundamentals, Basic Models, Terminologies, Linear Separability, Hebb network.

Supervised Learning Networks: Perceptron Networks- Theory, Perceptron learning rule, Architecture, Flowchart for training process, Perceptron training algorithm for single and multiple output classes, Perceptron network testing algorithm; Back-Propagation Network - Theory, Architecture, Flow chart for training process, Training algorithm, Learning factors of back-propagation network, Testing algorithm for back-propagation network.

Learning Outcomes:

At the end of the unit, students will be able to:

- Explain how an agent can formulate an Training algorithms. (L2)
- Solve the problems by systematically using Training Algorithm (L2)
- Derive new representations of Back-propagation Techniques (L5)

UNIT–II: UNSUPERVISED LEARNING NETWORKS

Fixed weight competitive nets – Maxnet, Mexican Hat Net, Hamming network; Kohonenself-organizing feature maps – Theory, Architecture, Flowchart, Training algorithm; Learning vector quantization – Theory, Architecture, Flowchart, Training algorithm, Variants; Counter propagation networks – Theory, Full counter propagation Net, Forward-only counter propagation Net; Adaptive resonance theory network – Fundamental architecture, Fundamental operating principle, Fundamental algorithm.

Learning Outcomes:

At the end of the unit, students will be able to:

- Examine how to organize feature maps. (L5)
- Develop programs using Fundamental Algoritm. (L6)
- Analyze Adaptive resonance theory network. (L4)

UNIT–III: GENETIC ALGORITHMS

Genetic algorithms- Biological background, Traditional optimization and search techniques, Genetic algorithm and search space, Genetic algorithms vs. traditional algorithms, Basic terminologies in genetic algorithm, Simple GA, General genetic algorithm, Operators in genetic algorithm, Stopping condition for genetic algorithm flow, Constraints in genetic algorithm, Problem solving using genetic algorithm, Adaptive genetic algorithms, Hybrid genetic algorithms, Advantages and limitations of genetic algorithm, Applications of genetic algorithm.

Learning Outcomes:

At the end of the unit, students will be able to:

- Develop a program that uses Basic terminologies in genetic algorithm. (L6)
- Explain the techniques that provide robust Hybrid genetic algorithms.(L2)
- Apply of genetic algorithm in realtime environment.

UNIT–IV: FUZZY LOGIC

Introduction to fuzzy logic, Classical sets, Fuzzy sets, Membership function – Features, Fuzzification, Methods of membership value assignments; Fuzzy arithmetic and measures–Fuzzy arithmetic, Extension principle, Fuzzy measures, Measures of fuzziness, Fuzzy integrals; Fuzzy rule base and approximation reasoning -Truth values and tables in fuzzy logic, Fuzzy propositions, Formation of rules, Compound rules, Aggregation of fuzzy rules, Fuzzy reasoning,Fuzzy inference systems, Overview of fuzzy expert system; Fuzzy decision making, Fuzzy logic control systems.

Learning Outcomes:

At the end of the unit, students will be able to:

- Explain the role of fuzzy logic in various applications. (L2)
- List the Formation of rules in fuzzy logic. (L1)
-

UNIT–V: HYBRID SOFT COMPUTING TECHNIQUES AND APPLICATIONS

Hybrid Soft Computing Techniques: Genetic neuro hybrid systems, Genetic fuzzy hybrid and fuzzy genetic hybrid systems.

Applications of Soft Computing: Optimization of traveling salesman problem using genetic algorithm approach, Genetic algorithm-based internet search technique, Soft computing-based hybrid fuzzy controllers, Soft computing-based rocket engine control.

Learning Outcomes:

At the end of the unit, students will be able to:

- Apply Optimization of travelling salesman problem using genetic algorithm approach (L3)
- Design Intelligent Agents (L6)
- Summarize Soft computing-based hybrid fuzzy controllers (L5)

Text Book(S):

1. S. N. Sivanandam and S. N. Deepa, Principles of Soft Computing, Wiley, 3rd Edition, 2019.

Reference Books:

1. S. Rajasekaran and G. A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic and Genetic Algorithms:Synthesis and Applications, PHI Learning Private Ltd, 2011.
2. Udit Chakraborty, Samir Roy, Soft Computing: Neuro-Fuzzy and Genetic Algorithms, Pearson, 2013.
3. Saroj Kaushik, Sunita Tewari, Soft Computing: Fundamentals, Techniques and Applications, McGraw Hill, 2018.

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III B.TECH–II SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A65401	**Managerial Economics and Financial Analysis (Humanities Elective – I)**	3	0	0	3

Course Objectives:

- To inculcate the basic knowledge of micro economics and financial accounting
- To make the students learn how demand is estimated for different products, input-output relationship for optimizing production and cost
- To know the various types of Market Structures & pricing methods and its strategies
- To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.

Course Outcomes:

CO1: Define the concepts related to Managerial Economics, financial accounting and management.

CO2: Understand the fundamentals of Economics viz., Demand, Production, cost, revenue and markets

CO3: Apply the concepts of production, cost and revenues for effective business decisions

CO4: Analyze how to invest their capital and maximize returns

CO5: Evaluate the capital budgeting techniques

Mapping of CO's with PO's and PSO's

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1											3		1		
CO2											2				
CO3											3				
CO4								2							
CO5											3				

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UNIT-I:Managerial Economics

Introduction – Nature, meaning, significance, functions and advantages. Demand-Concept, Function, Law of Demand – DemandElasticity- Types – Measurement. Demand Forecasting- Factors governing Forecasting, Methods. Managerial Economics and Financial Accounting and Management.

Learning Outcomes:

At the end of the Unit, the learners will be able to

1. State the Nature of Managerial Economics and its importance
2. Understand the concept of demand andits determinants
3. Analyze the Elasticity and degree of elasticity
4. Evaluate demand forecasting methods
5. Design the process of demand estimation for different types of demand

UNIT-II: Production and Cost Analysis

Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least-cost combination– Shortrun and longrun Production Function- Isoquants andIsocosts, MRTS - Cobb-Douglas Production Function - Laws of Returns - Internal and External Economies of scale.Cost&Break-Even Analysis - Cost concepts and Cost behavior- Break-Even Analysis (BEA) -Determination of Break-Even Point (Simple Problems)-Managerial significance and limitations of Break-Even Analysis.

Learning Outcomes:

At the end of the Unit, the learners will be able to

1. Define the production function, Input-Output relationship and different cost concepts
2. Apply the least-cost combination of inputs

3. Analyze the behavior of various cost concepts

4. Evaluate BEA for real time business decisions

5. Develop profit appropriation for different levels of business activity

UNIT-III: Business Organizations and Markets

Introduction – Nature, meaning, significance, functions and advantages.Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises.Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition – Monopoly-Monopolistic Competition–Oligopoly-Price-Output Determination - Pricing Methods and Strategies.

Learning Outcomes:

At the end of the Unit, the learners will be able to

1. Explain the structure of markets, features of different markets and forms of business organizations

2. Apply the price output relationship in different markets

3. Analyze the optimum output levels to maximize profit in different markets

4. Evaluate price-output relationship to optimize cost,revenue and profit

UNIT- IV:Capital Budgeting

Introduction – Nature, meaning, significance, functions and advantages. Typesof Working Capital,Components, Sources of Short-term and Long-term Capital, Estimating Working capital requirements. Capital Budgeting–Features, Proposals,Methods and Evaluation. Projects – Pay Back Method, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (sample problems)

Learning Outcomes:

At the end of the Unit, the learners will be able to

1. Explain the concept of capital budgeting and its importance in business

2. Contrast and compare different investment appraisal methods

3. Analyze the process of selection of investment alternatives using different appraisal methods

4. Evaluate methods of capital budgeting for investment decision making and for maximizing returns

5. Design different investment appraisals and make wise investments

UNIT-V: Financial Accounting and Analysis

Introduction – Nature, meaning, significance, functions and advantages. Concepts and Conventions- Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).***Financial Analysis -*** Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

Learning Outcomes:

At the end of the Unit, the learners will be able to

1. Discuss the concept,convention and significance of accounting
2. Apply the fundamental knowledge of accounting while posting the journal entries
3. Analyze the process and preparation of final accounts and financial ratios
4. Evaluate the financial performance of an enterprise by using financial statements

Text Books:

1. Varshney&Maheswari: Managerial Economics, Sultan Chand, 2013.
2. Aryasri: Business Economics and Financial Analysis, 4/e, MGH, 2019

References:

1. Ahuja Hl Managerial economics Schand,3/e,2013
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International, 2013.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage,201

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III B.TECH–II SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A65402	**Business Ethics and Corporate Governance (Humanities Elective – I)**	3	0	0	3

Course Objective:

- To make the student understand the principles of business ethics
- To enable them in knowing the ethics in management
- To facilitate the student's role in corporate culture
- To impart knowledge about the fair-trade practices
- To encourage the student in creating knowingabout the corporate governance

Course Outcomes:

CO1: Define the Ethics and Types of Ethics.

CO2: Understand business ethics and ethical practices in management

CO3: Understand the role of ethics in management

CO4: Apply the knowledge in cross cultural ethics

CO5: Analyze law and ethics

Mapping of CO's with PO's and PSO's

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1								3					1		3
CO 2								3							3

CO 3								2							3
CO 4						1									
CO 5											2				

UNIT-I: ETHICS

Introduction – Meaning – Nature, Scope, significance, Loyalty, and ethical behavior - Value systems - Business Ethics,Types, Characteristics, Factors, Contradictions and Ethical Practices inManagement- Corporate Social Responsibility – Issues of Management – Crisis Management.

Learning Outcomes:
After completion of this unit student will
1. Understand the meaning of loyalty and ethical Behavior
2. Explain various types of Ethics
3. Analyze the corporate social responsibility of management

UNIT-II: ETHICS IN MANAGEMENT

Introduction Ethics in production, finance, ,Human Resource Managementand,Marketing,Management - Technology Ethics and Professional ethics - The Ethical Value System – Universalism, Utilitarianism, Distributive Justice, Social Contracts, Individual Freedom of Choice, Professional Codes; Culture and Ethics – Ethical Values in different Cultures, Culture and Individual Ethics.

Learning Outcomes:
After completion of this unit student will
1. Understand the meaning of Marketing Ethics
2. Compare and contrast technical ethics and professional ethics
3. Develop ethical values

UNIT-III: CORPORATE CULTURE

Introduction, Meaning, definition, Nature, Scope, Functions and significance– Cross cultural issues in Ethics - - Emotional Honesty – Virtue of humility – Promote happiness – karma yoga – proactive – flexibility and purity of mind. The Ethical Value System – Universalism, Utilitarianism, Distributive Justice, Social Contracts, Individual Freedom of Choice, Professional Codes; Culture and Ethics –

Ethical Values in different Cultures, Culture and Individual Ethics.

Learning Outcomes:
After completion of this unit student will
1. Define UniversalismUtilitarianism, Distributive
2. Understand the corporate culture in business
3. Analyze Ethical Value System Ethical Values in different Cultures

UNIT- IV: LEGAL FRAME WORK

Law and Ethics, Agencies enforcing Ethical Business Behavior, Legal Impact– Environmental Protection, Fair Trade Practices, legal Compliances, Safeguarding Health and wellbeing of Customers.

Learning Outcomes:
After completion of this unit student will
1. Understand Law and Ethics
2. Analyze Different fair-trade practices
3. Make use of Environmental Protection andFair-Trade Practices

UNIT -V: CORPORATE GOVERNANCE

Introduction, meaning – scope Nature - Issues, need, corporate governance code, transparency & disclosure, role of auditors, board of directors and shareholders. Global issues, accounting and regulatory frame work, corporate scams, committees in India and abroad, corporate social responsibility. of BODs composition, Cadbury Committee - various committees - reports - Benefits and Limitations.

Learning Outcomes:
After completion of this unit student will
1. Understand corporate governance code
2. Analyze role ofauditors, board of directors and shareholders in corporate governance
3. Implementing corporatesocialresponsibility in India.

Text books.

1. Murthy CSV: Business Ethics and Corporate Governance, HPH

2. Bholananth Dutta, S.K. Podder – Corporation Governance, VBH.

Reference books

1. Dr. K. Nirmala, KarunakaraReaddy : Business Ethics and Corporate Governance, HPH

2. H.R.Machiraju: Corporate Governance

3. K. Venkataramana, Corporate Governance, SHBP.

4. N.M.Khandelwal : Indian Ethos and Values for Managers

III B.TECH–II SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A65403	**Entrepreneurship and Incubation** **(Humanities Elective – I)**	3	0	0	3

Course Objective:

- To make the student understand about Entrepreneurship
- To enable the student in knowing various sources of generating new ideas in setting up of new enterprise
- To facilitate the student in knowing various sources of finance in starting up of a business
- To impart knowledge about various government sources which provide financial assistance to entrepreneurs/ women entrepreneurs
- To encourage the student in creating and designing business plans

Course Outcomes:

CO1: Define the Concepts related to the Entrepreneurship and Incubators

CO2: Understand the concept of Entrepreneurship and challenges in the world of competition.

CO3: Apply the Knowledge in generating ideas for New Ventures.

CO4: Analyze various sources of finance and subsidies to entrepreneur/women Entrepreneurs.

CO5: Evaluate the role of central government and state government in promoting Entrepreneurship.

Mapping of CO's with PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1													2		

CO2			2												
CO3											3				
CO4						1									
CO5									2		2				

UNIT-I: Entrepreneurship
Introduction-Nature, meaning, significance, functions and advantages. concept, characteristics-knowledge and skills requirement - process - Factors supporting entrepreneurship - Differences between Entrepreneur and Entrepreneur - entrepreneurial mindset and personality - Recent trends.

Learning Outcomes

At the end if the Unit, the learners will be able to
1. Understand the concept of Entrepreneur and Entrepreneurship in India
2. Analyze recent trends in Entrepreneurship across the globe
3. Develop a creative mind set and personality in starting a business.

UNIT-II: Women Entrepreneurship
Introduction – Nature, meaning, significance, functions and advantages. Growth of women entrepreneurship in India. - Issues & Challenges - Entrepreneurial motivations.Entrepreneurship Development and Government. Role, of Central and State Government - incentives, subsidies and grants – Export-oriented Units - Fiscal and Tax concessions.

Learning Outcomes

At the end of the Unit, the learners will be able to
1. Understand the role of government in promoting women entrepreneurship
2. Analyze the role of export-oriented units
3. Evaluate the tax concessions available for Women entrepreneurs

.

UNIT-III:Product Development
Introduction – Nature, meaning, significance, functions and advantages. Startup Initiatives - Generating business/ Service idea – Sources and methods –Identifying opportunities - Feasibility study - Market feasibility, technical/operational feasibility, Financial feasibility. Developing business plan, Preparing project report, Presenting business plan to investors.

Learning Outcomes

At the end if the Unit, the learners will be able to
1. Analyze the sources of new methods in generating business idea
2. Evaluate market feasibility, financial feasibility and technical feasibility

3. Design and draw business plans in project preparation and prepare project reports

UNIT-IV: Startups

Introduction – Nature, meaning, significance, functions and advantages. Fundamentals of Business Incubation - Principles and good practices of business incubation- Process of business incubation and the business incubator and how they operate and influence theType/benefits of incubators - Corporate/educational / institutional incubators - Broader business incubation environment - Pre-Incubation and Post - Incubation process - Idea lab, Business plan structure -Value proposition

Learning Outcomes

At the end of the Unit, the learners will be able to:
1. Understand the importance of business incubation
2. Apply brilliant ideas in the process of business incubation
3. Analyze the process of business incubation/incubators.
4. Design their own business incubation/incubators as viable-business unit.

UNIT-V: Finance

Introduction – Nature, meaning, significance, functions and advantages. Sources - Long term and Short term - Institutional Finance – Commercial Banks, SFC's and NBFC's in India, Role in small and medium business - Entrepreneurship development programs in India - The entrepreneurial journey- Institutions supporting entrepreneurship development.

Learning Outcomes

At the end of the Unit, the learners will be able to
1. Understand the various sources of finance in Starting the new venture
2. Analyze the role of banks and other financial institutions in promoting entrepreneurship in India
3. Evaluate the need and importance of MSMEs in the growth of country

Text Books

1. D F Kuratko and T V Rao, **Entrepreneurship** - A South-Asian Perspective – Cengage Learning, 2012. (For PPT, Case Solutions Faculty may visit : login.cengage.com)
2 .Nandan H, Fundamentals of Entrepreneurship, PHI, 2013

References

1.Vasant Desai,Small Scale Industries and Entrepreneurship, Himalaya Publishing 2012.
2. Rajeev Roy Entrepreneurship, 2nd Edition, Oxford, 2012.
3.B.JanakiramandM.Rizwana‖ Entrepreneurship Development: Text & Cases, Excel Books, 2011.
4.Stuart Read, Effectual Entrepreneurship, Routledge, 2013.

E-Resources

1. Entrepreneurship-Through-the-Lens-of-enture Capital

2. http://www.onlinevideolecture.com/?course=mba-programs&subject=entrepreneurship
3. http://nptel.ac.in/courses/122106032/Pdf/7_4.pd
4. http://freevideolectures.com/Course/3514/Economics-/-Management-/-Entrepreneurhip/50

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III B.TECH–II SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A60510	**Network Security Lab & Compiler Design Lab**	0	0	3	1.5

Course Objective:

- To understand the working principle of various communication protocols.
- To analyze the various routing algorithms.
- To know the concept of data transfer between nodes.
- To implement Lexical Analyzer using Lex tool & Syntax Analyzer or parser using YACC Tool
- To implement front end of the compiler by means of generating Intermediate codes.

Course Outcomes:

CO1: Analyze performance of various communication protocols.
CO2: Compare routing algorithms
CO3: Apply mathematical foundations to solve computational problems in computer networking
CO4: Design Lexical analyzer for given language using C and LEX tools.
CO5: Generate machine code from the intermediate code forms

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3		3		2						1	3	
CO2		2	3								2			3	
CO3	2			3					2				1	3	
CO4	1	1	3										1		
CO5	2	2	3		1										

List of Experiments:

1. Working with Sniffers for monitoring network communication (Ethereal)
2. Understanding of cryptographic algorithms and implementation of the same in C or C++
3. Using openssl for web server - browser communication
4. Using GNU PGP
5. Performance evaluation of various cryptographic algorithms
6. Using IPTABLES on Linux and setting the filtering rules
7. Configuring S/MIME for e-mail communication
8. Understanding the buffer overflow and format string attacks
9. Using NMAP for ports monitoring
10. Implementation of proxy based security protocols in C or C++ with features like confidentiality, integrity and authentication

Following are some of the web links, which help to solve the above assignments

http://linuxcommand.org/man_pages/openssl1.html
http://www.openssl.org/docs/apps/openssl.html
http://www.queen.clara.net/pgp/art3.html
http://www.ccs.ornl.gov/~hongo/main/resources/contrib/gpg-howto/gpg-howto.html
https://netfiles.uiuc.edu/ehowes/www/gpg/gpg-com-0.htm
http://www.ethereal.com/docs/user-guide/

Compiler Design Lab

List of Experiments:

1. Write a program to search for a given pattern in a set of files. It should support regular expressions. It should work similar to grep and fgrep of Linux environment.

2. Write programs to implement DFA and NFA.(Input : DFA or NFAand a string and Output : Verification of any given string for acceptance.)

3. Design a PDA for any given CNF. Simulate the processing of a string using the PDA and show the parse tree.

4. Design a Lexical analyzer for identifying different types of tokens used in C language. Note: The reserved keywords such as if, else, class, structetc must be reported as invalid identifiers. C allows identifier names to begin with underscore character too.

5. Program to recognize the identifiers, if and switch statements of C using a lexical analyzer generator tool.

6. Consider the following grammar:

S --> ABC
A-->abA | ab
B--> b | BC
C--> c | cC

Design any shift reduced parser which accepts a string and tells whether the string is accepted by above grammar or not.

7. YACC program that reads the input expression and convert it to post fix expression.

References:

1. Compiler Design using FLEX and YACC‖, Das, PHI. 2. ―Compiler Design in C‖, Holub, PHI.

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III B.TECH–II SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A60511	**Machine Learning Lab**	0	0	2	1

Course Objectives:

1. Make use of Data sets in implementing the machine learning algorithms.
2. Implement the machine learning concepts and algorithms in any suitable language of choice.

Course outcomes:

The students should be able to:

CO1: Understand the implementation procedures for the machine learning algorithms.
CO2: Design Java/Python programs for various Learning algorithms.
CO3: Apply appropriate data sets to the Machine Learning algorithms.
CO4: Identify and apply Machine Learning algorithms to solve real world problems.

Description (if any):

1. The programs can be implemented in either JAVA or Python
2. For problems 1 to 6 and 10, programs are to be developed without using the built-in classes or APIs of Java/Python.

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3		3	1		1						2	3	
CO2		3	3	2	1								1	2	
CO3	2	1	2	1	3	1				2		1	3	2	
CO4	1	3	3	1	1					1			2	3	

Experiments:

1. Implement and demonstratethe FIND-Salgorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.

2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithmto output a description of the set of all hypotheses consistent with the training examples.

3. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.

4. Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.

5. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.

6. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.

7. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.

8. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.

9. Write a program to implement k-Nearest Neighbor algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.

10. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.

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III B.TECH–II SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
		3	0	0	0

Course Objectives:

- To understand the basic concepts of research and research problem
- To make the students learn about various types of data collection and sampling design
- To enable them to know the method of statistical evaluation
- To make the students understand various testing tools in research
- To make the student learn how to write a research report

Course Outcomes:

CO1: Define the basic concepts and its methodologies

CO2: Understand the concept of sampling, research design etc.

CO3: Demonstrate the knowledge of research processes

CO4: Analyze the importance of research articles in their academic discipline

CO5: Select appropriate testing tools used in research

CO6: Design a research paper without any ethical issues

Mapping of COs with POs and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2	1	2									1		1
CO2		1	1	1											
CO3															
CO4															

CO5															
CO6								2							

UNIT I

Introduction to Research

Meaning of Research – Objectives of Research – Types of Research – Research Approaches – Guidelines for Selecting and Defining a Research Problem – Research Design – Concepts related to Research Design – Basic Principles of Experimental Design.

Learning Outcomes:

After completion of this unit student will

1. Understand the concept of research and its process

2. Explain various types of research

3. Know the steps involved in research design

4. Understand the different research approaches

UNIT II:

Sampling Design

Steps in Sampling Design –Characteristics of a Good Sample Design – Random Sampling Design. Measurement and Scaling Techniques-Errors in Measurement – Tests of Sound Measurement – Scaling and Scale Construction Techniques – Time Series Analysis – Interpolation and Extrapolation. Data Collection Methods – Primary Data – Secondary data – Questionnaire Survey and Interviews.

Learning Outcomes:

After completion of this unit student will

1. Understand the concept of sampling and sampling design

2. Explain various techniques in measurement and scaling

3. Learn various methods of data collection

4. Design survey questionnaires for different kinds of research

5. Analyze the questionnaires

UNIT III

Correlation and Regression Analysis

Method of Least Squares – Regression vs Correlation – Correlation vs Determination – Types of Correlations and Their Applications

Learning Outcomes:

After completion of this unit student will

1. Know the association of two variables
2. Understand the importance of correlation and regression
3. Compare and contrast correlation and regression
4. Learn various types of correlation
5. Apply the knowledge of C&R Analysis to get the results

UNIT IV

Statistical Inference

Tests of Hypothesis – Parametric vs Non-parametric Tests – Hypothesis Testing Procedure – Sampling Theory – Sampling Distribution – Chi-square Test – Analysis of variance and Co-variance – Multivariate Analysis

Learning Outcomes:

After completion of this unit student will

1. Know the statistical inference
2. Understand the hypothesis testing procedure
3. Compare and contrast Parametric and Non-parametric Tests
4. Understand the use of chi-square test in investigating the distribution of categorical variables
5. Analyze the significance of variance and covariance

UNIT V

Report Writing and Professional Ethics

Interpretation of Data – Report Writing – Layout of a Research Paper – Techniques of Interpretation- Making Scientific Presentations in Conferences and Seminars – Professional Ethics in Research.

Learning Outcomes:

After completion of this unit student will

1. Learn about report writing

2. Understand how to write research paper

3. Explain various techniques of interpretation

4. Understand the importance of professional ethics in research

5. Design a scientific paper to present in the conferences/seminars

Text books:

1. Research Methodology: Methods and Techniques – C.R.Kothari, 2nd Edition, New Age International Publishers.
2. Research Methodology: A Step by Step Guide for Beginners- Ranjit Kumar, Sage Publications

References:

1. Research Methodology and Statistical Tools – P.Narayana Reddy and G.V.R.K.Acharyulu, 1st Edition,ExcelBooks,New Delhi.
2. Business Research Methods–Donald R. Cooper & Pamela S Schindler, 9/e,

3. S C Gupta, Fundamentals of Statistics,7th Edition Himalaya Publications

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IV B.TECH–I SEMESTER (R19)

L-T-P-C: 3-0-0-

SubjectCode	TitleoftheSubject	L	T	P	C
19A70501	**Data Analytics**				

Course Objectives

- To introduce the terminology, technology and its applications
- To introduce the concept of Analytics for Business
- To introduce the tools, technologies & programming languages this is used in day to day analytics cycle
- To discuss the overall process of how data analytics is applied

Course Outcomes:

CO1: Students are able to understand the basic programming and can perform calculations for given input and produce output.
CO2: Students are able to work with different data sets and with binary and image files.
CO3: Students are able to analyze different frames and environments and apply different functions for vector inputs to make the work easier.
CO4: Students are able to design different graphics using different parameters for better visualization.
CO5: Students are able to create a data model by analyzing the relationships between different variables.

Mapping of Cos with Pos and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3					2		3	3	2	
CO2			3		3				1	2	2	3	2	3	2
CO3	2	3	3	2	3	3			2	2	2	2	3	2	
CO4			3	3	3	2			3		2	3	3	3	
CO5	3		3		3	3				2	3	2	2	3	2

Unit -1

Introduction to R: Introduction to R, Calculating Environment, Basic Programming, Input and Output, Functions, Data Structures, String handling.

Learning Outcomes:

At the end of the unit, students will be able to do:

1. Apply basic concepts and perform the calculation easily.(L3)
2. Analyze different functions and data structures.(L4)

3. Apply different string functions in order to handle them.(L3)

Unit – 2

Data Importing and Exporting: Reading Data from Files, Data Normalization, Relational Databases, Merging, Combining and subletting datasets, working with Binary and Image Files, Installing Packages.

Learning Outcomes:

At the end of the unit, students will be able to do:

1. Apply relational databases. (L3)
2. Build the datasets by merging, combining and subletting the data. (L6)
3. Work with Binary and Image files. (L3)
4. Install different Packages.(L6)

Unit 3

Data Analysis: Data Types, Matrices, Data Frames, Importing and exporting Data, apply, lapply, sapply, mapply, split and tapply functions, ddply.

Learning Outcomes:

At the end of the unit, students will be able to do:

1. Identify different data types. (L3)
2. Develop the matrices and data frames. (L6)
3. Apply different functions for vector inputs. (L3)

Unit -4

Data Visualization: Exploring Data, Scatter Plots, Line Graphs, Bar Graphs, Histograms, Box Plots,Pie charts, points, Using Color in plots, Facets, Summarized Data Distributions.

Learning Outcomes:

At the end of the unit, students will be able to do:

1. Create different graphs like Line graphs, Bar graphs, Scatter plots, Histograms, Box plots. (L6)
2. Design a graph using different colors and points. (L6)
3. Summarize the data distribution.(L2)

Unit -5

Probability and Statistics: Data Description, Probability, Distributions -Discrete and Continuous Distributions, Sample Distributions, Hypothesis testing, Regression Models – Linear and Multiple Regression models.privacy, security, ethics, A look back at Data Science, Next-generation data scientists.

Learning Outcomes:

At the end of the unit, students will be able to do:

1. Define Probability and distributions.(L1)
2. Apply the data model by analyzing the relationships between different variables.(L3)
3. Understand privacy, security and ethics in Data science.(L2)

Text Books:

1. Introduction to Scientific Programming and Simulation Using R, Owen Jones, Robert Maillardet and Andrew Robinson, Second Edition, CRC Press, 2014
2. A First Course in Statistical Programming with R, Braun W. J., Murdoch D. J.. — Cambridge University Press, 2007
3. Data Manipulation with R, Jaynal Abedin and Kishor Kumar Das, Second Edition, Packt publishing, BIRMINGHAM – MUMBAI.
4. Beginning R The Statistical Programming language- Mark Gardener, John Wiley & Sons, Inc, 2012

Reference Books:

1. Graphics for Statistics and Data Analysis with R – Kevin J. Keen, CRC Press, 2010
2. Data Analysis and Graphics Using R, Third Edition, John Maindonald, W. John Braun, Cambridge University Press, 2010
3. Exploratory Data Analysis with R – Roger D. Peng, Leanpub publications, 2015
4. Introduction to Probability and Statistics Using R, G. jay Kerns, First Edition, 2011
5. The Art of Data Science- A Guide for anyone Who Works with Data – Roger D. Peng and Elizabeth Matsui, Leanpub Publications, 2014

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IV B.TECH–I SEMESTER (R19)

L-T-P-C: 3-0-0-3

SubjectCode	TitleoftheSubject	L	T	P	C
19A70502	**Internet of Things**				

Course Objectives:

- Introduce the fundamental concepts of IoT and physical computing
- Expose the student to a variety of embedded boards and IoT Platforms
- Create a basic understanding of the communication protocols in IoT communications.
- Familiarize the student with application program interfaces for IoT.
- Enable students to create simple IoT applications.

Course outcomes:

Upon completion of the course, the students should be able to:

CO1: Choose the sensors and actuators for an IoT application

CO2: Select protocols for a specific IoT application

CO3: Utilize the cloud platform and APIs for IoT applications

CO4: Experiment with embedded boards for creating IoT prototypes

CO5: Design a solution for a given IoT application

Mapping of Cos with Pos and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				2								3	2	
CO2			3		2			2		1			3		
CO3	3												3		
CO4		2	3	2	2			2				1	3	2	
CO5		2	3	1									3	2	

UNIT I

Overview of IoT:

The Internet of Things: An Overview, The Flavour of the Internet of Things, The “Internet” of “Things”, The Technology of the Internet of Things, Enchanted Objects, Who is Making the Internet of Things?

Design Principles for Connected Devices: Calm and Ambient Technology, Privacy, Web Thinking for Connected Devices, Affordances.

Prototyping: Sketching, Familiarity, Costs Vs Ease of Prototyping, Prototypes and Production, Open source Vs Close source, Tapping into the community.

Learning Outcomes:

After completing this Unit, students will be able to

1. Explain IoT architecture. [L2]
2. Interpret the design principles that govern connected devices [L2]
3. Summarize the roles of various organizations for IoT [L2]
4. Interpret the significance of Prototyping [L2]

UNIT II

Embedded Devices:

Electronics, Embedded Computing Basics, Arduino, Raspberry Pi, Mobile phones and tablets, Plug Computing: Always-on Internet of Things

Learning Outcomes:

After completing this Unit, students will be able to

1. Explain the basics of microcontrollers [L2]
2. Outline the architecture of Arduino [L2]
3. Develop simple applications using Arduino [L3]
4. Outline the architecture of Raspberry Pi [L2]
5. Develop simple applications using Raspberry Pi [L3]
6. Select a platform for a particular embedded computing application [L3]

UNIT III

Communication in the IoT:

Internet Communications: An Overview, IP Addresses, MAC Addresses, TCP and UDP Ports, Application Layer Protocols

Prototyping Online Components:

Getting Started with an API, Writing a New API, Real-Time Reactions, Other Protocols Protocol

Learning Outcomes:

After completing this Unit, students will be able to

1. Interpret different protocols and compare them [L2]
2. Select which protocol can be used for a specific application [L3]
3. Utilize the Internet communication protocols for IoT applications [L3]
4. Select IoT APIs for an application [L3]
5. Design and develop a solution for a given application using APIs [L6]
6. Test for errors in the application [L4]

UNIT IV

Business Models: A short history of business models, The business model canvas, Who is the business model for, Models, Funding an Internet of Things startup, Lean Startups.

Manufacturing: What are you producing,Designing kits, Designing printed circuit boards.

Learning Outcomes:

After completing this Unit, students will be able to

1. Plan the business model [L6]
2. Predict the market value [L6]
3. Build the product [L6]

UNIT V

Manufacturing continued: Manufacturing printed circuit boards, Mass-producing the case and other fixtures, Certification, Costs, Scaling up software.

Ethics: Characterizing the Internet of Things, Privacy, Control, Environment, Solutions.

Learning Outcomes:

After completing this Unit, students will be able to

1. Outline the manufacturing techniques [L2]
2. Adapt the Ethics of the IoT[L6]

Text Book:

1. Adrian McEwen, Hakim Cassimally - Designing the Internet of Things, Wiley Publications, 2012

Reference Books:

1. ArshdeepBahga, Vijay Madisetti - Internet of Things: A Hands-On Approach, Universities Press, 2014.
2. The Internet of Things, Enabling technologies and use cases – Pethuru Raj, Anupama C. Raman, CRC Press.

Reference sites:

1. https://www.arduino.cc/
2. https://www.raspberrypi.org/

IV B.TECH–I SEMESTER (R19)

L-T-P-C: 3-0-0-3

SubjectCode	TitleoftheSubject	L	T	P	C
19A70503	**Service Oriented Architecture (Professional Elective-III)**				

Course Objectives:

- Understand SOA and evolution of SOA.
- Understand web services and primitive, contemporary SOA.
- Understand various service layers.
- Understand service-oriented analysis and design based on guidelines.

Course Outcomes:

At the end of the course students will be able to:

CO1: Comprehend the need for SOA and its systematic evolution

CO2: Apply SOA technologies to enterprise domain

CO3: Design and analyze various SOA patterns and techniques

CO4: Compare and evaluate best strategies and practices of SOA

Mapping of Cos with Pos and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2		1		1	2		1	1	1	3	3	
CO2	1	2	2	3	3	1			2	1			3	2	
CO3		2	3	2	1	1				1		1	3	2	
CO4	2	1	1	3					2				2	3	

UNIT I: Introducing SOA: Fundamental SOA, Common Characteristics of Contemporary SOA, Common Tangible Benefits of SOA, Common Pitfalls of Adopting SOA.

The Evolution of SOA: An SOA Timeline, The Continuing Evolution of SOA, The Roots of SOA.

Learning Outcomes:

At the end of the Unit, student should be able to:

1. Understand the fundamentals of SOA (L2).
2. Demonstrate the characteristics of Contemporary SOA (L3).
3. Explore of Evolution of SOA (L4).

UNIT II: Web Services and Primitive SOA: The Web Services Frame Work, Services, Service Descriptions, Messaging.

Web Services and Contemporary SOA (Part I-Activity management and Composition): Message Exchange Patterns, Service Activity, Coordination, Atomic Transactions, Orchestration and Choreography.

Web Services and Contemporary SOA (Part-II-Advanced Messaging, Metadata and Security): Addressing, Reliable Messaging, Correlation, Policies, Metadata exchange, Security.

Learning Outcomes:

At the end of the Unit, student should be able to:

1. Understand the framework of Web services (L2).
2. Manage various activities in web services and contemporary SOA (L1).
3. Analyze various security issues and policies in web services and Contemporary SOA (L4).

UNIT III : Principles of Service-Orientation: Service–Orientation and the Enterprise, Anatomy of SOA, Common Principles of Service–Orientation, Interrelation between Principles of Service- Orientation, Service Orientation and Object Orientation, Native Web Services Support for Principles of Service-Orientation.

Service Layers: Service-Orientation and Contemporary SOA, Service Layer abstraction, Application Service Layer, Business Service Layer, Orchestration Service Layer, Agnostic Services, Service Layer Configuration Scenarios.

Learning Outcomes:

At the end of the Unit, student should be able to:

1. Understand the Anatomy of SOA (L2).
2. Demonstrate the interrelation between principles of service orientation (L3).
3. Explore the service layer configuration scenarios (L4).

UNIT IV:

SOA Delivery Strategies:SOA Delivery Lifecycle Phases, The Top-Down Strategy, The Bottom-up Strategy, The Agile Strategy.

Service Oriented Design (Part I-Introduction): Introduction to Service-Oriented Design, WSDL Related XML Schema Language Basics, WSDL Language Basics, Service Interface Design Tools.

Service Oriented Design (Part II-SOA Composition Guidelines): SOA Composing Steps, Considerations for Choosing Service Layers, Considerations for Positioning Core SOA Standards, Considerations for Choosing SOA Extensions.

Learning Outcomes:

At the end of the Unit, student should be able to:

1. Analyze SOA delivery Lifecycle phases (L4).
2. Explore the benefits of Business Centric SOA (L4).
3. Understand the service interface design tools (L2).

UNIT V: Service Oriented Design (Part III- Service Design): Service Design Overview, Entity-Centric Business Service Design, Application Service Design, Task-Centric Business Service Design, Service Design Guidelines.

Service Oriented Design (Part IV-Business Process Design): WS-BPEL Language Basics, WS-Coordination Overview, Service Oriented Business Process Design.

Learning Outcomes:

At the end of the Unit, student should be able to:

1. Differentiate the various business service designs (L2).
2. Understand the WS-BPEL Language basics (L2).
3. Explore the service oriented business process design (L4).

Text Books:

1. Service-Oriented Architecture-Concepts, Technology, and Design, Thomas Erl, Pearson Education, 2006.
2. Understanding SOA with Web Services, Eric Newcomer, Greg Lomow, Pearson Education, 2005.

Reference Books:

1. The Definitive guide to SOA, Jeff Davies & others, Apress,Dreamtech.
2. Java SOA Cook book, E.Hewitt,SPD.
3. SOA in Practice, N.M.Josuttis,SPD.
4. Applied SOA, M.Rosen and others, Wiley India pvt.Ltd.
5. Java Web Services Architecture, J.Mc Govern, and others, Morgan Kaufmann Publishers,Elsevier.
6. SOA for Enterprise Applications, Shankar.K, Wiley IndiaEdition.
7. SOA-Based Enterprise Integration, W.Roshen,TMH.
8. SOA Security, K.RamaRao, C.Prasad, dreamtech press.

IV B.TECH–I SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A70504	**High Performance Computing (Professional Elective – III)**	3	0	0	3

Course Objectives:

- Understand the role of HPC in science and engineering.
- Use HPC platforms and parallel programming models.
- Able to measure, analyze and assess the performance of HPC applications and their supporting hardware.
- Able to administration, scheduling, code portability and data management in an HPC environment, with particular reference to Grid Computing.
- analyze the suitability of different HPC solutions to common problems found in Computational Science

Course Outcomes:

CO1: Understand and Analyses the high performance, Grid and Cluster Computing.
CO2: Analyses the Parallel Computer Architectures, Cluster Computer and its Architecture
CO3: Design an algorithm for Load Sharing and Balancing.
CO4: Create, select, and apply appropriate techniques, resources of Heterogeneous Computing Systems
CO5: Understand the impact of the professional engineering solutions of Cloud Computing.

Mapping of Cos with Pos and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				2		2				1		3	1	
CO2		3		2										3	
CO3	2		3	2			1			2				3	
CO4					3	2		2			2		3	2	

CO 5		2	2			2	3	2					3	2	

Unit I:

Introduction: Introduction to high performance computing, Requirement for high performance computing, need of high performance computing, grid computing, cluster computing

Learning Outcomes:

At the end of the unit, students will be able to:

1. Study about high performance computing (L2)
2. Know about requirements for high performance computing (L1)
3. Understand grid and cluster computing (L2)

Unit –II:

Cluster Computing: Introduction to Cluster Computing, Scalable Parallel Computer Architectures, Cluster Computer and its Architecture, Classifications, Components for Clusters, Cluster Middleware and Single System Image, Resource Management and Scheduling, Programming Environments and Tools, Applications, Representative Cluster Systems, Heterogeneous Clusters, Security, Resource Sharing, Locality, Dependability, Cluster Architectures, Detecting and Masking Faults, Recovering from Faults, Condor, Evolution of Meta computing.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Understand the Cluster, Parallel computer architectures (L2).
2. Identify the application of Cluster Systems (L3).
3. Detecting and Masking Faults, Recovering from Faults (L2).

Unit- III :

Load Sharing and Balancing: Evolution, Job and Resource Management Systems, State-of-the Art in RMS and Job, Rigid Jobs with Process Migration, Communication-Based Scheduling, Batch Scheduling, Fault Tolerance, Scheduling Problem for Network Computing, Algorithm ISH, MCP and ETF, Dynamic Load Balancing, Mapping and Scheduling, Task Granularity and Partitioning, Static and Dynamic Scheduling

Learning Outcomes:

At the end of the unit, students will be able to:

1. Analyses the Load Sharing and Balancing (L4)

2. Understand the Static and Dynamic Scheduling(L2)

Unit – IV:

Grid Computing: Introduction to Grid Computing, Virtual Organizations, Architecture, Applications, Computational, Data, Desktop and Enterprise Grids, Data-intensive Applications, High-Performance Commodity Computing, High-Performance Schedulers, Grid Middleware: Connectivity, Resource and Collective 10 Layer, Globus Toolkit, GSI, GRAM, LDAP, GridFTP, GIIS, Heterogeneous Computing Systems, Mapping Heuristics: Immediate and Batch Mode, Immediate: MCT, MET, Switching Algorithm, KPB and OLB, Batch: Min-Min, Max-Min, Sufferage, Duplex, GA, SA, GSA, Tabu and A*, Expected Time to Compute Matrix, Makespan, Heterogeneity: Consistent, Inconsistent and Partially-Consistent, QoS Guided Min-Min, Selective Algorithm, Grid Computing Security, Introduction to GridSim, Architecture, Grid Resource Broker, Grid Referral Service

Learning Outcomes:

At the end of the unit, students will be able to:

1. Understand the Architecture, Applications, Computational, Data, Desktop and Enterprise Grids(L2)
2. Analyses the Switching Algorithms(L4)

Unit – V:

Cloud Computing: Introduction to Cloud Computing, Types: Deployment and Service Models, Characteristics, Applications, Service-Level Agreement, Virtualization, High-Throughput Computing: Task Computing and Task-based Application Models, Market-Based Management of Clouds, EnergyEfficient and Green Cloud Computing Architecture, Resource Allocation, Leases, Task Scheduling: RR, CLS and CMMS, Workflow Scheduling, Montage, Epigenomics, SIPHT, LIGO, CyberShake, Task Consolidation, Introduction to CloudSim, Cloudlet, Virtual Machine and its Provisioning, Time and Space-shared Provisioning.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Understand the cloud computing Service Models, Characteristics, Applications(L2)
2. Analyses the Application Models, Market-Based Management of Clouds(L4)

Text Books:

1. High Performance Cluster Computing: Architectures and Systems, Volume 1 by Raj kumarBuyya.

Reference Books:

1. Grid and Cluster Computing byPrabhu , PHI Publication
2. Building Linux Clusters by David H.M, Willey Publication

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IV B.TECH–I SEMESTER (R19)

L-T-P-C: 3-0-0-3

SubjectCode	TitleoftheSubject	L	T	P	C
19A70505	**Block Chain Technologies (Professional Elective – III)**				

Course Objectives:

- Understand the philosophy of Block chain and the cutting edge technology behind its functions
- Illustrate how to setup Ethereum tools
- Explain the key vocabulary and concepts used in Block chain for Business

Course outcomes:

CO1: Upon completion of the course, the students should be able to:
Student able to Identify, and analyze complex engineering problems in Block chain

CO2: Student able to apply appropriate techniques, resources, and modern engineering and IT tools to Ethereum development

CO3: Student able toApply the knowledge ofsmart contracts and Distinguish setting up and interacting with a contract using Geth client and Mist Wallet

CO4: Student able to analyze complexSmart contract examples and patterns and Develop Decentralized applications

CO5: Use research-based knowledge and research methods including design of experiments Block chain Network.

Mapping of Cos with Pos and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3												
CO2	2		3		3	2					1		3		
CO3	3			3		2	2				2			3	
CO4		3	2	3	2					2				2	
CO5	2	3		3		2	1				2				1

UNIT-I

Blockchain concepts: Blockchain, Blockchain application example: Escrow, Blockchain stack, from web 2.0 to the next generation decentralized web, domain specific Blockchain application, Blockchain benefits and challenges.

Blockchain application templates: Blockchain application components, design methodology for Blockchain applications, Blockchain applications templates

Learning Outcomes:

After completing this Unit, students will be able to

1. Outline the benefits and challenges of Block chain(L2)
2. Design the Blockchain applications(L6)

UNIT-II

Setting up Ethereum development tools: Ethereum clients,Ethereum languages, TestRPC, Mist Ethereumwalle, meta mask, web3 JavaScript API, truffle.

Ethereum Accounts: Ethereum Accounts, keypairs, working with EOA Accounts, working with contract accounts.

Learning Outcomes:

After completing this Unit, students will be able to

1. Illustrate the use of Ethereum development tools(L2)
2. Create Ethereum accounts and work with them (L6)

UNIT-III

Smart contracts: Smart contract, structure of a contract, setting up and interacting with a contract using Geth client, setting up and interacting with a contract using Mist Wallet

Learning Outcomes:

After completing this Unit, students will be able to

1. Make use of of smart contracts(L3)
2. Distinguish setting up and interacting with a contract using Geth client and Mist Wallet.(L4)

UNIT-IV

Smart contracts (continued): Smart contract examples, Smart contract patterns.

Decentralized Applications: implementing Dapps, case studies,

Learning Outcomes:

After completing this Unit, students will be able to

1. Illustrate the Smart contract examples and patterns(L2)
2. Develop Decentralized applications.(L6)

UNIT-V

Mining: Concensus on Blockchain network, mining, Block validation, state storage in Ethereum.

Learning Outcomes:

After completing this Unit, students will be able to

1. Define Concensus on Blockchain network(L1)
2. Demonstrate State Storage in Ethereum(L2)

Text book:

1. Arshadeepbahga, Vijay madisetti, “Blockchain Applications A hands-on approach”, VPT 2017.
2. *Chandramouli Subramanian*, Asha A George, Abhilash K A and MeenaKarthikeyan, “Blockchain Technology”, Universty Press, 2021

References:

1. Imran Bashir, “Mastering Block chain” Packt Publishing Ltd, March 2017.
2. Melanie swan, “Block chain blueprint for a new economy”, O’REILLY

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IV B.TECH–I SEMESTER (R19)

Mobile Computing

(Open Elective – III) **L-T-P-C: 3-0-0-3**

SubjectCode	TitleoftheSubject	L	T	P	C
19A70506	Mobile Computing				

Course Objectives:

- Understand the concept of mobile computing paradigm, its novel applications and limitations.
- To understand the typical mobile networking infrastructure through a popular GSM protocol
- To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer
- To understand the database issues in mobile environments & data delivery models.
- To understand the ad hoc networks and related concepts.

Course Outcomes:

CO1: Explain the basics of mobile telecommunication system
CO2: Choose the required functionality at each layer for given application
CO3: Identify solution for each functionality at each layer
CO4: Choose simulator tools and design Ad hoc networks
CO5: Develop a mobile application.

Mapping of Cos with Pos and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1					2								3		
CO2		2							2				1		
CO3			3				2		2						
CO4			3		3									3	
CO5			3											2	

UNIT I

Introduction to Mobile Computing – Applications of Mobile Computing- Generations of Mobile Communication Technologies- Multiplexing – Spread spectrum -MAC Protocols – SDMA- TDMA- FDMA- CDMA

Learning Outcomes:

At the end of the Unit student able to
1. Depict the evolvement in the techniques using timelines(L2)
2. Analyze the problem definition and select a suitable multiplexing strategy(L4)
3. Discuss on mobile applications – Need, Quality of living(L6)

UNIT II

Mobile Telecommunication System : Introduction to Cellular Systems – GSM – Services & Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Mobility Management – Security – GPRS- UMTS – Architecture – Handover – Security

Learning Outcomes:

At the end of the Unit student able to
1. Understanding the elements, its function and signals of GSM required to establish a call(L2)
2. Identify the different techniques for sending voice and data(L3)
3. Analyze the GPRS- UMTS Architecture (L4)

UNIT III

Mobile Network Layer - Mobile IP – DHCP – AdHoc– Proactive protocol-DSDV, Reactive Routing Protocols – DSR, AODV , Hybrid routing –ZRP, Multicast Routing- ODMRP, Vehicular Ad Hoc networks (VANET) –MANET Vs VANET – Security.

Learning Outcomes:

At the end of the Unit student able to
1. Comparison of wired and wireless networks in IP layer(L4)
2. Analyze the different routing protocols and discuss the efficiency(L5)
3. Examine the working of DHCP(L4)
4. Prioritize the application wide QoS requirements(L5)

UNIT IV

Mobile Transport And Application Layers - Mobile TCP– WAP – Architecture – WDP – WTLS – WTP –WSP – WAE – WTA Architecture – WML

Learning Outcomes:

At the end of the Unit student able to
1. Understand the characteristic features of WAP and limitation of WAP(L2)
2. Demonstrate the development in WAP(L2)
3. Categorize the navigational elements of WML Task Elements, template Elements(L4)
4. Analyze the WTA architecture and services(L4)

UNIT V

Mobile Platforms And Applications- Mobile Device Operating Systems – Special Constraints & Requirements – Commercial Mobile Operating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone – M Commerce – Structure – Pros & Cons – Mobile Payment System – Security Issues

Learning Outcomes:

At the end of the Unit student able to:
1. Understand the different Mobile devices operating systems requirements and constraints(L2)
2. Compare the different software developments kits of mobile devices(L4)

3. Examine the security issues of mobile payments (L4)

Textbook:

1. Jochen Schiller, “Mobile Communications”, PHI, Second Edition, 2003.
2. Prasant Kumar Pattnaik, Rajib mall, “Fundamentals of Mobile Computing”, PHI Learning Pvt.Ltd, New Delhi-2012

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IV B.TECH–I SEMESTER (R19)

L-T-P-C: 3-0-0-3

SubjectCode	TitleoftheSubject	L	T	P	C
19A70507	**No SQL Databases (Open Elective – III)**				

Course objectives:

- To understand the need of NoSQL databases.
- To understand the features of different types of NoSQL databases.
- To understand the characteristics of NoSQL databases.
- To understand the usage of NoSQL using Mongodb.
- To understand the usage of NoSQL using HBASE.
- To understand the usage of NoSQL using Apache Cassandra.
- To understand the usage of NoSQL using Riak.

Course Outcomes: At the end of the course the student will be able to

CO1: Understand the need of NoSQL.
CO2: Examine the features of document database.

CO3: Adapt the knowledge of column oriented NoSQL databases using HBASE and Apache Cassandra.
CO4: Demonstrate map reduce on databases.
CO5: Adapt the knowledge of key-value databases.

Mapping of Cos with Pos and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3						1						3		
CO2		3											2		
CO3					2										
CO4		3		2			2						3		
CO5			3	2	3				2	2		2		3	

Unit-I:

Introduction: Overview, and History of NoSQL Databases Definition of the Four Types of NoSQL Database, The Value of Relational Databases, Getting at Persistent Data, Concurrency, Integration, Impedance Mismatch, Application and Integration Databases, Attack of the Clusters, The Emergence of NoSQL, Key Points

Learning Outcomes:

At the end of the unit student should be able to learn:

1. Identify the need of NoSQL (L3).

2. Define the types of NoSQL (L1).

3. Demonstrate the cluster attacks (L2).

Unit-II

NoSQL Key/Value databases using MongoDB, Document Databases, What Is a Document Database? Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Blogging Platforms, Web Analytics or Real-Time Analytics, E-Commerce Applications, When Not to Use, Complex Transactions Spanning Different Operations, Queries against Varying Aggregate Structure

Learning Outcomes:

At the end of the unit student should be able to learn:

1. Define document database (L1).

2. Examine the features of document database (L4).

3. Adapt the knowledge of the document databases (L1).

4. Adapt the knowledge of MongoDB (L1).

Unit-III

Column- oriented NoSQL databases using Apache HBASE, Column-oriented NoSQL databases using Apache Cassandra, Architecture of HBASE, What Is a Column-Family Data Store? Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Blogging Platforms, Counters, Expiring Usage, When Not to Use

Learning Outcomes:

At the end of the unit student should be able to learn:

1. Demonstrate the different column-oriented NoSQL databases and their usage (L2)

2. Adapt the knowledge of column oriented NoSQL databases using HBASE and Apache Cassandra (L1).

3. Examine the features of Column-Family databases (L4).

Unit-IV:

Replication and sharding, MapReduce on databases. Distribution Models, Single Server, Sharding, Master-Slave Replication, Peer-to-Peer Replication, Combining Sharding and Replication

Learning Outcomes:

At the end of the unit student should be able to learn:

1. Define and combine sharding and replication (L1).

2. Demonstrate mapreduce on databases (L2).

3. Justify different distribution models (L5).

Unit-V:

NoSQL Key/Value databases using Riak, Key-Value Databases, What Is a Key-Value Store, Key-Value Store Features, Consistency, Transactions, Query Features, Structure of Data, Scaling, Suitable Use Cases, Storing Session Information, User Profiles, Preferences, Shopping Cart Data, When Not to Use, Relationships among Data, Multioperation Transactions, Query by Data, Operations by Sets

Learning Outcomes:

At the end of the unit student should be able to learn:

1. Define key/value databases (L1).

2. Demonstrate the store and query features of Riak (L2).

3. Adapt the knowledge of key-value databases (L1).

4. Experiment operations on sets (L3).

Textbook

1. NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence: Sadalage, P. & Fowler Pearson Education

Reference:

1. Next Generation Databases: NoSQL, New SQL and Big data by GUY Harrison.

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IV B.TECH–I SEMESTER (R19)

L-T-P-C: 3-0-0-3

SubjectCode	TitleoftheSubject	L	T	P	C
19A70508	**Data Visualization Techniques** **(Open Elective – III)**				

Course Objectives:

- Focuses on the key factors used in data visualization, including chart primitives, graphical perception and techniques for exploring the visual data spectrum.
- Focuses on basics of data visualization to building a table and styling table using data table's library.
- An understanding of the key techniques and theory used in visualization, including data models, graphical perception and techniques for visual encoding and interaction.
- Understand why visualization is an important part of data analysis.
- Understand the type of data impacts the type of visualization.

Course Outcomes:

CO1: Study the key factors of Data Visualization and List various applications of Data visualization.
CO2: Students will be able to use web technology to create visualizationsCO3: Students will ability to apply computer science principles relating to data representation, retrieval, programming and analysis.
CO4: Apply existing techniques from scalar, volume, multidimensional, textual, graph-based, tree-based, and temporal visualization to actual problems and data
CO5: Create interactive and animated charts and understand how to add a play button to the page

Mapping of Cos with Pos and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2			1					1					
CO2		2	2										2	3	
CO3		3	3	2	1										
CO4		2	2		1								3		
CO5			2		3								1	2	1

UNIT-I

INTRODUCTION TO DATA VISUALIZATION: Acquiring and Visualizing Data, Simultaneous acquisition and visualization, Applications of Data Visualization, Keys factors of Data Visualization (Control of Presentation, Faster and Better JavaScript processing, Rise of HTML5, Lowering the implementation Bar).

EXPLORING THE VISUAL DATA SPECTRUM: charting Primitives (Data Points, Line Charts, Bar Charts, Pie Charts, and Area Charts), Exploring advanced Visualizations (Candlestick Charts, Bubble Charts, Surface Charts, Map Charts, Info graphics), Making use of HTML5 CANVAS, Integrating SVG.

Learning Outcomes:

At the end of this unit, students will be able to:

1. Define data visualization (L1)
2. Identify key factors for data visualization. (L4)
3. Create chart primitives (charts, bar charts, pie charts and area charts) (L6)

UNIT-II

BASICS OF DATA VISUALIZATION – TABLES: Reading Data from Standard text files(.txt, .csv, XML), Displaying JSON content, Outputting Basic Table Data(Building a table, Using Semantic Table, Configuring the columns), Assuring Maximum readability(Styling your table, Increasing readability, Adding dynamic Highlighting), Including computations, Using data tables library, relating data table to a chart.

Learning Outcomes:

At the end of this unit, students will be able to:

1. How to read data from text files (.txt,.csv,.XML) (L1)
2. Build a table and add styles to table. (L2)
3. Select data tables library to create a table.(L5)

UNIT-III

VISUALIZING DATA PROGRAMMATICALLY: Creating HTML5 CANVAS Charts

(HTML5 Canvas basics, linear interpolations, A simple column Chart, Adding animations), Starting with Google charts (Google Charts API Basics, A Basic bar chart, A basic Pie chart, Working with Chart Animations).

Learning Outcomes:

At the end of this unit, students will be able to:

1. Understand the basics of HTML5 canvas
2. Draw a simple column chart and add animations.
3. Understand the Google charts API basics and prepare Google charts

UNIT-IV

INTRODUCTION TO D3.JS: Getting setup with D3, Making selections, changing selection's attribute (attr()), D3 strives to be declarative, Changing methods, appending new elements, Putting all together, Selecting multiple elements with d3.selectall(), Building Bar charts with selections

Data-joins; Conceptual overview of data joins, Enter and binding data, using a data join to make a Bar chart, Using anonymous functions to access bound data, finishing the rest of chart, storing data in objects.

Sizing charts and Axes (Linear scales, using smart margin conventions, adding axes, Ordinal scales and axes)

Loading and filtering External data : Building a graphic that uses all of the population distribution data, Data formats you can use with D3, Creating a server to upload your data, D3'sfunction for loading data, Dealing with Asynchronous requests, Loading and formatting Large Data Sets.

Learning Outcomes:

At the end of this unit, students will be able to:
1. Understand the different concepts in D3.JS
2. Create bar chart using data join
3. Learn how to loading and filtering external data

UNIT-V
MAKING CHARTS INTERACTIVE AND ANIMATED: Data joins, updates and exits, interactive buttons, Updating charts, Adding transactions, using keys

ADDING A PLAY BUTTON: wrapping the update phase in a function, Adding a Play button to the page, Making the Play button go, Allow the user to interrupt the play, sequence.

Learning Outcomes:

At the end of this unit, students will be able to:
1. Prepare charts and add different features to the charts. (L3)
2. Learn how to add a play button to the page (L2)
3. Explain how the user interrupt the play in a page. (L5)

Text Books:

1. Jon Raasch, Graham Murray, Vadim Ogievetsky, Joseph Lowery, "JavaScript and jQuery for Data Analysis and Visualization", WROX.
2. Ritchie S. King, "Visual story telling with D3" Pearson.

References:

1. A Julie Steele and Noah Iliinsky, Designing Data Visualizations: Representing Informational Relationships, O'Relly.
2. Andy Kirk, Data Visualization: A Successful Design Process, PAKT.
   Scott Murray, Interactive Data Visualization for Web, O'Relly

IV B.TECH–I SEMESTER (R19)
L-T-P-C: 3-0-0-3

SubjectCode	TitleoftheSubject	L	T	P	C
19A75401	**Management Science (Humanities Elective – II)**				

Course Objectives:

- To provide fundamental knowledge on Management, Administration, Organization & its concepts.
- To make the students understand the role of management in Production
- To impart the concept of HRM in order to have an idea on Recruitment, Selection, Training &Development, job evaluation and Merit rating concepts
- To create awareness on identify Strategic Management areas & the PERT/CPM for better Project Management
- To make the students aware of the contemporary issues in management

Course Outcomes:

CO1: Define the Management, and its Functions

CO2: Understand the concepts & principles of management and designs of organization in a practical world

CO3: Apply the knowledge of Work-study principles & Quality Control techniques in industry

CO4: Analyze the concepts of HRM in Recruitment, Selection and Training & Development.

CO5: Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time & cost of project & to analyze the business through SWOT.

Mapping of CO's with PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1											3		3		
CO2											2				1
CO3									1		2				
CO4											3				
CO5									1		3				

UNIT-I: INTRODUCTION TO MANAGEMENT

Management- Concept and meaning-Nature-Functions-Management as a Science and Art and both. Schools of Management Thought-Taylor's Scientific Theory-Henry Fayol's principles-Elton Mayo's Human relations-Systems Theory- **Organizational Designs**-Line organization-Line & Staff Organization-Functional Organization-Matrix Organization-Project Organization-Committee form of Organization-Social responsibilities of Management.

Learning Outcomes: At the end if the Unit, the learners will be able to

1. Understand the concept of management and organization
2. Analyze the organization chart & structure for an enterprise.
3. Apply the concepts & principles of management in real life industry.
4. Evaluate and interpret the theories and the modern organization theory.

UNIT-II: OPERATIONS MANAGEMENT

Principles and Types of Plant Layout-Methods of Production (Job, batch and Mass Production), Work Study-Statistical Quality Control- Deming 's contribution to Quality. **Materials Management -** Objectives- Inventory-Functions - Types, Inventory Techniques-EOQ-ABC Analysis-Purchase Procedure and Stores Management-**Marketing Management -**Concept- Meaning - Nature-Functions of Marketing - Marketing Mix- Channels of Distribution -Advertisement and Sales Promotion- Marketing Strategies based on Product Life Cycle.

Learning Outcomes: At the end of the Unit, the learners will be able to

1. Understand the core concepts of Management Science and Operations Management
2. Apply the knowledge of Quality Control, Work-study principles in real life industry.
3. Analyze Marketing Mix Strategies for an enterprise
4. Evaluate Materials departments &Determine EOQ
5. Create and design advertising and sales promotion

UNIT-III: HUMAN RESOURCES MANAGEMENT (HRM)

HRM- Evolution of HRM - Definition and Meaning – Nature-Managerial and Operative functions--Job Analysis - Human Resource Planning (HRP)–Process of Recruitment&Selection - Training and Development-Performance Appraisal-Methods of Performance Appraisal – Placement-Employee Induction-Wage and Salary Administration.

Learning Outcomes: At the end if the Unit, the learners will

1. Understand the concepts of HRM in Recruitment, Selection, Training& Development
2. Apply Managerial and operative Functions
3. Analyze the need of training
4. Evaluate performance appraisal
5. Design the basic structure of salaries and wages

UNIT-IV: STRATEGIC& PROJECT MANAGEMENT

Strategy Definition& Meaning-Vision - Mission- Goals- Corporate PlanningProcess- Environmental Scanning-Steps in Strategy Formulation and Implementation-SWOT Analysis
Project Management- Network Analysis- ProgrammeEvaluation and Review Technique (PERT) - Critical Path Method (CPM) Identifying Critical Path - Probability of Completing the project within given time - Project Cost Analysis - Project Crashing (Simple problems).

Learning Outcomes: At the end of the Unit, the learners will be able to
1. Understand Mission, Objectives, Goals & strategies for an enterprise
2. Apply SWOT Analysis to strengthen the project
3. Analyze Strategy formulation and implementation
4. Evaluate PERT and CPM Techniques
5. Creative in completing the projects within given time

UNIT -V: Contemporary Issues In Management

The concept of Management Information System (MIS)- Materials Requirement Planning (MRP)- Customer Relations Management (CRM)- Total Quality Management (TQM)- Six Sigma Concept- Supply Chain Management (SCM)- Enterprise Resource Planning (ERP)- Performance Management- Business Process Outsourcing (BPO) - Business Process Re-engineering and Bench Marking -Balanced Score Card-Knowledge Management.

Learning Outcomes: At the end if the Unit, the learners will be able to
1. Understand modern management techniques
2. Apply Knowledge in Understanding in modern
3. Analyze CRM,MRP,TQM
4. Evaluate Six Sigma concept and SCM

<u>Text Books:</u>

1. A.R Aryasri, Management Science, TMH, 2013
2. Stoner, Freeman, Gilbert, Management, Pearson Education,New Delhi, 2012.

<u>References:</u>

1. Koontz &Weihrich, Essentials of Management, 6/e, TMH, 2005.
2. Thomas N.Duening& John M.Ivancevich, ManagementPrinciples and Guidelines,Biztantra.
3. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2004.
4. Samuel C.Certo, Modern Management, 9/e, PHI, 2005

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IV B.TECH–I SEMESTER (R19)

L-T-P-C: 3-0-0-3

SubjectCode	TitleoftheSubject	L	T	P	C
19A75402	**Organizational Behavior (Humanities Elective – II)**				

Course Objective:

- To enable student's comprehension of organizational behaviour
- To offer knowledge to students onself-motivation, leadership and management
- To facilitate them to become powerful leaders
- To Impart knowledge about group dynamics
- To make them understand the importance of change and development

Course Outcomes: At the end of the course, students will be able to

CO1: Define the Organizational Behavior, its nature and scope.

CO2: Understand the nature and concept of Organizational behaviour

CO3: Apply theories of motivation to analyze the performance problems

CO4: Analyze the different theories of leadership

CO5: Evaluate group dynamics

Mapping of CO's with PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1											1				1
CO2											3				1
CO3											3				
CO4											2				
CO5											3				

Unit-I: Introduction

Meaning, definition, nature, scope and functions - Organizing Process – Making organizing effective - Understanding Individual Behavior –Attitude -Perception - Learning – Personality.

Learning Outcomes: -After completion of this unit student will

1. Understand the concept of Organizational Behavior
2. Contrast and compare Individual& Group Behavior and attitude
3. Evaluate personality types

Unit-II: Motivation and Leading

Theories of Motivation- Maslow'sHierarchy of Needs - Hertzberg's Two Factor Theory - Vroom's theoryof expectancy - McClelland's theory of needs–Mc Gregor's theory X and theory Y– Adam's equity theory – Locke's goal setting theory– Alderfer'sERG theory - Leadership–research,theories, traits - LeadersVs Managers.

Learning Outcomes: -After completion of this unit student will
1. Understand the concept of Motivation
2. Analyze the Theories of motivation
3. Explain how employees are motivated according to Maslow's Needs Hierarchy

Unit-III: Organizational Culture

Introduction – Meaning, scope, definition, Nature - Organizational Climate - Leadership - Traits Theory–Managerial Grid - Transactional Vs Transformational Leadership - Qualities of good Leader - Conflict Management -Evaluating Leader- Women and Corporate leadership.

Learning Outcomes: -After completion of this unit student will

1. Understand the concept of Leadership
2. Contrast and compare Trait theory and Managerial Grid
3. Distinguish the difference between Transactional and Transformational Leadership
4. Evaluate the qualities of good leaders

Unit-IV: Group Dynamics

Introduction – Meaning, scope, definition, Nature- Types of groups - Determinants of group behavior - Group process – Group Development - Group norms - Group cohesiveness - Small Groups - Group decisionmaking - Team building - Conflict in the organization– Conflict resolution

Learning Outcomes: -After completion of this unit student will
1. Understand the concept of Group Dynamics
2. Contrast and compare Group behavior and group development
3. Evaluate how to resolve conflicts in the organization

Unit-V: Organizational Change and Development

Introduction –Nature, Meaning, scope, definition and functions- Organizational Culture - Changing the Culture – Change Management – Work Stress Management - Organizational management – Managerial implications of organization's change and development

Learning Outcomes: -After completion of this unit student will
1. Understand the importance of organizational change and development
2. Apply change management in the organization
3. Analyze work stress management
4. Evaluate Managerial implications of organization

Text Books:

1. Luthans, Fred, OrganisationalBehaviour, McGraw-Hill, 12 Th edition 2011 2. P Subba Rao, OrganisationalBehaviour,Himalya Publishing House 2017

References

1. McShane,Organizational Behaviour, TMH 2009
2. Nelson, OrganisationalBehaviour, Thomson, 2009.
3. Robbins, P.Stephen, Timothy A. Judge, OrganisationalBehaviour, Pearson 2009.

Aswathappa, OrganisationalBehaviour,Himalaya, 2009

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IV B.TECH–I SEMESTER (R19)

L-T-P-C: 3-0-0-3

SubjectCode	TitleoftheSubject	L	T	P	C
19A75403	**Business Environment (Humanities Elective – II)**				

Course Objective:

- To make the student understand about the business environment
- To enable them in knowing the importance of fiscal and monitory policy
- To facilitate them in understanding the export policy of the country
- To Impart knowledge about the functioning and role of WTO
- To Encourage the student in knowing the structure of stock markets

Course Outcome: At the end of the course, students will be able to

CO1: Define Business Environment and its Importance.
CO2: Understand various types of business environment.
CO3: Apply the knowledge of Money markets in future investment
CO4: Analyze India's Trade Policy
CO5: Evaluate fiscal and monitory policy

Mapping of CO's with PO's and PSO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1							1				3		3		
CO2											2				
CO3											3				
CO4								2							
CO5											3				

Unit-I: Overview of Business Environment

Introduction – meaning Nature,Scope,significance, functions and advantages. Types- Internal & External, Micro and Macro.Competitive structure of industries -Environmental analysis- advantages & limitations of environmental analysis& Characteristics of business.

Learning Outcomes: -After completion of this unit student will

1. Understand the concept of Business environment
2. Classify various types of business environment
3. Evaluate the environmental analysis in business
4. Discuss the Characteristics of Business.

Unit-II: Fiscal Policy

Introduction – Nature, meaning, significance, functions and advantages. Public Revenues - Public Expenditure - Public debt - Development activities financed by publicexpenditure - Evaluation of recent fiscal policy of GOI. Highlights of Budget- Monetary Policy - Demand and Supply of Money –RBI - Objectives of monetary and credit policy - Recent trends- Role of Finance Commission.

Learning Outcomes: -After completion of this unit student will

1. Understand the concept of public revenue and public Expenditure
2. Identify the functions of RBI and its role
3. Analyze the Monitory policy in India
4. Know the recent trends and the role of Finance Commission in the development of our country
5. Differentiate between Fiscal and Monitory Policy

Unit-III: India's Trade Policy

Introduction – Nature, meaning, significance, functions and advantages. Magnitude and direction of Indian International Trade - Bilateral and Multilateral Trade Agreements - EXIM policy and role of EXIM bank -Balance of Payments– Structure & Major components - Causes for Disequilibrium in Balance of Payments - Correction measures.

Learning Outcomes: -After completion of this unit student will

1. Understand the role ofIndian international trade
2. Understand and explain the need for Export and EXIM Policies
3. Analyze causes for Disequilibrium and correction measure
4. Differentiate between Bilateral and Multilateral Trade Agreements

UNIT-IV: World Trade Organization

Introduction – Nature, meaning, significance, functions and advantages. Organization and Structure - Role and functions of WTO in promoting world trade - Agreements in the Uruguay Round –TRIPS, TRIMS, and GATT - Disputes Settlement Mechanism - Dumping and Anti-dumping Measures.

Learning Outcomes: -After completion of this unit student will

1. Understand the role of WTO in trade
2. Analyze Agreements on trade by WTO
3. Understand the Dispute Settlement Mechanism
4. Compare and contrast the Dumping and Anti-dumping Measures.

Unit-V: Money Markets and Capital Markets

Introduction – Nature, meaning, significance, functions and advantages. Features and components of Indian financial systems - Objectives, features and structure of money markets and capital markets - Reforms and recent development – SEBI – Stock Exchanges - Investor protection and role of SEBI.

Learning Outcomes: -After completion of this unit student will

1. Understand the components of Indian financial system
2. Know the structure of Money markets and Capital markets
3. Analyze the Stock Markets
4. Apply the knowledge in future investments
5. Understand the role of SEBI in investor protection.

Text Books:

1. Francis Cherunilam (2009), International Business: Text and Cases, Prentice Hall of India.
2. K. Aswathappa, Essentials of Business Environment: Texts and Cases & Exercises 13th Revised Edition.HPH2016

Reference Books:

1. K. V. Sivayya, V. B. M Das (2009), Indian Industrial Economy, Sultan Chand Publishers, New Delhi, India.
2. Sundaram, Black (2009), International Business Environment Text and Cases, Prentice Hall of India, New Delhi, India.
3. Chari. S. N (2009), International Business, Wiley India.
4. E. Bhattacharya (2009), International Business, Excel Publications, New Delhi.

IV B.TECH–I SEMESTER (R19)

L-T-P-C: 0-0-3-1.5

SubjectCode	TitleoftheSubject	L	T	P	C
19A70509	**Data Analytics Lab**				

Course Objective:

- Install and use R Programming to perform basic programming and use the calculating environment in R.
- Illustrate the use of functions and data structures by object-oriented programming for solving real world problems.
- Define different Graphics parameters for designing different types of graphs for better visualization.
- Understand, analyze and interpret correlation and regression to analyze the underlying relationships between different variables.

Course Outcomes:

CO1: Students are able to understand the basic programming and can perform calculations for given input and produce output
CO2: Students are able to apply the functions and data structures for solving real world problems
CO3: Students are able to analyze different frames and environments for object oriented programming
CO4: Students are able to design different graphics using different parameters for better visualization
CO5: Students are able to create a data model by analyzing the relationships between different variables

Mapping of Cos with Pos and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	3		3			2	2	2	3	3	3	2	2
CO2	2	3		2	3	3				3	3	3	3	3	2
CO3		3	2		3			2	2		3		2	3	
CO4			3		3						3		2	3	
CO5			3	3	3			2	2		3	3	3	3	

List of Experiments:

1. R Environment Setup & R as calculating environment

2. R Basic programming, Input and output

3. Programming with functions & Sophisticated Data structures

4. Better Graphics using Graphics parameters

5. Frames and environments & Object –oriented Programming

6. Numerical Accuracy and program efficiency

7. Probability & Statistics: The law of Total probability

8. Simulation: Monte Carlo Integration – Hit and miss method

9. Data Modeling: Linear and Multiple Regression Models

Case Study: Consider the data set of Ozone levels in United States for the year 2014 and do the following analysis

- ✔ Formulate your questions
- ✔ Read in your data
- ✔ Check the packaging
- ✔ Look at the top and the bottom of your data
- ✔ Check your “n” s
- ✔ Validate with at least one external data source
- ✔ Make a plot
- ✔ Follow up

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IV B.TECH–I SEMESTER (R19)

L-T-P-C: 0-0-3-1.5

SubjectCode	TitleoftheSubject	L	T	P	C
19A70510	**Internet of Things Lab**				

Course Objectives:

- Understand the definition and significance of the Internet of Things
- Discuss the architecture, operation, and business benefits of an IoT solution
- Examine the potential business opportunities that IoT can uncover
- Explore the relationship between IoT, cloud computing, and big data
- Identify how IoT differs from traditional data collection systems

Course outcomes:

At the end of the course, students will be able to

CO1: Choose the sensors and actuators for an IoT application

CO2: Select protocols for a specific IoT application

CO3: Utilize the cloud platform and APIs for IoT application

CO4: Experiment with embedded boards for creating IoT prototypes

CO5: Design a solution for a given IoT application

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	2				3								3	3	
CO 2			3		3			2		3			3	3	
CO 3	2	3			3								3	3	
CO 4		3	3	1	3			2	3	3	1	1	3	3	
CO 5		3	3	1	3								3	3	

Mapping of Cos with Pos and PSOs

List of Experiments:

1. Select any one development board (Eg., Arduino or Raspberry Pi) and control LED using the board.
2. Using the same board as in (1), read data from a sensor. Experiment with both analog and digital sensors.
3. Control any two actuators connected to the development board using Bluetooth.
4. Read data from sensor and send it to a requesting client. (using socket communication)
   Note: The client and server should be connected to same local area network.
5. Create any cloud platform account, explore IoT services and register a thing on the platform.
6. Push sensor data to cloud.
7. Control an actuator through cloud.
8. Access the data pushed from sensor to cloud and apply any data analytics or visualization services.
9. Create a mobile app to control an actuator.
10. Design an IoT based air pollution control system which monitors the air pollution by measuring carbon monoxide, ammonia, etc and gives alarm or sends message when the pollution level is more than permitted range.
11. Design an IoT based system which measures the physical and chemical properties of the water and displays the measured values.
12. Identify a problem in your local area or college which can be solved by integrating the things you learned and create a prototype to solve it (Mini Project).
13. Design a business model canvas for a digital display

Text Book:

2. Adrian McEwen, Hakim Cassimally - Designing the Internet of Things, Wiley Publications, 2012.
3. Alexander Osterwalder, and Yves Pigneur – Business Model Generation – Wiley, 2011

Reference Books:

3. ArshdeepBahga, Vijay Madisetti - Internet of Things: A Hands-On Approach, Universities Press, 2014.
4. The Internet of Things, Enabling technologies and use cases – Pethuru Raj, Anupama C. Raman, CRC Press.

Reference sites:

https://www.arduino.cc/

https://www.raspberrypi.org

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IV B.TECH–II SEMESTER (R19)

Software Project Management

(Professional Elective – IV)

L-T-P-C: 3-0-0-3

SubjectCode	TitleoftheSubject	L	T	P	C
19A80501	Software Project Management				

Course Objectives:

- Teach the specific roles within a software organization as related to project and process management.
- Describe the principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience-based creation & improvement of models (process management).
- Introduce the basic infrastructure competences (e.g., process modelling and measurement).
- Explain the basic steps of project planning, project management, quality assurance, and process management and their relationships.

Course Outcomes:

CO1: Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
CO2: Compare and differentiate organization structures and project structures
CO3: Implement a project to manage project schedule, expenses and resources with the application of suitable project management tools

Mapping of Cos with Pos and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3		3		2		3	1	2	2	2	3	2
CO2	2			2	2		3	1	1		2		2	1	1
CO3		1		2	3	2	2	2	2	2	3	1	2	3	3

UNIT I

Conventional Software Management: The waterfall model, conventional software Management performance. Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

Learning Outcomes:

1. Understand basic steps to build a software. (L2).
2. Estimate the cost of software by using cost estimation models (L5).
3. Compute the size of software by using SLOC and function points (L3).

UNIT II

Improving Software Economics: Reducing Software product size, improving software processes,

improving team effectiveness, improving automation, Achieving required quality, peer inspections.
The old way and the new: The principles of conventional software engineering, principles of modern software management, transitioning to an iterative process.
Learning Outcomes:

1. Analyze software estimation and to reduce the size of software (L4).
2. Illustrate the principles for improving the team effectiveness (L2).
3. Estimate costs and schedules, and overall productivity using a smaller team (L5).
4. Choose the practices for conventional software engineering(L1).
5. Understand Principles of modern software management (L2).

UNIT III
Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.
Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts. Model based software architectures: A Management perspective and technical perspective.
Learning Outcomes:

1. Select life cycle model based on requirements, users (L3).
2. Can organizedistinct sets of artifacts (L3).
3. Develop and justify the artifacts for the product(L6).

UNIT IV
Work Flows of the process: Software process workflows, Inter Trans workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic status assessments.
Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Interaction planning process, Pragmatic planning.
Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.
Process Automation: Automation Building Blocks, the Project Environment
Learning Outcomes:

1. Organize the hierarchy for work breakdown structures (L3).
2. Select general guidelines for iterations in planning process (L3).
3. Discuss default roles in software line of business organization (L6).
4. Identify discrete states for project environment artifacts (L3).

UNIT V
Project Control and Process instrumentation: The server care Metrics, Management indicators, quality indicators, life cycle expectations pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminates, Example.
Future Software Project Management: Modern Project Profiles Next generation Software economics, modern Process transitions.
Case Study: The Command Center Processing and Display System-Replacement (CCPDS-R)
Learning Outcomes:

1. Determine quality of software products using software metrics (L4).
2. Measure change traffic over time (L5).
3. Apply software economics for modern projects (L3).
4. Analyze the command center processing (L4).

Text Books:

1. Software Project Management, Walker Royce, Pearson Education.
2. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition,TataMc-Graw Hill.

Reference Books:

1. Applied Software Project Management, Andrew Stellman& Jennifer Greene, O‟Reilly, 2006.
2. Head First PMP, Jennifer Greene & Andrew Stellman, O‟Reilly,2007.
3. Software Engineering Project Managent, Richard H. Thayer & Edward Yourdon, second edition,Wiley India, 2004.
4. Agile Project Management, Jim Highsmith, Pearson education, 2004.
5. The art of Project management, Scott Berkun, O‟Reilly, 2005.
6. Software Project Management in Practice, PankajJalote, Pearson Education,2002.

IV B.TECH–II SEMESTER (R19)

L-T-P-C: 3-0-0-3

SubjectCode	TitleoftheSubject	L	T	P	C
19A80502	**Cloud Computing (Professional Elective-IV)**				

Course Objectives:

This course is designed to:

1. Define cloud services and models
2. Demonstrate design the architecture for new cloud application.
3. Explain how to re-architect the existing application for the cloud.

Course Outcomes:

Upon completion of the course, the students should be able to:

CO1: Outline the procedure for Cloud deployment
CO2: Distinguish different cloud service models and deployment models
CO3: Compare different cloud services
CO4: Design applications for an organization which use cloud environment.
CO5: Understand the importance of virtualization in distributed computing and how this has enabled the development of Cloud Computing.

Mapping of Cos with Pos and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2							3						2		
CO3							3						2		
CO4			3		3									3	
CO5							1				2		2		

Unit-I: Introduction to Cloud Computing, Characteristics of Cloud Computing, Cloud Models, Cloud Services Examples, Cloud based services and Applications, Cloud Concepts and Technologies, Virtualization, Load Balancing, Scalability and Elasticity, Deployment, Replication, Monitoring, Software defined networking, Network function virtualization, Map Reduce, Identity and Access Management, Service Level Agreements, Billing.

Learning Outcomes

At the end of the unit, students will be able to:

1. Outline the Cloud characteristics and models.(L2)
2. Classify different models, different technologies in cloud.(L2)

Unit-II: Cloud Services and Platforms: Compute Services, Storage Services, Database Services, Application Services, Content Delivery Services, Analytics Services, Deployment and Management Services, Identity and Access Management Services, Open Source Private Cloud Software, Apache Hadoop, Hadoop MapReduce Job Execution, Hadoop Schedulers, Hadoop Cluster Setup.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Summarize the Services and Platform of cloud.(L2)
2. Demonstrate Hadoop Cluster Setup. (L2)

Unit-III: CloudApplication Design: Design Considerations, Reference Architectures, Cloud Application Design Methodologies, Data Storage Approaches,

Multimedia Cloud: Introduction, Case Study: Live Video Streaming App, Streaming Protocols, Case Study: Video Transcoding APP.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Design and build cloud applications.(L6)
2. Describe the multimedia cloud. (L2)

Unit-IV: Python for Amazon Web Services, Python for Google Cloud Platform, Python for Windows Azure, Python for MapReduce, Python Packages of Interest, Python Web Application Framework – Django, Designing a RESTful Web API.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Select different cloud services from different vendors (L2)
2. Utilize Python language to access cloud services (L3)

Unit-V: Cloud Application Development in Python, Design Approaches, Image Processing APP, Document Storage App, MapReduce App, Social Media Analytics App, Cloud Application Benchmarking and Tuning, Cloud Security, Cloud Computing for Education.

Learning Outcomes:

At the end of the unit, students will be able to:

1. Investigate different Cloud applications. (L4)
2. Design cloud applications using Python. (L6)

Textbooks:

1. ArshadeepBhaga, Vijay Madisetti, “Cloud Computing AHandson Approach”, Universities Press, 2018.

References:

1. Chris Hay, Brian Prince, “Azure in Action” Manning Publications [ISBN: 9781935182481],2010.
2. Henry Li, “Introducing Windows Azure” Apress; 1 edition [ISBN: 978-14302-2469-3],2009.
3. Eugenio Pace, Dominic Betts, Scott Densmore, Ryan Dunn, Masashi Narumoto, MatiasWoloski, “Developing Applications for the Cloud on the Microsoft Windows Azure Platform” Microsoft Press; 1 edition [ISBN: 9780735656062],2010.
4. Eugene Ciurana, “Developing with Google App Engine” Apress; 1 edition [ISBN: 978-1430218319],2009.

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IV B.TECH–II SEMESTER (R19)

SubjectCode	TitleoftheSubject	L	T	P	C
19A80503	**Deep Learning (Professional Elective –IV)**				

L-T-P-C: 3-0-0-3

Course Objectives:

- Demonstrate the major technology trends driving DeepLearning
- Build, train and apply fully connected deep neuralnetworks
- Implement efficient (vectorized) neuralnetworks
- Analyze the key parameters and hyper parameters in a neural network'sarchitecture

Course Outcomes:

After completing this course, students will be able to:

CO1: Apply linear algebra and probability theory in the deep learning applications

CO2: Elaborate the challenges and motivations to Deep learning

CO3: Differentiate the architectures of deep neuralnetwork

CO4: Build a convolution neuralnetwork

CO5: Build and train RNN andLSTMs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	3										1	3	
CO2	2	2	3			2							1	3	
CO3	2	2	3	3									1	3	
CO4	1	1	3										1		
CO5	2	2	3		1										

Mapping of Cos with Pos and PSOs

UNIT I

Linear Algebra: Scalars, Vectors, Matrices and Tensors, Matrix operations, types of matrices, Norms, Eigen decomposition, Singular Value Decomposition, Principal Components Analysis.Probability and Information Theory: Random Variables, Probability Distributions, Marginal Probability, Conditional Probability, Expectation, Variance and Covariance, Bayes’

Rule, Information Theory. Numerical Computation: Overflow and Underflow, Gradient-Based Optimization, Constrained Optimization, Linear Least Squares.

Learning Outcomes:

After completing this Unit, students will be able to:

1. Understand linear algebra in the deep learning context (L2)
2. Utilize probability and information theory in machine/deep learning applications (L3)

UNIT II

Machine Learning: Basics and Underfitting, Hyper parameters and Validation Sets, Estimators, Bias and Variance, Maximum Likelihood, Bayesian Statistics, Supervised and Unsupervised Learning, Stochastic Gradient Descent, Challenges Motivating Deep Learning. Deep Feedforward Networks: Learning XOR, Gradient-Based Learning, Hidden Units, Architecture Design, Back-Propagation and other Differentiation Algorithms.

Learning Outcomes:

After completing this Unit, students will be able to:

1. Illustrate machine learning basics leads to deep learning(L2)
2. Contrast super and unsupervised learning(L2)

UNIT III

Regularization for Deep Learning: Parameter Norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised Learning, Multi-Task Learning, Early Stopping, Parameter Tying and Parameter Sharing, Sparse Representations, Bagging and Other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, Tangent Prop and Manifold Tangent Classifier. Optimization for Training Deep Models: Pure Optimization, Challenges in Neural Network Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates, Approximate Second-Order Methods, Optimization Strategies and Meta-Algorithms.

Learning Outcomes:

After completing this Unit, students will be able to:

1. Evaluate Regularization Problems for Deep learning (L5)
2. Apply optimization for Training Deep Learning models (L3)

UNIT IV

Convolutional Networks: The Convolution Operation, Pooling, Convolution, Basic Convolution Functions, Structured Outputs, Data Types, Efficient Convolution Algorithms, Random or Unsupervised Features, Basis for Convolutional Networks.

Learning Outcomes:

After completing this Unit, students will be able to:

1. Appraise Basic Convolution Functions (L5)
2. Develop Efficient Convolution Algorithms (L3)

UNIT V

Sequence Modeling: Recurrent and Recursive Nets: Unfolding Computational Graphs, Recurrent Neural Networks, Bidirectional RNNs, Encoder-Decoder Sequence-to-Sequence Architectures, Deep Recurrent Networks, Recursive Neural Networks, Echo State Networks, LSTM, Gated RNNs, Optimization for Long-Term Dependencies, Auto encoders, Deep Generative Models.

Learning Outcomes:

After completing this Unit, students will be able to:

1. Illustrate Recurrent and Recursive Neural Networks (L2)
2. Apply Auto encoders and Deep Generative Models (L3)

Text Books:

1. Ian Goodfellow, YoshuaBengio, Aaron Courville, “Deep Learning”, MIT Press,2016.
2. Josh Patterson and Adam Gibson, “Deep learning: A practitioner's approach”, O'Reilly Media, First Edition,2017.

Reference Books:

1) Fundamentals of Deep Learning, Designing next-generation machine intelligence algorithms, Nikhil Buduma, O’Reilly, Shroff Publishers,2019.
2) Deep learning Cook Book, Practical recipes to get started Quickly, DouweOsinga, O’Reilly, Shroff Publishers,2019.

E-Resources:

1) https://keras.io/datasets/
2) http://deeplearning.net/tutorial/deeplearning.pdf
3) https://arxiv.org/pdf/1404.7828v4.pdf

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IV B.TECH–II SEMESTER (R19)

L-T-P-C: 3-0-0-3

SubjectCode	TitleoftheSubject	L	T	P	C
19A80504	**Digital Marketing (Open Elective – IV)**				

Course Objectives:

- To provide foundation in the key concepts on digital marketing
- Learn to develop, evaluate, and execute a comprehensive digital marketing strategy and plan
- Understand the major digital marketing channels - online advertising: Digital display, mobile, search engine, and social media
- Understand how and why to use digital marketing for multiple goals within a larger marketing and/or media strategy
- Learn how to measure digital marketing and content efforts

Course Outcomes:

CO1: Analyze the confluence of marketing, operations, and human resources in real-time delivery
CO2: Demonstrate cognitive knowledge of the skills required in conducting online research and research on online markets, as well as in identifying, assessing and selecting digital market opportunities
CO3: Explain emerging trends in digital marketing and critically assess the use of digital marketing tools by applying relevant marketing theories and frameworks
CO4: Investigate and evaluate issues in adapting to globalised markets that are constantly changing and increasingly networked
CO5: Interpret the traditional marketing mix within the context of a changing and extended range of digital strategies and tactics.

Mapping of Cos with Pos and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3	3										2		3
CO2		3	3			2		2			3	2	2	3	3
CO3		3		2	3	2	1			1			2	3	3
CO4		3	3				1	2	1		3	2	2		3
CO5		3	3	3		2					3		2		3

Unit-I

An Introduction To Digital Marketing - People Power, Market Research Versus Market Reality, What Are The 3i Principles?
Search Engine Optimization: An Introduction, Positioning, Search Behavior, Stage 1: Goals, Stage 2: On-Page Optimization, Stage 3: Off-Page Optimization, Stage 4: Analyze
Learning Outcomes:
At the end of the unit, students will be able to:

1. Understand the objective of New Marketing Environment (L2)
2. Define various components of Online Marketing Environment (L1)
3. Analyse the search engine for the purpose of marketing (L4)

Unit-II

Pay Per Click- An Introduction, Stage 1: Goals, Stage 2: Setup, Stage 3: Manage, Stage 4: Analyze
Digital Display Advertising- An Introduction, Display Advertising: An Industry Overview, Stage 1: Define, Stage 2 : Format, Stage 3: Configure, Stage 4: Analyze
Learning Outcomes:
At the end of the unit, students will be able to:

1. Understand the Digital Advertising principles(L2)
2. Analyze online marketing communities(L4)
3. Construct the Working of web marketing (L3)

Unit-III

Email Marketing: An Introduction, Stage 1: Data—Email Marketing Process, Stage 2: Design and Content, Stage 3: Delivery, Stage 4: Discovery
Social Media Marketing (Part I): Introduction, Stage 1: Goals, Stage 2: Channels
Learning Outcomes:
At the end of the unit, students will be able to:

1. Understand the Online Customer Expectations(L2)
2. Analysing Social media Communities(L4)
3. Develop the Website Designing. (L6)

Unit-IV

Social Media Marketing (Part II): An Introduction, Stage 3:Implementation, Stage 4: Analyze, Laws and Guidelines
Mobile Marketing: An Introduction, Stage 1: Opportunity, Stage 2: Optimize, Stage 3: Advertise, Stage 4: Analyze, Building a multichannel marketing strategy, Case Study: Kiip
Learning Outcomes:
At the end of the unit, students will be able to:

1. Develop Social media Communities(L4)
2. Identify mobile market Advertising strategies(L3)
3. Develop mobile marketing channels(L3)

Unit-V

Analytics: An Introduction, Stage1: Goals, Stage 2: Setup, Stage 3: Monitor, Stage 4: Analyze
Strategy and Planning-An Introduction, Stage 1: Approach, Stage 2: Audience, Stage 3: Activities, Stage 4: Analysis

Learning Outcomes:

At the end of the unit, students will be able to:

1. Identify web analytics market strategies(L3)
2. Analyze the analytics principles(L4)
3. Analyze various Marketing planning activities(L4)

Text Books:

1. The Art of Digital Marketing: The Definitive Guide to Creating Strategic, Targeted, and Measurable Online Campaigns by Ian Dodson, Wiley Publisher.

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IV B.TECH–II SEMESTER (R19)

L-T-P-C: 3-0-0-3

SubjectCode	TitleoftheSubject	L	T	P	C
19A80505	**Natural Language Processing (Open Elective – IV)**				

Course Objectives:

- Explain and apply fundamental algorithms and techniques in the area of natural language processing (NLP)
- Discuss approaches to syntax and semantics in NLP.
- Examine current methods for statistical approaches to machine translation.
- Explore machine learning techniques used in NLP.

Course Outcomes:

Upon completion of the course, the students should be able to:

CO1: Build NLP applications using Python.
CO2: Apply various Parsing techniques, Bayes Rule, Shannon game, Entropy and Cross Entropy.
CO3: Explain the fundamentals of CFG and parsers and mechanisms in ATN's.
CO4: ApplySemantic Interpretation and Language Modeling
CO5: Interpret Machine Translation and multilingual Information Retrieval systems and Automatic Summarization

Mapping of Cos with Pos and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2	2				2							2	
CO2	3	3		3			1					2	3	1	
CO3	3		3		3				2				3		
CO4	3									2			3		
CO5		2	3		3				3						

UNIT I:

Introduction to Natural language

The Study of Language, Applications of NLP, Evaluating Language Understanding Systems, Different Levels of Language Analysis, Representations and Understanding, Organization of Natural language Understanding Systems, Linguistic Background: An outline of English Syntax.

Learning Outcomes:

At the end of the module, students will be able to:

1. Classify various NLP Applications (L2)
2. Apply the logic by using Python Programming(L3)
3. List the AI Languages (L1)
4. Outline the Linguistic Background (L2)

Unit II:

Grammars and Parsing

Grammars and Parsing- Top- Down and Bottom-Up Parsers, Transition Network Grammars, Feature Systems and Augmented Grammars, Morphological Analysis and the Lexicon, Parsing with Features, Augmented Transition Networks, Bayees Rule, Shannon game, Entropy and Cross Entropy.

Learning Outcomes:

At the end of the module, students will be able to:

1. Demonstrate the Top- Down and Bottom-Up Parsing techniques (L2)
2. Apply Bayes Rule, Shannon game, Entropy and Cross Entropy. (L3).
3. Develop game playing strategies using Shannon game. (L3)

UNIT III:

Grammars for Natural Language

Grammars for Natural Language, Movement Phenomenon in Language, Handling questions in Context Free Grammars, Hold Mechanisms in ATNs, Gap Threading, Human Preferences in Parsing, Shift Reduce Parsers, Deterministic Parsers.

Learning Outcomes:

At the end of the module, students will be able to:

1. Classify Grammars for Natural Language (L2)
2. Explain Hold Mechanisms in ATNs. (L2)
3. Explain Human Preferences in Parsing. (L2)

UNIT IV:

Semantic Interpretation

Semantic &Logical form, Word senses & ambiguity, The basic logical form language, Encoding ambiguity in the logical Form, Verbs & States in logical form, Thematic roles, Speech acts & embedded sentences, Defining semantics structure model theory.

Language Modeling

Introduction, n-Gram Models, Language model Evaluation, Parameter Estimation, Language Model Adaption, Types of Language Models, Language-Specific Modeling Problems, Multilingual and Crosslingual Language Modeling.

Learning Outcomes:

At the end of the module, students will be able to:

1. Distinguish Language model Evaluation (L4)
2. List the types of Language Models (L1)

UNIT V:

Machine Translation

Survey: Introduction, Problems of Machine Translation, Is Machine Translation Possible, Brief History, Possible Approaches, Current Status. Anusaraka or Language Accessor: Background, Cutting the Gordian Knot, The Problem, Structure of Anusaraka System, User Interface, Linguistic Area, Giving up Agreement in Anusarsaka Output, Language Bridges.

Multilingual Information Retrieval

Introduction, Document Preprocessing, Monolingual Information Retrieval, CLIR, MLIR, Evaluation in Information Retrieval, Tools, Software and Resources.

Multilingual Automatic Summarization

Introduction, Approaches to Summarization, Evaluation, How to Build a Summarizer, Competitions and Datasets.

Learning Outcomes:

At the end of the module, students will be able to:

1. Apply Machine Translation techniques. (L3)
2. Elaborate Multilingual Information Retrieval and Multilingual Automatic Summarization. (L6)

Text Books:

1. James Allen, Natural Language Understanding, 2nd Edition, 2003, Pearson Education.
2. Multilingual Natural Language Processing Applications : From Theory To Practice-Daniel M.Bikel and ImedZitouni, Pearson Publications.
3. Natural Language Processing, A paninian perspective, AksharBharathi,Vineetchaitanya,Prentice –Hall of India.

References Books:

1. Charniack, Eugene, Statistical Language Learning, MIT Press, 1993.
2. Jurafsky, Dan and Martin, James, Speech and Language Processing, 2nd Edition, Prentice Hall, 2008.
3. Manning, Christopher and Henrich, Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999.

After completing this Unit, students will be able to

1. Adapt legal issues and ethics in computer security. [L6]
2. Elaborate on the Emerging topics. [L6]

Text Books:

1. Pfleeger, C.P., Security in Computing, Prentice Hall, 2010, 5thedition.
2. Schneier, Bruce. Applied Cryptography, Second Edition, John Wiley & Sons,1996

Reference Books:

1. Rhodes-Ousley, Mark. Information Security: The Complete Reference, Second Edition, Information Security Management: Concepts and Practice, McGraw-Hill,2013.
2. Whitman, Michael E. and Herbert J. Mattord. Roadmap to Information Security for IT and Infosec Managers. Boston, MA: Course Technology,2011.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGEOFENGINEERING(Autonomous),ANANTHAPURAMU

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

B.Tech (R19 Regulation)

IV B.TECH–II SEMESTER (R19)

L-T-P-C: 3-0-0-3

SubjectCode	TitleoftheSubject	L	T	P	C
19A80506	**Cyber Security (Open Elective – IV)**				

Course Objectives:

- Understand essential building blocks andbasic concepts of cyber security
- Explore Web security and Network security
- Explain the measures for securing the networks and cloud
- Understand privacy principles and policies
- Describe the legal issues and ethics in computer security

Course Outcomes:

Upon completion of the course, the students should be able to:

CO1: Illustrate the broad set of technical, social & political aspects of Cyber Securityand security management methods to maintain securityprotection

CO2: Assess the vulnerabilities and threats posed by criminals, terrorist and nation statesto nationalinfrastructure

CO3: Identify the nature of secure software development and operatingsystems

CO4: Demonstrate the role security management in cyber security defence

CO5: Adapt the legal and social issues at play in developingsolutions.

Mapping of Cos with Pos and PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2				3	2	3	2	2		3	2	3	2
CO2		2	2		3	3		2	3			3		2	3
CO3		3		2	3			3	2	2	3		3	2	
CO4			3		3			3			3	2		3	3
CO5					2	3	3	3	2			3		2	3

UNIT I

Introduction: Introduction to Computer Security, Threats, Harm, Vulnerabilities, Controls, Authentication, Access Control, and Cryptography, Authentication, Access Control, Cryptography. Programs and Programming: Unintentional (Non-malicious) Programming Oversights, Malicious Code—Malware,Countermeasures.

Learning Outcomes:

After completing this Unit, students will be able to

1. Explain Vulnerabilities, threats and. Counter measures for computer security[L2]
2. Interpret the design of the malicious code [L2]

UNIT II

Web Security: User Side, Browser Attacks, Web Attacks Targeting Users, Obtaining User or Website Data, Email Attacks.Operating Systems Security: Security in Operating Systems, Security in the Design of Operating Systems, Rootkit.

Learning Outcomes:

After completing this Unit, students will be able to

1. Outline the attacks on browser, Web and email. [L2]
2. Explain the security aspects of Operating Systems. [L3]

UNIT III

Network Security: Network Concepts, Threats to Network Communications, Wireless Network Security, Denial of Service, Distributed Denial-of-Service Strategic Defenses: Security Countermeasures, Cryptography in Network Security, Firewalls, Intrusion Detection and Prevention Systems, Network Management .Cloud Computing and Security: Cloud Computing Concepts, Moving to the Cloud, Cloud Security Tools and Techniques, Cloud Identity Management, Securing IaaS.

Learning Outcomes:

After completing this Unit, students will be able to

1. Identify the network security threats and attacks. [L3]
2. Design the Counter measures to defend the network security attacks. [L6]
3. Analyze the security tools and techniques for Cloud computing [L4]

UNIT IV

Privacy: Privacy Concepts, Privacy Principles and Policies, Authentication and Privacy, Data Mining, Privacy on the Web, Email Security, Privacy Impacts of Emerging Technologies, Where the Field Is Headed. Management and Incidents: Security Planning, Business Continuity Planning, Handling Incidents, Risk Analysis, Dealing with Disaster.

Learning Outcomes:

After completing this Unit, students will be able to

1. Interpret the need for Privacy and its impacts of Emerging Technologies. [L2]
2. Explain how to handle incidents and deal with Disaster. [L2]

UNIT V

Legal Issues and Ethics: Protecting Programs and Data, Information and the Law, Rights of Employees and Employers, Redress for Software Failures, Computer Crime, Ethical Issues in Computer Security, Incident Analysis with Ethics, Emerging Topics: The Internet of Things, Economics, Computerized Elections, Cyber Warfare.

Learning Outcomes:

After completing this Unit, students will be able to

1. Adapt legal issues and ethics in computer security. [L6]
2. Elaborate on the Emerging topics. [L6]

Text Books:

1. Pfleeger, C.P., Security in Computing, Prentice Hall, 2010, 5thedition.
2. Schneier, Bruce. Applied Cryptography, Second Edition, John Wiley & Sons,1996

Reference Books:

1. Rhodes-Ousley, Mark. Information Security: The Complete Reference, Second Edition, Information Security Management: Concepts and Practice, McGraw-Hill,2013.
2. Whitman, Michael E. and Herbert J. Mattord. Roadmap to Information Security for IT and Infosec Managers. Boston, MA: Course Technology,2011.

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DEPARTMENT COMPUTER SCIENCE AND ENGINEERING
B.Tech. Course Structure (R20)

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Induction Program – 3 weeks

Semester-I(Theory-5,Lab -4)					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	20A15101	Linear Algebra and Calculus Common to All branches of Engineering	BS	3-0-0	3
2.	20A15201	AppliedPhysics Common to EEE, ECE, CSE	BS	3-0-0	3
3.	20A15501	CommunicativeEnglish Common to EEE, ECE, CSE, CHEM	HS	3-0-0	3
4.	20A10501	Problem Solving and C Programming	ES	3-0-0	3
5.	20A10301	Engineering Drawing Common to EEE, ECE, CSE	LC	1-0-2	2
6.	20A10302	Engineering Graphics Lab Common to EEE, ECE, CSE	LC	0-0-2	1
7.	20A15202	Applied Physics Lab Common to EEE, ECE, CSE	BS	0-0-3	1.5
8.	20A15502	Communicative English Lab Common to EEE, ECE, CSE, CHEM	HS	0-0-3	1.5
9.	20A10502	Problem Solving and C Programming Lab	ES	0-0-3	1.5
				Total	**19.5**

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Semester-II(Theory-5,Lab -5)					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	20A15102	Differential Equations & Transformations	BS	3-0-0	3
2.	20A15303	Chemistry Common to EEE, ECE, CSE	BS	3-0-0	3
3.	20A10503	Python Programming	ES	3-0-0	3
4.	20A12401	Basic Electrical and Electronics Engineering Common to MECH, CSE, CHEM	ES	3-0-0	3
5.	20A10303	Engineering Workshop Common to EEE, ECE, CSE	LC	0-0-2	1
6.	20A10505	CSE Workshop Common to EEE, ECE, CSE	LC	0-0-4	2
7.	20A10504	Python Programming Lab	ES	0-0-3	1.5
8.	20A15304	Chemistry Lab Common to EEE, ECE, CSE	BS	0-0-3	1.5
9.	20A12402	BasicElectricalandElectronicsEngineeringLab Common to MECH, CSE, CHEM	ES	0-0-3	1.5
10.	20A10803	Environmental Science Common to EEE, ECE, CSE	MC	3-0-0	0.0
				Total	**19.5**

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Semester- III (Theory-5 ,Lab3)					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	20A35103	Discrete Mathematics & Graph Theory	BS	3-0-0	3
2.	20A30501	Digital Systems	PC/ES	3-0-0	3
3.	20A30502	Data Structures	PC/ES	3-0-0	3
4.	20A30503	OOPS through Java	PC/ES	3-0-0	3
5	20A39101A 20A39101B 20A39101C	Humanities Elective Common to EEE, ECE, CSE Managerial Economics And Financial Analysis Entrepreneurship & Incubation Business Ethics And Corporate Governance	HS	3-0-0	3
6	20A30504	Digital Systems Lab	PC/ES	0-0-3	1.5
7.	20A30505	Data Structures Lab	PC/ES	0-0-3	1.5
8.	20A30506	OOPS through Java Lab	PC/ES	0-0-3	1.5
9.	20A30507	Skill oriented Course – I IoT Using Python	SC	1-0-2	2
10	20A19101	Mandatory Course-II (Universal Human Values) Common to EEE, ECE, CSE	MC	3-0-0	0
11	20A39901	NSS/NCC/NSO Activities	-	0-0-2	0
				Total	**21.5**

Semester-IV (Theory- ,Lab)					
S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	20A45103	Probability and Statistical Methods	BS	3-0-0	3
2.	20A40501	Computer Organization	PC/ES	3-0-0	3
3.	20A40502	Database Management Systems	PC/ES	3-0-0	3
4.	20A40503	Operating Systems	PC/ES	3-0-0	3
5.	20A40504	Software Engineering	PC/ES	3-0-0	3
6.	20A40505	Database Management Systems Lab	PC/ES	0-0-3	1.5
7.	20A40506	Operating Systems Lab	PC/ES	0-0-3	1.5
8.	20A40507	Software Engineering Lab	PC/ES	0-0-3	1.5
9.	20A40508	Skill oriented Course – II Exploratory Data Analytics with R	SC	1-0-2	2
10	20A49102	Mandatory non-credit Course-III (Design Thinking for Innovation) Common to All Branches	MC	2-1-0	0
				Total	**21.5**
Community Service Internship/Project (Mandatory) for 6 weeks duration during Summer vacation					

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Semester-V					
S.No	**Code**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	20A50501	Formal Languages and Automata Theory	PC	3-0-0	3
2.	20A50502	Computer Networks	PC	3-0-0	3
3.	20A50503	Design and Analysis of Algorithms	PC	3-0-0	3
4.	20A50504a 20A50504b 20A50504c	ProfessionalElective-I 1. Introduction toAI 2. Object Oriented AnalysisDesign 3. OptimizationTechniques	PE	3-0-0	3
5.	20A50505	Open Elective - I (Each department offer one course including Mathematics, Physics, Chemistry and HSS) (Common to All Branches) 1. Introduction to Java Programming	OE	3-0-0	3
6.	20A50506	Computer Networks Lab	PC	0-0-3	1.5
7.	20A50507	Design and Analysis of Algorithms Lab	PC	0-0-3	1.5
8.		Skill Advanced Course-I Soft Skills	SC	1-0-2	2
9.	20A50508	Evaluation of Community Service Project			1.5
10.	20A59901	Mandatory non-credit Course - IV Intellectual property Rights Common to EEE, ECE, CSE	MC	2-0-0	0
				Total	**21.5**

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Semester-VI					
S.No	**Code**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	20A60501	Compiler Design	PC	3-0-0	3
2.	20A60502	Machine Learning	PC	3-0-0	3
3.	20A60503	Cryptography & Network Security	PC	3-0-0	3
4.	20A60504a 20A60504b 20A60504c	Professional Elective-II 1. Softwaretesting 2. Fundamentals of AR/VR 3. Image and VideoProcessing	PE	3-0-0	3
5.	20A60505	Open Elective - II (Each department offer one course including Mathematics, Physics, Chemistry and HSS) (Common to All Branches) 1. Introduction to Linux Programming	OE	3-0-0	3
6.	20A60506	Cryptography & Network Security Lab	PC	0-0-3	1.5
7.	20A60507	Professional Elective-II Lab	PC	0-0-3	1.5
8.	20A60508	Machine Learning Lab	PC	0-0-3	1.5
9.	20A60509	Skill Oriented Course-IV Full stack Development	SC	1-0-2	2
10.	20A65901	Mandatory non-credit Course - V Indian Constitution	MC	2-0-0	0
				Total	**21.5**
Industry Internship (Mandatory) for 6 - 8 weeks duration during summer vacation					

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Semester-VII					
S.No	**Code**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	20A70501a 20A70501b 20A70501c	Professional Elective-III 1. AgileMethodologies 2. CloudComputing 3. PatternRecognition	PE	3-0-0	3
2.	20A70502a 20A70502b 20A70502c	Professional Elective-IV 1. DevOps 2. Advance NetworkTechnologies 3. DesignPatterns	PE	3-0-0	3
3.	20A70503a 20A70503b 20A70503c	Professional Elective-V(MOOC) 1. DeepLearning 2. Block Chain Technology andApplications 3. Natural Language Processing	PE	3-0-0	3
4.	20A70504	Open Elective - III (Each department offer one course including Mathematics, Physics, Chemistry and HSS) 1. CyberSecurity (Common to All Branches)	OE	3-0-0	3
5.	20A70505	Open Elective - IV (Each department offer one course including Mathematics, Physics, Chemistry and HSS) (Common to All Branches) 1. Introduction to DBMS	OE	3-0-0	3
6.	20A75401a 20A75401b 20A75401c	Humanities Elective((Common to All Branches) 1. Managementscience 2. Businessenvironment 3. Organizationalbehaviour	HS	3-0-0	3
7.	20A70506	Skill Oriented Course-V Mobile Application Development	SC	1-0-2	2
		Summer Internship Evaluation	20A70507	-	3
				Total	**23**

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B.Tech. Course Structure (R20)

Semester-VIII					
S.No	**Code**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	20A80501	Full Internship & Project work	PR	-	12
				Total	**12**

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DEPARTMENT COMPUTER SCIENCE AND ENGINEERING
B.Tech. Course Structure (R20)

HONOUR DEGREE IN COMPUTER SCIENCE AND ENGINEERING

S.No.	Course Code	Course Name	Contact Hours per week		Credits
			L	T	
1	20A05H11	Edge and Fog Computing	3	1	4
2	20A05H12	Quantum Computing	3	1	4
3	20A05H13	Introduction to Autonomous Navigation Systems	3	1	4
4	20A05H14	Reinforcement Learning	3	1	4
SUGGESTED MOOCs					
5	20A05H15a	MOOC I*	--	--	2
6	20A05H16a	MOOC II*	--	--	2

**** Based on the availability of courses offered by NPTEL SWAYAM with a minimum of 12 weeks duration.**

Minor Degree In COMPUTER SCIENCE AND ENGINEERING

S.No.	Course Code	Course Title	Contact Hours per week			Credits
			L	T	P	
1.	20A05M11	Introduction to Data Science	3	1	0	4
2.	20A05M12	Introduction to AI & ML	3	1	0	4
3.	20A05M13	Data Analytics using Python	3	1	0	4
4.	20A05M14	Software Project Management	3	1	0	4
5.	20A05M15a	MOOC I* DAA				2
6.	20A05M16a	MOOC II* Deep Learning				2

**** Based on the availability of courses offered by NPTEL SWAYAM with a minimum of 12 weeks duration.**

COMPUTER SCIENCE AND ENGINEERING

		Open Elective Course – I*				
S.No.	**Course Code**	**Course Name**	**L**	**T**	**P**	**Credits**
1.	20A50105	Experimental Stress Analysis	3	0	0	3
2.	20A50205	Electric Vehicle Engineering	3	0	0	3
3.	20A50305	Optimization Techniques	3	0	0	3
4.	20A50405	Basics of Electronics and Communication	3	0	0	3
5.	20A50505	Introduction to Java Programming	3	0	0	3
6.	20A50805	Energy Conversion and Storage Devices	3	0	0	3
7.	20A55101	Optimization Methods (Mathematics)	3	0	0	3
8.	20A55201	Material Characterization Techniques(Physics)	3	0	0	3
9.	20A55401	E-Business (H & SS)	3	0	0	3
10.	20A55301	Chemistry Of Energy Materials (Chemistry)	3	0	0	3

***It is mandatory that the candidate should select any subject other than parent branch subject.**

		Open Elective Course – II				
S.No.	**Course Code**	**Course Name**	**L**	**T**	**P**	**Credits**
1.	20A60105	Disaster Management(CIVIL)	3	0	0	3
2.	20A60205	Renewable Energy Systems(EEE)	3	0	0	3
3.	20A60305	Solar Energy Systems(MECH)	3	0	0	3
4.	20A60405	Basics of Integrated Circuits Applications(ECE)	3	0	0	3
5.	20A60505	Introduction to Linux Programming (CSE) (CSE)	3	0	0	3
6.	20A60805	Green Technology(CHEM)	3	0	0	3
7.	20A65101	Mathematical Modelling & Simulation (Common for CIVIL,MECH &CHEM)(Mathemtics)	3	0	0	3
8.	20A65102	Wavelet transforms and its Applications (Common for EEE&ECE) (Mathemtics)	3	0	0	3
9.	20A65103	Statistical Methods for Data Science CSE (Data Science) (Mathemtics)	3	0	0	3
10.	20A65201	Physics Of Electronic Materials And Devices (Physics)	3	0	0	3
11.	20A65501	Academic Writing and Public Speaking(H & SS)	3	0	0	3
12.	20A65301	Chemistry Of Polymers And Its Applications (Chemistry)	3	0	0	3

***It is mandatory that the candidate should select any subject other than parent branch subject.**

COMPUTER SCIENCE AND ENGINEERING

		Open Elective Course – III*				
S.No.	**Course Code**	**Course Name**	**L**	**T**	**P**	**Credits**
1.	20A70103	Building Technology for Engineers (CIVIL)	3	0	0	3
2.	20A70204	Battery Management Systems (EEE)	3	0	0	3
3.	20A70304	Modern Manufacturing Methods (MECH)	3	0	0	3
4.	20A70404	Digital Electronics (ECE)	3	0	0	3
5.	20A70504	CyberSecurity (CSE)	3	0	0	3
6.	20A70804	Industrial Pollution Control Engineering (CHEM)	3	0	0	3
7.	20A75101	Numerical Methods for Engineers	3	0	0	3
8.	20A75201	SMART MATERIALS AND DEVICES (Physics)	**3**	**0**	**0**	**3**
9.	20A75501	Employability Skills (H&SS)	**3**	**0**	**0**	**3**
10.	20A75301	GREEN CHEMISTRY AND CATALYSIS FOR SUSTAINABLE ENVIRONMENT (Chemistry)	**3**	**0**	**0**	**3**

***It is mandatory that the candidate should select any subject other than parent branch subject.**

		Open Elective Course – IV*				
S.No.	**Course Code**	**Course Name**	**L**	**T**	**P**	**Credits**
1.	20A70104	Environmental Impact and Assessment (CIVIL)	3	0	0	3
2.	20A70205	IOT Applications in Electrical Engineering (EEE)	3	0	0	3
3.	20A70305	Material Handling Equipment (MECH)	3	0	0	3
4.	20A70405	Principles of Digital Signal Processing (ECE)	3	0	0	3
5.	20A70505	Introduction to DBMS (CSE)	3	0	0	3
6.	20A70805	Solid Waste management (CHEM)	3	0	0	3
7.	20A75102	Number theory and its Applications (Mathemtics)	3	0	0	3
8.	20A75202	Sensors and Actuators For Engineering Applications (Physics)	**3**	**0**	**0**	**3**
9.	20A79102	English Literary Spectrum (H & Ss)	**3**	**0**	**0**	**3**
10.	20A75302	Chemistry Of Nanomaterials And Applications (Chemistry)	**3**	**0**	**0**	**3**

***It is mandatory that the candidate should select any subject other than parent branch subject.**

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
LINEAR ALGEBRA AND CALCULUS
Common to All Branches of Engineering

Course Code: 20A15101 Semester I(R20) L T P C: 3 0 0 3

Course Objectives:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

Course Outcomes:

CO1: develop the use of matrix algebra techniques that is needed by engineers for practical applications

CO2: Utilize mean value theorems to real life problems.

CO3: familiarize with functions of several variables which is useful in optimization.

CO4: Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems

CO5: Students will become familiar with 3- dimensional coordinate systems and also learn the Utilization of special functions.

UNIT- I: Matrices

Rank of a matrix by echelon form, normal form. Solving system of homogeneous and non-homogeneous equations linear equations. Eigenvalues and Eigenvectors and their properties, Properties of Eigen values and Eigen vectors on special matrices, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, diagonalization of a matrix.

UNIT – II: Mean Value Theorems

Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), related problems.

UNIT – III: Multivariable calculus

Partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

UNIT – IV: Multiple Integrals

Double integrals, change of order of integration, change of variables. Evaluation of triple integrals, change of variables between Cartesian, cylindrical and spherical polar co-ordinates. Finding areas and volumes using double and triple integrals.

UNIT – V: Beta and Gamma functions

Beta and Gamma functions and their properties, relation between beta and gamma functions, evaluation of definite integrals using beta and gamma functions.

Textbooks:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.

Reference Books:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 201.
4. Micheael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson edn
5. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press
6. Peter O'neil, Advanced Engineering Mathematics, Cengage Learning.
7. R.L. Garg Nishu Gupta, Engineering Mathematics Volumes-I &II, Pearson Education
8. B. V. Ramana, Higher Engineering Mathematics, Mc Graw Hill Education
9. H. k Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand.
10. N. Bali, M. Goyal, C. Watkins, Advanced Engineering Mathematics, Infinity Science Press.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
APPLIED PHYSICS
Common to EEE, ECE& CSE

Course Code: 20A15201 Semester – I(R20) L T P C: 3 0 0 3

Course Objectives:

- To make a bridge between the physics in school and engineering courses.
- To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
- To understand the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications, study of propagation of light wave through optical fibres along with engineering applications.
- To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
- To enlighten the concepts of Quantum Mechanics and to provide fundamentals of de'Broglie waves, quantum mechanical wave equation and its applications, the importance of free electron theory and band theory of solids.
- Evolution of band theory to distinguish materials, basic concepts and transport phenomenon of charge carriers in semiconductors. To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications.

Course Outcomes:

CO1: Study the different realms of physics and their applications in both scientific technological Systems through physical optics.

CO2: Identify the wave properties of light and the interaction of energy with the matter.

CO3: Asses the electromagnetic wave propagation and its power in different media.

CO4: Understands the response of dielectric and magnetic materials to the applied electric and Magnetic fields.

CO5: Study the quantum mechanical picture of subatomic world along with the discrepancies between the classical estimates and laboratory observations of electron transportation phenomena by free electron theory and band theory.

CO6: Elaborate the physical properties exhibited by materials through the understanding of Properties of semiconductors and superconductors.

UNIT – I: Wave Optics

Interference-Principle of superposition –Interference of light – Conditions for sustained interference- Interference in thin films (Reflection Geometry)– Colors in thin films –Newton's Rings–Determination of wavelength and refractive index.

Diffraction-Introduction–Fresnel and Fraunhofer diffraction–Fraunhofer diffraction due to single slit, double slit and N-slits (qualitative) – Grating spectrum.

Polarization-Introduction–Types of polarization–Polarization by reflection, refraction and double refraction - Nicol's Prism -Half wave and Quarter wave plateswith applications.

UNIT – II: Lasers and Fiber Optics

Lasers-Introduction – Characteristics of laser – Spontaneous and Stimulated emission of radiation – Einstein's coefficients – Population inversion – Lasing action–Pumping mechanisms – Nd-YAG laser – He-Ne laser – Applications of lasers.

Fiber optics-Introduction –Principle of optical fiber–Acceptance Angle–Numerical Aperture–Classification of optical fibers based on refractive index profile and modes –Propagation of electromagnetic wave through optical fibers – Fiber optic communication system – Losses in optical fibers –Applications.

UNIT – III: Dielectric and Magnetic Materials

Dielectric Materials-Introduction –Dielectric polarization– Dielectric polarizability, Susceptibility and Dielectric constant –Types of polarizations: Orientation polarization (Qualitative), Electronic and Ionic polarization – Lorentz internal field –Clausius-Mossotti equation– Dielectric breakdown - Dielectric Loss – Piezoelectricity and Ferro electricity.

Magnetic Materials-Introduction – Magnetic dipole moment – Magnetization –Magnetic susceptibility and Permeability–Origin of permanent magnetic moment –Classification of magnetic materials: Dia, Para, Ferro, Ferri&Antiferro–Domain concept of Ferromagnetism (Qualitative) – Hysteresis –Soft and Hard magnetic materials.

UNIT – IV: Quantum Mechanics, Free Electron Theory andBand theory of Solids

Quantum Mechanics- Dual nature of matter – Schrodinger's time independent and dependent wave equation – Significance of wave function – Particle in a one-dimensional infinite potential well.

Free Electron Theory-Classical free electron theory– Quantum free electron theory– Equation for electrical conductivity based on quantum free electron theory – Origin of resistance –Fermi-Dirac distribution–Density of states–Fermi energy.

Band theory of Solids- Bloch's Theorem (Qualitative)–Kronig-Penney model (Qualitative) –E vs K diagram – Classification of crystalline solids –Effective mass of electron –m^* vs K diagram – Concept of hole.

UNIT – V: Semiconductors and Super Conductors

Semiconductors- Introduction–Intrinsic semiconductors –Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors – Density of charge carriers – Dependence of Fermi energy on carrier concentration and temperature–Drift and diffusion currents – Einstein's equation–Direct and indirect band gap semiconductors–Hall effect – Hall coefficient – Applications of Hall effect.

Superconductors- Introduction – Properties of superconductors – Meissner effect– Type I and Type II superconductors – BCS theory –Josephson effects (AC and DC)– High T_c superconductors – Applications of superconductors.

Text books:

1. Engineering Physics by M.N.Avadhanulu, P.G. Kshirsagar& TVS Arun Murthy S.Chand Publications, 11th Edition 2019.
2. Engineering Physics" by D.K.Bhattacharya and Poonam Tandon, Oxford press (2018).
3. Applied Physics by P.K. Palanisamy ,SciTech publications (2018)

Reference Books:

1. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley &Sons, 11th Edition (2018)
2. Engineering Physics by M.R.Srinivasan, New Age international publishers (2014).
3. Engineering Physics – K. Thyagarajan, McGraw Hill Publishers (2018).
4. Engineering Physics by Shatendra Sharma, Jyotsna Sharma, Pearson Education (2018)
5. Engineering Physics by Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press (2016)
6. Semiconductor physics and devices- Basic principle – Donald A, Neamen, Mc Graw Hill (2014)
7. Engineering Physics by B.K. Pandey and S. Chaturvedi, Cengage Learning (2018)
8. University Physics by H.D. Young and R.A. Freedman, Pearson (2017)

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
COMMUNICATIVE ENGLISH
Common to EEE, ECE& CSE & CHEM

Course Code: 20A15501 **Semester – I(R20)** **L T P C: 3 0 0 3**

Course Objectives:

- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers.
- Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials.
- Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information.
- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing.

Course Outcomes:

CO1: Retrieve the knowledge of basic grammatical concepts.
CO2: Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
CO3: Apply grammatical structures to formulate sentences and correct word forms
CO4: Analyze discourse markers to speak clearly on a specific topic in informal discussions
CO5: Evaluate reading/listening texts and to write summaries based on global comprehension of these texts.
CO6: Create a coherent paragraph interpreting a figure/graph/chart/table

UNIT – I: On the conduct of life: William Hazlitt

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions. **Speaking:** Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others. **Reading:** Skimming to get the main idea of a text; scanning to look for specific pieces of information. **Reading for Writing :**Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph. **Grammar and Vocabulary:** Parts of Speech, Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countable and uncountable; singular and plural; basic sentence structures; simple question form - wh-questions; word order in sentences.

UNIT – 2: The Brook: Alfred Tennyson

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts. **Speaking:** Discussion in pairs/small groups on specific topics followed by short structured talks. **Reading:** Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together. **Writing:** Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writing - punctuation, capital letters. **Grammar and Vocabulary:** Cohesive devices - linkers, sign posts and transition signals; use of articles and zero article; prepositions.

UNIT – 3: The Death Trap: Saki

Listening: Listening for global comprehension and summarizing what is listened to. **Speaking:** Discussing specific topics in pairs or small groups and reporting what is discussed **Reading:** Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.**Writing:** Summarizing, Paragraph Writing **Grammar and Vocabulary:** Verbs - tenses; subject-verb agreement; direct and indirect speech, reporting verbs for academic purposes.

UNIT – 4: Innovation: Muhammad Yunus

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video. **Speaking:** Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. **Reading:** Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data. **Writing:** Letter Writing: Official Letters/Report Writing **Grammar and Vocabulary:** Quantifying expressions - adjectives and adverbs; comparing and contrasting; Voice - Active & Passive Voice

UNIT – 5: Politics and the English Language: George Orwell

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension. **Speaking:** Formal oral presentations on topics from academic contexts - without the use of PPT slides. **Reading:** Reading for comprehension. **Writing:** Writing structured essays on specific topics using suitable claims and evidences. **Grammar and**

Vocabulary: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Text books:

1. Language and Life: A Skills Approach- I Edition 2019, Orient Black Swan

Reference Books:

- Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
- Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
- Raymond Murphy's *English Grammar in Use*Fourth Edition (2012) E-book
- Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.
- Oxford Learners Dictionary, 12th Edition, 2011

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
PROBLEM SOLVING AND C PROGRAMMING

Course Code: 20A10501 **Semester – I (R20)** **L T P C: 3 0 0 3**

Course Objectives:

- Introduce the internal parts of a computer, and peripherals.
- Introduce the Concept of Algorithm and use it to solve computational problems
- Identify the computational and non-computational problems
- Teach the syntax and semantics of a C Programming language
- Demonstrate the use of Control structures of C Programming language
- Illustrate the methodology for solving Computational problems

Course Outcomes:

CO1: Assemble a computer using parts
CO2: Recognize the importance of programming language independent constructs
CO3: Solve computational problems
CO4: Select the features of C language appropriate for solving a problem
CO5: Design computer programs for real world problems
CO6: Organize the data which is more appropriated for solving a problem

UNIT – I:

Computer Fundamentals: What is a Computer, Evolution of Computers, Generations of Computers, Classification of Computers, Anatomy of a Computer, Memory revisited Operational overview of a CPU.

Introduction to Programming, Algorithms and Flowcharts: Programs and Programming, Programming languages, Compiler, Interpreter, Loader, Linker, Program execution, Fourth generation languages, Fifth generation languages, Classification of Programming languages, Structured programming concept, Algorithms, Pseudo-code, Flowcharts.

UNIT – II:

Introduction to computer problem solving: Introduction, the problem-solving aspect, top-down design.

Fundamental algorithms: Exchanging the values of two variables, counting, summation of a set of numbers, factorial computation, sine function computation, generation of the Fibonacci sequence, reversing the digits of an integer.

UNIT – III:

Types, Operators, and Expressions: Variable names, data types and sizes, constants, declarations, arithmetic operators, relational and logical operators, type conversions, increment and decrement operators, bitwise operators, assignment operators and expressions, conditional expressions precedence and order of evaluation.

Input and output: standard input and output, formatted output-Printf, formatted input-Scanf.

Control Flow: Statements and blocks, if-else, else-if, switch, Loops-while and for, Loops-Do-while, break and continue, Goto and labels.

Functions and Program Structure: Basics of functions, functions returning non-integers, external variables. Scope rules, Header files, Static Variables.

UNIT – IV:

Factoring methods: Finding the square root of a number, the smallest divisor of a number, the greatest common divisor of two integers.

Pointers and arrays: Pointers and addresses, pointers and function arguments, pointers and arrays, address arithmetic, character pointers and functions, pointer array; pointers to pointers, Multi-dimensional arrays, initialization of arrays, pointer vs. multi-dimensional arrays, command line arguments, pointers to functions.

Array Techniques: Array order reversal, finding the maximum number in a set, removal of duplicates from an order array, finding the k^{th} smallest element**.**

UNIT – V:

Sorting and Searching: Sorting by selection, sorting by exchange, sorting by insertion, sorting by partitioning, binary search.

Structures: Basics of structures, structures and functions, arrays of structures, pointers to structures, self-referential structures, typedef, unions, bit-fields.

File in C: Introduction, Using Files in C, Working with Text Files, Working with Binary Files, Direct File Input and Output, Files of records.

Text books:

1. Pradip Dey, and Manas Ghosh, “Programming in C”, 2018, Oxford University Press.
2. R.G. Dromey, “How to Solve it by Computer”. 2014, Pearson.
3. Brian W. Kernighan, and Dennis M. Ritchie, “The C Programming Language”, 2nd Edition, Pearson.

Reference books:

- P.Chenna Reddy, “ Computer Fundamentals and C Programming” 2018, BS Publications
- RS Bichkar“ Programming with C”, 2012, Universities Press.
- Pelin Aksoy, and Laura Denardis, “Information Technology in Theory”, 2017, Cengage Learning.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
ENGINEERING DRAWING
Common to EEE, ECE& CSE

Course Code: 20A10301 **Semester – I(R20)** **L T P C: 1 0 2 2**

Course Objectives:

- Bring awareness that Engineering Drawing is the Language ofEngineers
- Familiarize how industry communicates technicalinformation
- Teach the practices for accuracy and clarity in presenting the technical information
- Develop the engineering imagination essential for successfuldesign

Course Outcomes:

- Draw various curves applied in engineering
- Plot the projection of points, Lines and planes
- Draw the projections of solids inclined to one or both planes
- Draw the sectional view and true shape of the regular solids
- Draw the development of surfaces of solids

UNIT – I:

Introduction to Engineering Drawing: Principles of Engineering Drawing andits significance-Conventions in drawing-lettering - BIS conventions.

a)Conic sections including the rectangular hyperbola- general methodonly,
b) Cycloid, epicycloids andhypocycloid
c) Involutes

UNIT – II:
Projection of points, lines and planes: Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surfaces.

UNIT – III:
Projections of solids: Projections of regular solids inclined to one or both planes by rotational or auxiliaryviewsmethod.

UNIT – IV:
Sections of solids: Section planes and sectional view of right regular solids- prism, cylinder, pyramid and cone. True shapes of the sections.

UNIT – V:
Development of surfaces: Development of surfaces of right regular solids-prism, cylinder, pyramid, cone and their sectional parts

Text books:

1. K.L.Narayana&P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.
2. N.D.Bhatt, Engineering Drawing, 53/e, Charotar Publishers,2016

Reference Books:

- Dr K.Prahlada Rao, Dr. S. Krishnaiah, Prof.A.V.S. Prasad, Engineering Graphics, Amaravati publications.
- Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, Copy Right,2009
- Venugopal, Engineering Drawing and Graphics, 3/e, New Age Publishers,2000
- Shah and Rana, Engineering Drawing, 2/e, Pearson Education,2009
- K.C.John, Engineering Graphics, 2/e, PHI,2013
- Basant Agarwal &C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
ENGINEERING GRAPHICS LAB
Common to EEE, ECE& CSE

Course Code: 20A10302 Semester – (R20) L T P C: 0 0 2 1

Course Objectives:

- Instruct the utility of drafting & modelling packages in orthographic and isometric drawings
- Instruct graphical representation of machinecomponents

UNIT: Computer Aided Drafting

Introduction to Geometric Modeling: Basic drawing and editing commands: line, circle, rectangle, erase, view, undo, redo, snap, object editing, moving, copying, rotating, scaling, mirroring, layers, templates, polylines, trimming, extending, stretching, fillets,arrays,dimensions.

Dimensioning principles and conventional representations**.**

Orthographic Projections: Systems of projections, conventions and application to orthographic projections - simple objects.

Isometric Projections: Principles of isometric projection- Isometric scale; Isometric views: lines, planes, simple solids.

Text books:

1. K. Venugopal, V.Prabhu Raja, Engineering Drawing + Auto Cad, New Age International Publishers.
2. Kulkarni D.M, AP Rastogi and AK Sarkar, Engineering Graphics with Auto Cad, PHI Learning, Eastern Economy editions.

Reference Books:

- T. Jayapoovan, Engineering Graphics using Auto Cad, Vikas Publishing House
- K.L.Narayana&P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.
- Linkan Sagar, BPB Publications, Auto Cad 2018 Training Guide.
- K.C.John, Engineering Graphics, 2/e, PHI,2013
- Basant Agarwal &C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
APPLIED PHYSICS LAB
Common to EEE, ECE& CSE

Course Code: 20A15202 Semester – I(R20) L T P C: 0 0 3 1.5

Course Objectives:

- Understands the concepts of interference, diffraction and their applications.
- Understand the role of optical fiber parameters in communication.
- Recognize the importance of energy gap in the study of conductivity and Hall Effectin a semiconductor.
- Illustrates the magnetic and dielectric materials applications.
- Apply the principles of semiconductors in various electronic devices.

Course Outcomes:

- Operate optical instruments like microscope and spectrometer
- Determine thickness of a hair/paper with the concept of interference
- Estimate the wavelength of different colors using diffraction grating and resolving power
- Plot the intensity of the magnetic field of circular coil carrying current with distance
- Evaluate the acceptance angle of an optical fiber and numerical aperture
- Determine the resistivity of the given semiconductor using four probe method
- Identify the type of semiconductor i.e., n-type or p-type using hall effect
- Calculate the band gap of a given semiconductor

List of experiments:

1. Determination of the thickness of the wire using wedge shape method
2. Determination of the radius of curvature of the lens by Newton's ring method
3. Determination of wavelength by plane diffraction grating method
4. Determination of dispersive power of prism
5. Determination of wavelength of LASER source using diffraction grating
6. Determination of particle size using LASER
7. To determine the numerical aperture of a given optical fiber and hence to find its acceptance angle
8. Determination of dielectric constant by charging and discharging method
9. Magnetic field along the axis of a circular coil carrying current –Stewart Gee's method
10. Measurement of magnetic susceptibility by Gouy's method
11. Study the variation of B versus H by magnetizing the magnetic material (B-H curve)
12. To determine the resistivity of semiconductor by Four probe method
13. To determine the energy gap of a semiconductor
14. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall Effect
15. Measurement of temperature coefficient of resistance using thermostat

References:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- SChand Publishers, 2017
2. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering

COMMUNICATIVE ENGLISH LAB

Common to EEE, ECE& CSE& CHEM

Course Code: 20A15502 Semester – I(R20) L T P C: 0 0 3 1.5

Course Objectives:

- students will be exposed to a variety of self instructional, learner friendly modes of language learning
- students will learn better pronunciation through stress, intonation and rhythm
- students will be trained to use language effectively to face interviews, group discussions, public speaking
- students will be initiated into greater use of the computer in resume preparation, report writing, format making etc

Course Outcomes

- Listening and repeating the sounds of English Language
- Understand the different aspects of the English language
- proficiency with emphasis on LSRW skills
- Apply communication skills through various language learning activities Analyze the English speech sounds, stress, rhythm, intonation and syllable Division for better listening and speaking comprehension.
- Evaluate and exhibit acceptable etiquette essential in social and professional settings Create awareness on mother tongue influence and neutralize it in order to Improve fluency in spoken English.

List of Topics

1. Phonetics
2. Reading comprehension
3. Describing objects/places/persons
4. Role Play or Conversational Practice
5. JAM
6. Etiquettes of Telephonic Communication
7. Information Transfer
8. Note Making and Note Taking **9.**E-mail Writing
10. Group Discussions-1
11. Resume Writing
12. Debates
13. Oral Presentations
14. Poster Presentation
15. Interview Skills-1

Suggested Software

Orel, Walden Infotech, Young India Films

Reference Books

1. Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014.
2. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
3. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
4. Hewings, Martin. Cambridge Academic English (B2). CUP, 2012.
5. A Textbook of English Phonetics for Indian Students by T.Balasubramanyam

Web Links:

www.esl-lab.comwww.englishmedialab.com
www.englishinteractive.net

JNTUA College of Engineering (Autonomous), Ananthapuramu

Department of Computer Science & Engineering

PROBLEM SOLVING AND C PROGRAMMING LAB

Course Code: 20A10502 Semester – I(R20) L T P C: 0 0 3 1.5

Course Objectives:

Course Outcomes:

1. Construct a computer given its parts (L6)

2. Select the right control structure for solving the problem (L6)
3. Analyze different sorting algorithms (L4)
4. Design solutions for computational problems (L6)
5. Develop C programs which utilize the memory efficiently using programming constructs like pointers.

List of experiments:

1. Assemble and disassemble parts of a Computer
2. Design a C program which reverses the number
3. Design a C program which finds the second maximum number among the given list of numbers.
4. Construct a program which finds the kth smallest number among the given list of numbers.
5. Design an algorithm and implement using C language the following exchanges

   $a \leftarrow b \leftarrow c \leftarrow d$

6. Develop a C Program which counts the number of positive and negative numbers separately and also compute the sum of them.

7. Implement the C program which computes the sum of the first n terms of the series

   Sum = 1 – 3 + 5 -7 + 9

8. Design a C program which determines the numbers whose factorial values are between 5000 and 32565.

9. Design an algorithm and implement using a C program which finds the sum of the infinite series

   $1 - x^2/2! + x^4/4! - x^6/6! + ...$

10 Design a C program to print the sequence of numbers in which each number is the sum of the three most recent predecessors. Assume first three numbers as 0, 1, and 1.

11. Implement a C program which converts a hexadecimal, octal and binary number to decimal number and vice versa.

12. Develop an algorithm which computes the all the factors between 1 to 100 for a given number and implement it using C.

13. Construct an algorithm which computes the sum of the factorials of numbers between m and n.

14. Design a C program which reverses the elements of the array.

15. Given a list of n numbers, Design an algorithm which prints the number of stars equivalent to the value of the number. The starts for each number should be printed horizontally.

16. Implement the sorting algorithms a. Insertion sort b. Exchange sort c. Selection sort d.. Partitioning sort.

17. Illustrate the use of auto, static, register and external variables.

18. Design algorithm and implement the operations creation, insertion, deletion, traversing on a singly linked list.

19. Develop a C program which takes two numbers as command line arguments and finds all the common factors of those two numbers.

20. Design a C program which sorts the strings using array of pointers.

21. File operations

22. Indexing of a file

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
DIFFERENTIAL EQUATIONS AND TRANSFORMATIONS

Course Code: 20A15102 Semester – II(R20) L T P C: 3 0 0 3

Course Objectives:

1) To enlighten the learners in the concept of differential equations and multivariable calculus.
2) To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real-world applications.

Course Outcomes:

UNIT – I: Linear differential equations of higher order (Constant Coefficients)

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskian, method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Mass spring system.

UNIT – II: Partial Differential Equations

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order equations using Lagrange's methodand non-linear PDEs (Standard Forms)

UNIT – III: Applications of Partial Differential Equations

Classification of PDE, method of separation of variables for second order equations. Applications of Partial Differential Equations: One dimensional Wave equation, One dimensional Heat equation.

UNIT – IV: Laplace Transforms

Definition-Laplace transform of standard functions-existence of Laplace Transform – Inverse transform – First shifting Theorem, Transforms of derivatives and integrals – Unit step function – Second shifting theorem – Dirac's delta function – Convolution theorem – Laplace transform of Periodic function. Differentiation and integration of transform – solving Initial value problems to ordinary differential equations with constant coefficients using Laplace transforms.

Fourier Series: Determination of Fourier coefficients (Euler's) – Dirichlet conditions for the existence of Fourier series – functions having discontinuity-Fourier series of Even and odd functions – Fourier series in an arbitrary interval – Half-range Fourier sine and cosine expansions-typical wave forms - Parseval's formula- Complex form of Fourier series.

UNIT – V: Fourier transforms & Z Transforms

Fourier integral theorem (without proof) – Fourier sine and cosine integrals-complex form of Fourier integral. Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – convolution theorem.

Z-transform – Inverse z-transform – Properties – Damping rule – Shifting rule – Initial and final value theorems. Convolution theorem – Solution of difference equations by z-transforms

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
CHEMISTRY

Common to EEE, ECE& CSE

Course Code: 20A15303 **Semester – II(R20)** **L T P C: 3 0 0 3**

Course Objectives:

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers
- To introduce instrumental methods, molecular machines and switches

Course Outcomes:

- Apply Schrodinger wave equation to hydrogen atom, Illustrate the molecular orbital energy level diagram of different molecular species, Explain the band theory of solids for conductors, semiconductors and insulators Discuss the magnetic behavior and colour of complexes.
- Explain splitting in octahedral and tetrahedral geometry of complexes Discuss the magnetic behaviour and colour of coordination compounds Explain the band theory of solids for conductors, semiconductors and insulators. Demonstrate the application of Fullerenes, carbon nano tubes and Graphines nanoparticles
- Apply Nernst equation for calculating electrode and cell potentials, Differentiate between pH metry, potentiometric and conductometric titrations, Explain the theory of construction of battery and fuel cells, Solve problems based on cell potential.
- Explain the different types of polymers and their applications, Explain the preparation, properties and applications of PVC, Bakelite Describe the mechanism of conduction in conducting polymers, Discuss Buna-S and Buna-N elastomers and their applications.
- Explain the different types of spectral series in electromagnetic spectrum, Understand the principles of different analytical instruments, Explain the different applications of analytical instruments.

UNIT – I: Structure and Bonding Models

Planck's quantum theory, dual nature of matter, Schrodinger equation, significance of Ψ and Ψ^2, applications to hydrogen, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of O_2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order.

UNIT – II: Modern Engineering Materials

i). Coordination compounds: Crystal field theory – salient features – splitting in octahedral and tetrahedral geometry. Properties of coordination compounds-Oxidation state, coordination, magnetic and colour.

ii). Semiconductor materials, super conductors- basic concept, band diagrams for conductors, semiconductors and insulators, Effect of doping on band structures.

iii). Nanochemistry: Introduction, classification of nanometerials, properties and applications of Fullerenes, carbonnanotubes and Graphenes nanoparticles

iv).Super capacitors: Introduction, Basic concept-Classification – Applications.

UNIT – III: Electrochemistry and Applications

Electrodes – concepts, reference electrodes (Calomel electrode, Ag/AgCl electrode and glass electrode); Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).
Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.
Primary cells – Zinc-air battery, Secondary cells – Nickel-Cadmium (Ni-Cad),and lithium ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygen, methanol fuel cells – working of the cells.

UNIT – IV: Polymer Chemistry
Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation.
Plastics - Thermoplastic and Thermosetting plastic, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres.
Elastomers–Buna-S, Buna-N–preparation, properties and applications.
Conducting polymers – polyacetylene, polyaniline, polypyrroles – mechanism of conduction and applications.

UNIT – V: Instrumental Methods and Applications
Electromagnetic spectrum. Absorption of radiation: Beer-Lambert’s law, Principle and applications of UV-Visibleand IR Spectroscopies. Solid-Liquid Chromatography–TLC, retention time and pH metry

Text books:

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins’ Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference Books:

1. G.V.Subba Reddy, K.N.Jayaveera and C. Ramachandraiah, Engineering Chemistry, Mc Graw Hill, 2020.
2. D. Lee, Concise Inorganic Chemistry, 5/e, Oxford University Press, 2008.
3. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
4. J.M.Lehn, Supra Molecular Chemistry, VCH Publications

Department of Computer Science & Engineering

PYTHON PROGRAMMING

Course Code:20A10503 Semester – II (R20) L T P C: 3 0 0 3

Course Objectives:

- To teach the fundamentals of Python
- To elucidate problem-solving using a Python programming language
- To introduce a function-oriented programming paradigm through python
- To train in the development of solutions using modular concepts
- To introduce the programming constructs of python

Course Outcomes:

1. Explain the features of Python language
2. Select appropriate data structure for solving a problem
3. Design object-oriented programs for solving real-world problems

UNIT – I:

Introduction: What is a program, Running python, Arithmetic operators, Value and Types. Variables, Assignments and Statements: Assignment statements, Script mode, Order of operations, string operations, comments.

Functions: Function calls, Math functions, Composition, Adding new Functions, Definitions and Uses, Flow of Execution, Parameters and Arguments, Variables and Parameters are local, Stack diagrams, Fruitful Functions and Void Functions, Why Functions.

UNIT – II:

Case study: The turtle module, Simple Repetition, Encapsulation, Generalization, Interface design, Refactoring, docstring.

Conditionals and Recursion: floor division and modulus, Boolean expressions, Logical operators, Conditional execution, Alternative execution, Chained conditionals, Nested conditionals, Recursion, Infinite Recursion, Keyboard input.

Fruitful Functions: Return values, Incremental development, Composition, Boolean functions, More recursion, Leap of Faith, Checking types.

UNIT – III:

Iteration: Reassignment, Updating variables, The while statement, Break, Square roots, Algorithms.

Strings: A string is a sequence, len, Traversal with a for loop, String slices, Strings are immutable, Searching, Looping and Counting, String methods, The in operator, String comparison.

Case Study: Reading word lists, Search, Looping with indices.

Lists: List is a sequence, Lists are mutable, Traversing a list, List operations, List slices, List methods, Map filter and reduce, Deleting elements, Lists and Strings, Objects and values, Aliasing, List arguments.

UNIT – IV:

Dictionaries: A dictionary is a mapping, Dictionary as a collection of counters, Looping and dictionaries, Reverse Lookup, Dictionaries and lists, Memos, Global Variables.

Tuples: Tuples are immutable, Tuple Assignment, Tuple as Return values, Variable-length argument tuples, Lists and tuples, Dictionaries and tuples, Sequences of sequences.

Files: Persistence, Reading and writing, Format operator, Filename and paths, Catching exceptions, Databases, Pickling, Pipes, Writing modules.

Classes and Objects: Programmer-defined types, Attributes, Instances as Return values, Objects are mutable, Copying.

Classes and Functions:

UNIT – V:

Classes and Functions: Time, Pure functions, Modifiers, Prototyping versus Planning

Classes and Methods: Object oriented features, Printing objects, The init method, The __str__method, Operator overloading, Type-based Dispatch, Polymorphism, Interface and Implementation

Inheritance: Card objects, Class attributes, Comparing cards, decks, Printing the Deck, Add Remove shuffle and sort, Inheritance, Class diagrams, Data encapsulation.

The Goodies: Conditional expressions, List comprehensions, Generator expressions, any and all, Sets, Counters, defaultdict, Named tuples, Gathering keyword Args.

Text book:

1. Allen B. Downey, "Think Python", 2nd edition, SPD/O'Reilly, 2016.

Reference Books:

1. Martin C.Brown, "The Complete Reference: Python", McGraw-Hill, 2018.
2. Kenneth A. Lambert, B.L. Juneja, "Fundamentals of Python", CENGAGE, 2015.
3. R. Nageswara Rao, "Core Python Programming", 2nd edition, Dreamtech Press, 2019

JNTUA College of Engineering (Autonomous), Ananthapuramu

Department of Computer Science & Engineering

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Part – A: Basic Electrical Engineering

Common to MECH, CSE, CHEM

I B.Tech – II Sem L T P 3 0 03

Course Objectives:

1. To introduce basics of electric circuits.
2. To teach DC and AC electrical circuit analysis.
3. To explain working principles of transformers and electrical machines.
4. To impart knowledge on Power system generation, transmission and distribution

Unit 1 DC & AC Circuits:

Electrical circuit elements (R - L and C) - Kirchhoff laws - Series and parallel connection of resistances with DC excitation. Superposition Theorem - Representation of sinusoidal waveforms - peak and rms values - phasor representation - real power - reactive power - apparent power - power factor - Analysis of single-phase ac circuits consisting of RL - RC - RLC series circuits, Resonance.

Learning Outcomes: Students should be able to

● recall Kirchoff laws
● analyze simple electric circuits with DC excitation
● apply network theorems to simple circuits
● analyze single phase AC circuits consisting of series RL - RC - RLC combinations

Unit 2 DC & AC Machines:

Principle and operation of DC Generator - EMF equations - OCC characteristics of DC generator – principle and operation of DC Motor – Torque equation – Analyze Performance Characteristics of DC Motor - Speed control of DC Motor – Principle and operation of Single Phase Transformer - OC and SC tests on transformer - Principle and operation of 3-phase AC machines [Elementary treatment only]

Learning Outcomes: Students should be able to

● explain principle and operation of DC Generator & Motor.
● perform speed control of DC Motor
● explain operation of transformer and induction motor.
● explain construction & working of induction motor - DC motor

Unit 3 Basics of Power Systems:

JNTUACEA EEE R20 w.e.f. 2020 Batch

1. 2. 3. 4.

Layout & operation of Hydro, Thermal, Nuclear Stations –Principle of operation of solar PV cell, characteristics of PV cell – Basic concept of wind power generation- Typical AC power supply scheme – Definition of short, medium and long transmission lines – Concepts of distribution system.

Learning Outcomes: Students should be able to
● understand working operation of various generating stations
● analyze the I-V characteristics solar PV cell

Text Books:
1. D. P. Kothari and I. J. Nagrath - “Basic Electrical Engineering” - Tata McGraw Hill - 2010.
2. V.K. Mehta & Rohit Mehta, “Principles of Power System” – S.Chand – 2018.

References:
1. L. S. Bobrow - “Fundamentals of Electrical Engineering” - Oxford University Press - 2011.
2. E. Hughes - “Electrical and Electronics Technology” - Pearson - 2010.
3. C.L. Wadhwa – “Generation Distribution and Utilization of Electrical Energy”, 3rd Edition, New Age International Publications.
Course Outcomes: The students should be able to
● apply concepts of KVL/KCL in solving DC circuits
● understand and choose correct rating of a transformer for a specific application
● illustrate working principles of DC Motor
● identify type of electrical machine based on their operation
● understand the basics of power generation, transmission **and distribution**

JNTUA COLLEGE OF ENGINEERING (Autonomous):: ANANTHAPURAMU
DEPARTMENT OF MECHANICAL ENGINEERING

I –Year B.Tech.II -Semester

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20A12401

BASIC ELECTRICAL & ELECTRONICS ENGINEERING

ELECTRONICS ENGINEERING
PART- B

COURSE OBJECTIVES	
The students will be able to	
	Understand principle and terminology of electronics.
	Analyse the characteristics of electronic devices and understand the working of basic circuits such as rectifiers, amplifiers, filters, oscillators.
	Understand the concept of Digital Logic
	Understand the Concept & Principles of Digital Logic

COURSE OUTCOMES	
At the end of this course the student will be able to	
CO1	Able to apply the knowledge of diodes, Zener diodes, BJT"s and FET"s for applications of different circuits.
CO2	Analyse the applications of operational amplifiers.
CO3	Solve problems of various digital logic gates and circuits.
CO4	Correlate the fundamental concepts to various Real life applications of today.

UNIT I
Diodes and Transistors: Semiconductor Diode, Zener Diode, Rectifier Circuits, Wave Shaping Circuits,Bipolar Junction Transistors(operating modes modes,Configurations and Charecteristics), Introduction to Transistor Biasing and Transistor as an amplifier, Introduction to Field-Effect Transistors (Configurations and characteristics).

UNIT II
Operational Amplifiers: Op-amp Equivalent Circuit, Ideal and practical Op-amp characteristics, Op-Amp Applications (Inverting amplifier, Non -inverting amplifier, Summing, scaling & averaging amplifiers, integrator, differentiator, Active filters, oscillators and comparators).

UNIT III

Digital Electronics: Number Systems and Codes, Logic Gates, Boolean Theorems, DeMogan‟s Theorems, Algebraic Simplification, Karnaugh Map Method. Binary Addition, 2‟s Complement System, Full Adder, BCD Adder. NAND and NOR gate Latches, S-R Flip-Flop, JK Flip-Flop, D Flip-Flop, Introduction to Shift registers and Counters

Text Books:

Boylested, R. L. and Nashelsky, L., Electronic Devices and Circuit Theory, Pearson Education

Ramakant A.Gayakwad, Op-Amps and Linear Integrated Circuits, Eastern Economy Edition

3.M.Morris Mano and Michael D.Ciletti, Digital Design, Pearson Education,4th Edition

References:

R. Muthusubramanian, S. Salivahanan, "Basic Electrical and Electronics Engineering", Tata McGraw-Hill Education.

Bell, D. A., Electronic Devices and Circuits, Oxford University Press

3.R.J. Tocci: Digital Systems; PHI, 6e, 2001.

JNTUA College of Engineering (Autonomous), Ananthapuramu

Department of Computer Science & Engineering

ENGINEERING WORKSHOP

Common to EEE, ECE, CSE

Course Code: 20A10303 **Semester – II(R20)** **L T P C: 0 0 2 1**

Course Objectives:

- To familiarize students with wood working, sheet metal operations, fitting and electrical house wiring skills

Course Outcomes:

- Apply wood working skills in real world applications.
- Build different objects with metal sheets in real world applications.
- Apply fitting operations in various applications.
- Apply different types of basic electric circuit connections.
- Use soldering and brazing techniques.

List of Topics

Wood Working:

Familiarity with different types of woods and tools used in wood working and make following joints

a)Half – Lap joint b) Mortise and Tenon joint c) Corner Dovetail joint or Bridle joint

Sheet Metal Working:

Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets

a) Tapered tray b) Conical funnel c) Elbow pipe d) Brazing

Fitting:

Familiarity with different types of tools used in fitting and do the following fitting exercises

a) V-fit b) Dovetail fit c) Semi-circular fit d) Bicycle tire puncture and change of two wheelertyre

Electrical Wiring:

Familiarities with different types of basic electrical circuits and make the following connections

a) Parallel and series b) Two way switch c) Godown lighting
d) Tube light e) Three phase motor f) Soldering of wires

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
CSE WORKSHOP
Common to EEE, ECE, CSE

Course Code: 20A10505 **Semester – II (R20)** **L T P C:0 0 4 2**

Course Objectives:

- To make the students know about the internal parts of a computer, assembling and dissembling a computer from the parts, preparing a computer for use by installing the operating system
- To provide technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations and LAteX
- To learn about Networking of computers and use Internet facility for Browsing and Searching
- To learn about Google Forms and Google Sites

Course Outcomes:

- Disassemble and Assemble a Personal Computer and prepare the computer ready to use.
- Prepare the Documents using Word processors and Prepare spread sheets forcalculations using excel and also the documents using LAteX.
- Prepare Slide presentations using the presentation tool.
- Interconnect two or more computers for information sharing.
- Access the Internet and Browse it to obtain the required information.

List of experiments:

Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2: Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods

Task 3: Install Operating system: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Task 4: **Operating system features**: Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

Networking and Internet

Task 5: Networking: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc. should be done by the student. The entire process has to be documented.

Task 6: Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail account and send email. They should get acquaintance with applications like Facebook, skype etc. If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, and search process using different natural languages, and creating e-mail account.

Task 7: Antivirus: Students should download freely available Antivirus software, install it and use it to check for threats to the computer being used. Students should submit information about the features of the antivirus used, installation process, about virus definitions, virus engine etc.

Productivity tools

Task 8: Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered, Image Manipulation tools.

Task 9: Presentations: creating, opening, saving and running the presentations, selecting the style for slides, formatting the slides with different fonts, colours, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show.

Task 10: Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet

Task 11: LateX: Introduction to Latex and its installation and different IDEs. Creating first document using Latex, using content into sections using article and book class of LaTeX. Styling Pages: reviewing and customizing different paper sizes and formats. Formatting text (styles, size, alignment, colors and adding bullets and numbered items, inserting mathematical symbols, and images, etc.). Creating basic tables, adding simple and dashed borders, merging rows and columns. Referencing and Indexing: cross-referencing (refer to sections, table, images), bibliography (references).

Task 12: Google Forms and Google Sites: Create a Google Form, Add Questions, Edit Questions, Preview and Send Form, Analyze Form Responses. Create a Website using Google Sites. Update, Share and Publish a website.
Sample Programs: Create a Feedback Survey form and download the Responses, Create Online Quiz and Analyze Responses, Create and Publish "Student Profile Website".

Task 13: Fundamentals of web programming: HTML, DHTML, and JAVA Script.

References:

1. Introduction to Computers, Peter Norton, McGraw Hill
2. MOS study guide for word, Excel, Powerpoint& Outlook Exams, Joan Lambert, Joyce Cox, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Networking your computers and devices, Rusen, PHI
5. Trouble shooting, Maintaining & Repairing PCs, Bigelows, TMH
6. Lamport L. LATEX: a document preparation system: user's guide and reference manual. Addison-wesley; 1994.
7. https://support.google.com/a/users/answer/9991170
8. https://support.google.com/a/users/answer/9282722

JNTUA College of Engineering (Autonomous), Ananthapuramu

Department of Computer Science & Engineering

PYTHON PROGRAMMING LAB

Course Code: 20A10504 **Semester – II(R20)** **L T P C: 0 0 3 1.5**

Course Objectives:

1. To train solving computational problems
2. To elucidate solving mathematical problems using Python programming language
3. To illustrate the features of Python language

Course Outcomes:

1. Design solutions to mathematical problems
2. Organize the data for solving the problem
3. Develop Python programs for numerical and text based problems
4. Select appropriate programming construct for solving the problems
5. Illustrate object-oriented concepts

Laboratory Experiments:

1. Install Python Interpreter and use it to perform different Mathematical Computations. Try to do all the operations present in a Scientific Calculator
2. Write a function that draws a grid like the following:

```
+ - - - -  + - - - - +
|          |         |
|          |         |
|          |         |
|          |         |
+ - - - -  + - - - - +
|          |         |
|          |         |
|          |         |
|          |         |
+ - - - - + - - - - +
```

3. Write a function that draws a Pyramid with # symbols

```
      #
    # # #
  # # # # #
# # # # # # #
```

.

.

.

Up to 15 hashes at the bottom

4. Using turtles concept draw a wheel of your choice
5. Write a program that draws Archimedean Spiral
6. The letters of the alphabet can be constructed from a moderate number of basic elements, like vertical and horizontal lines and a few curves. Design an alphabet that can be drawn with a minimal number of basic elements and then write functions that draw the letters. The alphabet can belong to any Natural language excluding English. You should consider at least Ten letters of the alphabet.
7. The time module provides a function, also named time that returns the current Greenwich Mean Time in “the epoch”, which is an arbitrary time used as a reference point. On UNIX systems, the epoch is 1 January 1970.

   ```
   >>> import time
   >>>time.time()
   1437746094.5735958
   ```

   Write a script that reads the current time and converts it to a time of day in hours, minutes, and seconds, plus the number of days since the epoch.
8. Given n+r+1 <= 2^r . n is the input and r is to be determined. Write a program which computes minimum value of r that satisfies the above.
9. Write a program that evaluates Ackermann function
10. The mathematician Srinivasa Ramanujan found an infinite series that can be used to generate a numerical approximation of 1/**π** :
11. Write a function called estimate_pi that uses this formula to compute and return an estimate of **π.**

$$\frac{1}{\pi} = \frac{2\sqrt{2}}{9801} \sum_{k=0}^{\infty} \frac{(4k)!(1103 + 26390k)}{(k!)^4 396^{4k}}$$

    It should use a while loop to compute terms of the summation until the last term is smaller than 1e-15 (which is Python notation for 10^{-15}). You can check the result by comparing it to math.pi.

12. Choose any five built-in string functions of C language. Implement them on your own in Python. You should not use string related Python built-in functions.

13. Given a text of characters. Write a program which counts number of vowels, consonants and special characters.
14. Given a word which is a string of characters. Given an integer say ‘n’. Rotate each character by ‘n’ positions and print it. Note that ‘n’ can be positive or negative.
15. Given rows of text, write it in the form of columns.
16. Given a page of text. Count the number of occurrences of each latter (Assume case insensitivity and don’t consider special characters). Draw a histogram to represent the same
17. Write program which performs the following operations on list’s. Don’t use built-in functions
    a) Updating elements of a list
    b) Concatenation of list’s
    c) Check for member in the list
    d) Insert into the list
    e) Sum the elements of the list
    f) Push and pop element of list
    g) Sorting of list
    h) Finding biggest and smallest elements in the list
    i) Finding common elements in the list

18. Write a program that reads a file, breaks each line into words, strips whitespace and punctuation from the words, and converts them to lowercase.

19. Go to Project Gutenberg (http://gutenberg.org) and download your favorite out-of-copyright book in plain text format. Read the book you downloaded, skip over the header information at the beginning of the file, and process the rest of the words as before. Then modify the program to count the total number of words in the book, and the number of times each word is used. Print the number of different words used in the book. Compare different books by different authors, written in different eras.

20. Go to Project Gutenberg (http://gutenberg.org) and download your favorite out-of-copyright book in plain text format. Write a program that allows you to replace words, insert words and delete words from the file.

21. Consider all the files on your PC. Write a program which checks for duplicate files in your PC and displays their location. Hint: If two files have the same checksum, they probably have the same contents.

22. Consider turtle object. Write functions to draw triangle, rectangle, polygon, circle and sphere. Use object oriented approach.

23. Write a program illustrating the object oriented features supported by Python.

24. Design a Python script using the Turtle graphics library to construct a turtle bar chart representing the grades obtained by N students read from a file categorising them into distinction, first class, second class, third class and failed.

25. Design a Python script to determine the difference in date for given two dates in YYYY:MM:DD format(0 <= YYYY <= 9999, 1 <= MM <= 12, 1 <= DD <= 31) following the leap year rules.

26. Design a Python Script to determine the time difference between two given times in HH:MM:SS format.(0 <= HH <= 23, 0 <= MM <= 59, 0 <= SS <= 59)

Reference Books:

1. Peter Wentworth, Jeffrey Elkner, Allen B. Downey and Chris Meyers, "How to Think Like a Computer Scientist: Learning with Python 3", 3rd edition, Available at http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf
2. Paul Barry, "Head First Python a Brain Friendly Guide" 2nd Edition, O'Reilly, 2016
3. DainelY.Chen "Pandas for Everyone Python Data Analysis" Pearson Education, 2019

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
CHEMISTRY LAB
Common to EEE, ECE, CSE

Course Code: 20A15304 Semester – II (R20) L T P C: 0 0 3 1.5

Course Objectives:

- Verify fundamentals concepts with experiments

Course Outcomes:

- determine the cell constant and conductance of solutions
- prepare advanced polymer materials
- determine the physical properties like surface tension, adsorption and viscosity
- estimate the Iron and Calcium in cement
- calculate the hardness of water

List of Experiments:

1. Conductometric titration of strong acid vs. strong base
2. Conductometric titration of weak acid vs. strong base
3. Estimation of Ferrous Iron by Dichrometry.
4. Determination of cell constant and conductance of solutions
5. Potentiometry - determination of redox potentials and emfs
6. Determination of Strength of an acid in Pb-Acid battery
7. Preparation of a Bakelite and measurement of its mechanical properties (strength.).
8. Verify Lambert-Beer's law
9. Thin layer chromatography
10. Identification of simple organic compounds by IR.
11. Preparation of nanomaterial's by precipitation
12. Measurement of 10Dq by spectrophotometric method

Text books:

1. Vogel's Text book of Quantitative Chemical Analysis, Sixth Edition – J. Mendham et al, PearsonEducation.
2. Chemistry Practical – Lab Manual by Chandra Sekhar, GV Subba Reddy and Jayaveera

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB
Part – A: Electrical Engineering Lab
Common to Mech, CSE & Chem

Course Code:20A12402 Semester – II(R20) L T P C: 0 0 3 1.5

Course Objectives:

- To Verify Kirchoff's laws and Superposition theorem To learn performance characteristics of DC Machines. To perform various tests on 1- Phase Transformer.
- To Study the I – V Characteristics of Solar PV Cell

Course Outcomes:

- Understand Kirchoff's Laws & Superposition theorem.
- Analyze the various characteristics on DC Machines by conducting various tests.
- Analyze I – V Characteristics of PV Cell
- Apply the knowledge to perform various tests on 1-phase transformer

List of experiments: -

1. Verification of Kirchhoff laws.
2. Verification of Superposition Theorem.
3. Magnetization characteristics of a DC Shunt Generator.
4. Speed control of DC Shunt Motor.
5. OC & SC test of 1 – Phase Transformer.
6. Load test on 1-Phase Transformer.
7. I – V Characteristics of Solar PV cell
8. Brake test on DC Shunt Motor

Part – B: Electronics Engineering Lab

Course Objectives:

- To verify the theoretical concepts practically from all the experiments.
- To analyze the characteristics of Diodes, BJT, MOSFET, UJT.
- To design the amplifier circuits from the given specifications.
- Exposed to linear and digital integrated circuits.

Course Outcomes:

- Learn the characteristics of basic electronic devices like PN junction diode, Zener diode & BJT.
- Construct the given circuit in the lab
- Analyze the application of diode as rectifiers, clippers and clampers and other circuits. Design simple electronic circuits and verify its functioning.

List Of Experiments:

1. PN Junction diode characteristics A) Forward bias B) Reverse bias.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Full Wave Rectifier with & without filter.
4. Wave Shaping Circuits. (Clippers & Clampers)
5. Input & Output characteristics of Transistor in CB / CE configuration.
6. Frequency response of CE amplifier.
7. Inverting and Non-inverting amplifiers using Op-AMPs.
8. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
9. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.

Tools / Equipment Required:

DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
ENVIRONMENTAL SCIENCE
Common to EEE, ECE, CSE

Course Code: 20A10803 Semester – II(R20) L T P C: 3 0 0 0

Course Objectives:

- To make the students to get awareness on environment, to understand the importance of protecting natural resources , ecosystems for future generations and pollution causes due to day activities of human life to save earth from the inventions by the engineers.

Course Outcomes:

UNIT – I:

MULTIDISCIPLINARY NATURE OF ENVIRONMAENTAL STUDIES: - Definition, Scope and Importance – Need for Public Awareness.

NATURAL RESOURCES: Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestration, case studies. Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water –Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture. Fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources.

UNIT – II:

ECOSYSTEMS: Concept of an ecosystem – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems(ponds, streams, lakes, rivers, oceans, estuaries)

BIODIVERSITY AND ITS CONSERVATION: Introduction () Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – III:
ENVIRONMENTAL POLLUTION: Definition, Cause, effects and control measure of:

a) Air Pollution
b) Water Pollution
c) Soil Pollution
d) Marine Pollution
e) Noise Pollution
f) Thermal Pollution
g) Nuclear hazards

SOLID WASTE MANAGEMENT: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT – IV:
SOCIAL ISSUES AND THE ENVIRONMENT: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents holocaust. Case Studies – Wasteland reclamation – Consumerism and waste products – Environment Protection Act – Air (Prevention and Control of Pollution) Act – Water (Prevention and control of pollution) Act – Wildlife Protection Act – Forest Conservation Act –Issues involved in enforcement of environmental legislation – Public awareness.

UNIT – V:
HUMAN POPULATION AND THE ENVIRONMENT: Population growth, variation among nations, Population explosion – Family Welfare Programmed – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.
FIELD WORK: Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site – Urban/Rural/Industrial/Agricultural Study of common plants, insects and birds – river, hill slopes, e.t.c

Text books:

1. Text book of Environmental Studies for Undergraduate courses by ErachBarucha for University Grants Commission, Universities Press.
2. Environmental Studies by PalaniSwami – Pearson education
3. Environmental Studies by Dr.S.AzeemUnnisa, Academic Publishing Company

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Discrete Mathematics & Graph Theory

Course Code: 20A35103 **Semester III(R20)** **L T P C : 3 0 0 3**

Course Objectives:

Introduce the concepts of mathematical logic and gain knowledge in sets, relations and functions and Solve problems using counting techniques and combinatory and to introduce generating functions and recurrence relations. Use Graph Theory for solving real world problems.

Course Outcomes:

CO1: Apply mathematical logic to solve problems.
CO2: Understand the concepts and perform the operations related to sets, relations and functions.
CO3: Gain the conceptual background needed and identify structures of algebraic nature.
CO4: Apply basic counting techniques to solve combinatorial problems.
CO5: Formulate problems and solve recurrence relations.
CO6: Apply Graph Theory in solving computer science problems

UNIT – I: Mathematical Logic

Introduction, Statements and Notation, Connectives, Well-formed formulas, Tautology, Duality law, Equivalence, Implication, Normal Forms, Functionally complete set of connectives, Inference Theory of Statement Calculus, Predicate Calculus, Inference theory of Predicate Calculus.

UNIT – II: Set theory

Basic Concepts of Set Theory, Relations and Ordering, The Principle of Inclusion- Exclusion, Pigeon hole principle and its application,Functions composition of functions, Inverse Functions, Recursive Functions, Lattices and its properties. Algebraic structures: Algebraic systems-Examples and General Properties, Semi groups and Monoids, groups, sub groups, homomorphism, Isomorphism.

UNIT – III: Elementary Combinatorics

Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutations with Constrained Repetitions, Binomial Coefficients, The Binomial and Multinomial Theorems.

UNIT – IV: Recurrence Relations

Generating Functions of Sequences, Calculating Coefficients of Generating Functions, Recurrence relations, Solving Recurrence Relations by Substitution and Generating functions, The Method of Characteristic roots, Solutions of Inhomogeneous Recurrence Relations.

UNIT – V: Graphs

Basic Concepts, Isomorphism and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multigraphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four Color Problem.

Textbooks:

1. Joe L. Mott, Abraham Kandel and Theodore P. Baker, Discrete Mathematics for Computer Scientists & Mathematicians, 2nd Edition, Pearson Education.
2. J.P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, 2002

Reference Books:

1. Kenneth H. Rosen, Discrete Mathematics and its Applications with Combinatorics and Graph Theory, 7th Edition, McGraw Hill Education (India) Private Limited.
2. Graph Theory with Applications to Engineering and Computer ScienceByNarsinghDeo.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
DIGITAL SYSTEMS

Course Code: 20A30501 **Semester III(R20)** **L T P C: 3 0 0 3**

Course Objectives:

- Students would have a thorough understanding of the fundamental concepts and techniques used in digital electronics.
- On completion of this course students will have the skills and confidence to conceive and implement a complex digital system.
- Draw a circuit diagram for a sequential logic circuit and analyze its timing properties (input setup and hold times, minimum clock period, output propagation delays).
- Make the students to apply IoT data for business solution in various domains in secured manner.

Course Outcomes:

CO1: Realize different number systems and number base conversions and Boolean functions using universal gates.
CO2: Utilize the postulates of the Boolean Algebra to minimize the Combinational circuits.
CO3: Design and Analyze Sequential circuits and Finite State Machines.
CO4: Understand the definition and significance of the Internet of Things
CO5: Analyze the characteristics and concepts of embedded computing devices.

UNIT – I: DIGITAL FUNDAMENTALS

Number Systems – Decimal, Binary, Octal, Hexadecimal, 1‘s and 2‘s complements, Codes – Binary, BCD, Excess 3, Gray, Alphanumeric codes, Boolean theorems, Logic gates, Universal gates, Sum of products and product of sums, Minterms and Maxterms, Karnaugh map Minimization and Quine-McCluskey method of minimization.

UNIT – II: COMBINATIONAL CIRCUIT DESIGN

Design of Half and Full Adders, Half and Full Subtractors, Binary Parallel Adder – Carry look ahead Adder,BCD Adder, Multiplexer, Demultiplexer, Magnitude Comparator, Decoder, Encoder, Priority Encoder.

UNIT – III: SYNCHRONOUS SEQUENTIAL CIRCUITS

Flip flops – SR, JK, T, D, Master/Slave FF – operation and excitation tables, Triggering of FF,Analysisanddesign of clocked sequential circuits – Design – Moore/Mealy models, state minimization, state assignment, circuit implementation – Design of Counters- Ripple Counters, Ring Counters, Shift registers, Universal Shift Register.

UNIT - IV: INTRODUCTION TO IoT

The Internet of Things, The Flavour of the Internet of Things, The “Internet” of “Things”, The Technology of the Internet of Things, Enchanted Objects, Who is Making the Internet of Things?

UNIT – V: Prototyping Embedded Devices

Prototyping Embedded Devices- Electronics, Embedded Computing Basics, Arduino, Raspberry Pi.
Making Connections- Creating Series and Parallel Circuits, Switching Electric Current On and Off, Creating a Combination Circuit.

Textbooks:

1. M. Morris Mano, M.D. Ciletti, “Digital Design”, 5th edition, Pearson, 2018
2. Cathleen Shamieh, Electronics for dummies, A Wiley Brand, 3rd Edition, 2015.
3. Adrian McEwen, Hakim Cassimally, Designing the Internet of Things, 2014

Reference Books:

1. Donald P Leach, Albert Paul Malvino, GoutamSaha, “Digital Principles and applications”, McGrawHill , 8th Edition,2015.
2. David J. Comer, “Digital Logic & State Machine Design”, Oxford University Press, 3rd Reprinted Indian Edition, 2012
3. R.D. Sudhakar Samuel, “Digital Logic Design”, Elsevier Publishers.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
DATA STRUCTURES

Course Code:20A30502 **Semester III(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- To impart the basic concepts of data structures and algorithms
- To understand the concepts about searching and sorting techniques
- To understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures
- To Understand basic concepts about stacks, queues, lists, trees and graphs

Course Outcomes:

CO1: Ability to analyze the efficiency of program based on time complexity.
CO2: Implement Abstract data types using arrays and linked list.
CO3: Apply the different linear data structures like stack and queue to various computing problems.
CO4: Describe the hash function and concepts of collision and its resolution methods.
CO5: Able to apply principles and concepts of graph theory in practical situations.

UNIT – I: Introduction

Introduction and Overview: Definitions, Algorithms, Algorithm efficiency: Linear loops, logarithmic loops, Nested loops, Big-O notation, Standard measures of Efficiency, Big-O Analysis Examples, Abstract Data Types – Advantages of ADT, Concept of Data Structure, Over view of Data Structures, Implementation of Data Structures.

Sequential Storage Representation: Arrays, operations on Arrays – insertion, deletion, Traversing, Applications of Arrays - Linear Search, Binary Search, Insertion Sort, Merging of Arrays

UNIT – II: Linked Lists

Linked Lists: Definition, Single lined list: Representation of list in memory, Operations of single linked list, Circular linked list; Double Linked List: Operations of Double linked list; Applications of linked list: Sparse Matrix Manipulations, Polynomial representation.

UNIT – III: Stacks & Queues

Stacks: Introduction, Definition, Representation of stack: Array representation, Linked representation, Operations of stack, Applications of Stack: Evaluations of Arithmetic Expressions, Expression Conversion, Towers of Hanoi Problem.

Queues: Introduction, Definition, Representation of Queues: Array representation, Linked representation, Operations of Queues.

UNIT – IV: Queues & Hash Tables

Various Queue Structures: Circular Queue, Dequeue, Priority Queue, Applications of Queues.

Hash Tables: Hashing Techniques, Collision Resolution Techniques, Closed Hashing, Open Hashing, Comparison of Collision Resolution Techniques.

UNIT – V: Trees

Trees: Basic Terminologies, Definition and Concepts, Binary Tree, Properties of Binary Tree, Representation of Binary Tree, Binary Tree Traversals. Binary Search Tree: Binary Search Tree Properties, Binary Search Trees Operations, AVL Search Trees.

Textbooks:

1. D. Samantha, “Classic Data Structures” 2nd Edition, PHI Publication.
2. Richard F. Gilberg&Behrouz A. Forouzan, “Data Structures – A Pseudocode Approach with C” 2nd Edition, Cengage Learning.

Reference Books:

1. Jean Paul Tremblay and Paul G. Sorenson, “An Introduction to Data Structures with Applications”, Second Edition, Tata McGraw Hill
2. Rajesh K. Shukla, “ Data Structures using C & C++”, Wiley.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
OOPS THROUGH JAVA

Course Code:20A30503 **Semester III(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- To understand object-oriented concepts and problem-solving techniques
- To obtain knowledge about the principles of inheritance and polymorphism
- To implement the concept of packages, interfaces, exception handling and concurrency mechanism.
- To design the GUIs using applets and swing controls.
- To understand the Java Database Connectivity Architecture

Course Outcomes:

CO1: Solve real-world problems using OOP techniques.
CO2: Apply code reusability through inheritance, packages and interfaces
CO3: Solve problems using java collection framework and I/O classes.
CO4: Develop applications by using parallel streams for better performance and develop applets for web applications.
CO5: Build GUIs and handle events generated by user interactions and Use the JDBC API to access the database.

UNIT – I: **Introduction**

Introduction to Object Oriented Programming, The History and Evolution of Java, Introduction to Classes, Objects, Methods, Constructors, this keyword, Garbage Collection, Data Types, Variables, Type Conversion and Casting, Arrays, Operators, Control Statements, Method Overloading, Constructor Overloading, Parameter Passing, Recursion, String Class and String handling methods.

UNIT – II: **Inheritance, Packages, Interfaces**

Inheritance: Basics, Using Super, Creating Multilevel hierarchy, Method overriding, Dynamic Method Dispatch, Using Abstract classes, Using final with inheritance, Object class,
Packages: Basics, Finding packages and CLASSPATH, Access Protection, Importing packages.
Interfaces: Definition, Implementing Interfaces, Extending Interfaces, Nested Interfaces, Applying Interfaces, Variables in Interfaces.

UNIT – III: **Exception handling, Stream based I/O**

Exception handling - Fundamentals, Exception types, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built-in exceptions, creating own exception subclasses.
Stream based I/O (java.io) – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and Writing Files, Random access file operations, The Console class, Serialization, Enumerations, Autoboxing, Generics.

UNIT – IV: **Multithreading, The Collections Framework**

Multithreading: The Java thread model, Creating threads, Thread priorities, Synchronizing threads, Interthread communication.
The Collections Framework (java.util): Collections overview, Collection Interfaces, The Collectionclasses- Array List, Linked List, Hash Set, Tree Set, Priority Queue, Array Deque.

Hashtable, Properties, Stack, Vector, String Tokenizer, Bit Set, Date, Calendar, Random, Formatter, Scanner.

UNIT – V: **Applet, GUI Programming with Swings, Accessing Databases with JDBC**
Applet: Basics, Architecture, Applet Skeleton, requesting repainting, using the status window, passing parameters to applets
GUI Programming with Swings – The origin and design philosophy of swing, components and containers, layout managers, event handling, using a push button, jtextfield, jlabel and image icon, the swing buttons, jtext field, jscrollpane, jlist, jcombobox, trees, jtable, An overview of jmenubar, jmenu and jmenuitem, creating a main menu, show message dialog, show confirmdialog, show input dialog, show option dialog, jdialog, create a modeless dialog.
Accessing Databases with JDBC:
Types of Drivers, JDBC Architecture, JDBC classes and Interfaces, Basic steps in developing JDBC applications, Creating a new database and table with JDBC.

Textbooks:
1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Java How to Program, 10th Edition, Paul Dietel, Harvey Dietel, Pearson Education.

Reference Books:
1. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.
2. Core Java Volume – 1 Fundamentals, Cay S. Horstmann, Pearson Education.
3. Java Programming for core and advanced learners, Sagayaraj, Dennis, Karthik andGajalakshmi, University Press
4. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
5. Object Oriented Programming through Java, P. Radha Krishna, University Press.
6. Programming in Java, S. Malhotra, S. Chaudhary, 2nd edition, Oxford Univ. Press.
7. Java Programming and Object-oriented Application Development, R.A. Johnson,
8. Cengage Learning.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Humanities Elective-I)
Common to All Branches

Course Code:20A39101a **Semester III(R20)** **L T P C : 3 0 0 3**

Course Objectives:
- To inculcate the basic knowledge of micro economics and financial accounting
- To make the students learn how demand is estimated for different products, input-output relationship for optimizing production and cost
- To know the various types of Market Structures & pricing methods and its strategies
- To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
- To provide fundamental skills on Accounting and to explain the process of preparing Financial statements

Course Outcomes:

CO1: Define the concepts related to Managerial Economics, financial accounting and management.
CO2: Understand the fundamentals of Economics viz., Demand, Production, cost, revenue and markets
CO3: Apply the concepts of production, cost and revenues for effective business decisions
CO4: Analyze how to invest their capital and maximize returns
CO5: Evaluate the capital budgeting techniques
CO6: Develop theaccounting statements and evaluate the financial performance of business entity.

UNIT-I: Managerial Economics

Introduction – Nature, meaning, significance, functions and advantages. Demand-Concept, Function, Law of Demand –DemandElasticity- Types – Measurement. Demand Forecasting- Factors governing Forecasting, Methods. Managerial Economics and Financial Accounting and Management.

UNIT-II: Production and Cost Analysis

Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least-cost combination– Short run and long run Production Function- Isoquants and Isocosts, MRTS - Cobb-Douglas Production Function - Laws of Returns - Internal and External Economies of scale. Cost&Break-Even Analysis - Cost concepts and Cost behavior- Break-Even Analysis (BEA) -Determination of Break-Even Point (Simple Problems)-Managerial significance and limitations of Break-Even Analysis.

UNIT-III: Business Organizations and Markets

Introduction – Nature, meaning, significance, functions and advantages. Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises.Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition – Monopoly-Monopolistic Competition–Oligopoly-Price-Output Determination - Pricing Methods and Strategies.

UNIT- IV: Capital Budgeting

Introduction – Nature, meaning, significance, functions and advantages. Types of Working Capital, Components, Sources of Short-term and Long-term Capital, Estimating Working capital requirements. Capital Budgeting– Features, Proposals, Methods and Evaluation. Projects – Pay Back Method, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (sample problems)

UNIT-V: Financial Accounting and Analysis

Introduction – Nature, meaning, significance, functions and advantages. Concepts and Conventions- Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Financial Analysis - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

Text Books:

1. Varshney&Maheswari: Managerial Economics, Sultan Chand, 2013.
2. Aryasri: Business Economics and Financial Analysis, 4/e, MGH, 2019

References:

1. Ahuja Hl Managerial economics Schand,3/e,2013
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International, 2013.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage, 2013.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
ENTREPRENEURSHIP& INCUBATION
(Humanities Elective-I)
Common to All Branches

Course Code:20A39101b **Semester III(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- To make the student understand about Entrepreneurship
- To enable the student in knowing various sources of generating new ideas in setting up of new enterprise
- To facilitate the student in knowing various sources of finance in starting up of a business
- To impart knowledge about various government sources which provide financial assistance to entrepreneurs/ women entrepreneurs
- To encourage the student in creating and designing business plans

Course Outcomes:

CO1: Define the Concepts related to the Entrepreneurship and Incubators

CO2: Understand the concept of Entrepreneurship and challenges in the world of competition.

CO3: Apply the Knowledge in generating ideas for New Ventures.

CO4: Analyze various sources of finance and subsidies to entrepreneur/women Entrepreneurs.

CO5: Evaluate the role of central government and state government in promoting Entrepreneurship.

CO6: Create and design business plan structure through incubations.

UNIT-I: Entrepreneurship

Introduction-Nature, meaning, significance, functions and advantages. concept, characteristics-knowledge and skills requirement - process - Factors supporting entrepreneurship - Differences between Entrepreneur and Intrapreneur - entrepreneurial mindset and personality - Recent trends.

UNIT-II: Women Entrepreneurship

Introduction – Nature, meaning, significance, functions and advantages. Growth of women entrepreneurship in India. - Issues & Challenges - Entrepreneurial motivations. Entrepreneurship Development and Government.Role, of Central and State Government - incentives, subsidies and grants – Export- oriented Units - Fiscal and Tax concessions.

UNIT-III: Product Development

Introduction – Nature, meaning, significance, functions and advantages. Startup Initiatives - Generating business/ Service idea – Sources and methods – Identifying opportunities - Feasibility study - Market feasibility, technical/operational feasibility, Financial feasibility. Developing business plan, Preparing project report, Presenting business plan to investors.

UNIT-IV: Startups

Introduction – Nature, meaning, significance, functions and advantages. Fundamentals of Business Incubation - Principles and good practices of business incubation- Process of business incubation and the business incubator and how they operate and influence the Type/benefits of incubators - Corporate/educational / institutional incubators - Broader business incubation environment - Pre-

Incubation and Post - Incubation process - Idea lab, Business plan structure - Value proposition.

UNIT-V: Finance

Introduction – Nature, meaning, significance, functions and advantages. Sources - Long term and Short term - Institutional Finance – Commercial Banks, SFC's and NBFC's in India, Role in small and medium business - Entrepreneurship development programs in India - The entrepreneurial journey-Institutions supporting entrepreneurship development.

TEXT BOOKS

1. D F Kuratko and T V Rao, Entrepreneurship - A South-Asian Perspective – Cengage Learning, 2012. (For PPT, Case Solutions Faculty may visit : login.cengage.com)
2 .Nandan H, Fundamentals of Entrepreneurship, PHI, 2013

REFERENCES

1. VasantDesai,Small Scale Industries and Entrepreneurship, Himalaya Publishing 2012.
2. Rajeev Roy Entrepreneurship, 2nd Edition, Oxford, 2012.
3. B.JanakiramandM.Rizwana‖ Entrepreneurship Development: Text & Cases, Excel Books, 2011.
4. Stuart Read, Effectual Entrepreneurship, Routledge, 2013.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
BUSINESS ETHICS AND CORPORATE GOVERNANCE

(Humanities Elective-I)
Common to All Branches

Course Code:20A39101c **Semester III** **L T P C : 3 0 0 3**

Course Objectives:

- To make the student understand the principles of business ethics
- To enable them in knowing the ethics in management
- To facilitate the student's role in corporate culture
- To impart knowledge about the fair-trade practices
- To encourage the student in creating knowing about the corporate governance

Course Outcomes:

CO1: Define the Ethics and Types of Ethics.
CO2: Understand business ethics and ethical practices in management
CO3: Understand the role of ethics in management
CO4: Apply the knowledge in cross cultural ethics
CO5: Analyze law and ethics
CO6: Evaluate corporate governance

UNIT-I: ETHICS

Introduction – Meaning – Nature, Scope, significance, Loyalty, and ethical behavior - Value systems - Business Ethics, Types, Characteristics, Factors, Contradictions and Ethical Practices in Management-Corporate Social Responsibility – Issues of Management – Crisis Management.

UNIT-II: ETHICS IN MANAGEMENT

Introduction Ethics in production, finance, Human Resource Management and, Marketing Management - Technology Ethics and Professional ethics - The Ethical Value System – Universalism, Utilitarianism, Distributive Justice, Social Contracts, Individual Freedom of Choice, Professional Codes; Culture and Ethics – Ethical Values in different Cultures, Culture and Individual Ethics.

UNIT-III: CORPORATE CULTURE

Introduction, Meaning, definition, Nature, Scope, Functions, and significance – Cross cultural issues in Ethics - - Emotional Honesty – Virtue of humility – Promote happiness – karma yoga – proactive – flexibility and purity of mind. The Ethical Value System – Universalism, Utilitarianism, Distributive Justice, Social Contracts, Individual Freedom of Choice, Professional Codes; Culture and Ethics – Ethical Values in different Cultures, Culture and Individual Ethics.

UNIT- IV: LEGAL FRAME WORK

Law and Ethics, Agencies enforcing Ethical Business Behavior, Legal Impact– Environmental Protection, Fair Trade Practices, legal Compliances, Safeguarding Health and wellbeing of Customers.

UNIT -V: CORPORATE GOVERNANCE

Introduction, meaning – scope Nature - Issues, need, corporate governance code, transparency & disclosure, role of auditors, board of directors and shareholders. Global issues, accounting and regulatory

Frame work, corporate scams, committees in India and abroad, corporate social responsibility. of BoDs composition, Cadbury Committee - various committees - reports - Benefits and Limitations.

Text books.

1. Murthy CSV: Business Ethics and Corporate Governance, HPH
2. BholananthDutta, S.K. Podder – Corporation Governance, VBH.

Reference books

1. Dr. K. Nirmala, Karunakara Reddy: Business Ethics and Corporate Governance, HPH
2. H.R.Machiraju: Corporate Governance
3. K. Venkataramana, Corporate Governance, SHBP.
4. N.M.Khandelwal : Indian Ethos and Values for Managers

JNTUA College of Engineering(Autonomous),Ananthapuramu
Department of Computer Science & Engineering
DIGITAL SYSTEMS LAB

Course Code:20A30504 **Semester III(R20)** **L T P C : 0 0 3 1.5**

Course Objectives:

- To present a problem oriented introductory knowledge of Digital circuits and its applications.
- Explain the elements of digital system abstractions such as digital representations of information, digital logic, Boolean algebra, state elements and finite state machine (FSMs).
- Design simple digital systems based on these digital abstractions, using the "digital paradigm" including discrete sampled information.
- Work in a design team that can propose, design, successfully implement and report on a digital systems project.
- Train the students to build IoT systems using sensors, single board computers and open source IoT platforms.

Course Outcomes:

CO1: Design, Test and evaluate various combinational circuits such as adders, subtractors, multipliers, comparators, parity generators, multiplexers and de-Multiplexers.

CO2: Construct flips-flops, counters and shift registers and verify its functionality

CO3: Realize and implementation of Asynchronous and Synchronous counters using Flip-Flop IC's .

CO4: Implementation of different combinational logic circuits using IC's.

CO5: Design and develop IoT based sensor systems.

List of Experiments:

1. To verify (a) Demorgan's Theorem for 2 variables
2. The sum-of product and product-of-sum expressions using universal gates.
3. To design and implement 4-bit Parallel Adder/ subtractor using IC 7483.
4. To realize (a) 4:1 Multiplexer using gates
5. 3-variable function using IC 74151(8:1 MUX)
6. 8 Demux and 3:8 Decoder using IC74138.
7. To realise the following flip-flops using NAND Gates. (a) Clocked SR Flip-Flop (b) JK Flip-Flop.
8. To realize the following shift registers using IC7474 (a) SISO (b) SIPO (c)PISO (d) PIPO.
9. To realize the Ring Counter and Johnson Counter using IC7476.
10. To realize the Mod-N Counter using IC7490.
11. Build Indoor Air Quality Monitoring System using IoT Platform
    a. Monitored Parameters: Temperature, Humidity, CO2, VOC
    b. Function1: Generate notifications and alerts in case of parameters beyond limits
12. Function2: Mix fresh air in case of CO2 level crossing threshold level of 1000ppm Build Smart Farming application using IoT Platform
    a. Monitored Parameters: Soil Moisture, Rainfall, Weather Forecast
    b. Function1: Switch ON irrigation pump intelligently based on monitoring parameters
13. Build Smart Parking application using IoT Platform

a.Monitored Parameters: Vehicle detection
b. Function1: Provide information to user about free space in parking slots

14. Build Smart Home system using IoT Platform
    a. Monitored Parameters: People presence, Outside ambient conditions, IAQ parameters
    b. Function1: Control Home appliances through manual application control
    c. Function2: Intelligently control appliances based on monitoring parameters

References:

1. K. A. Navas, “Electronics Lab Manual”, Volume I, PHI, 5th Edition, 2015, ISBN:9788120351424
2. Cyril Prasanna Raj P., “CMOS digital circuit design manual”, Volume 1, MSEC E-publication, Edition 2016

JNTUA College of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
DATA STRUCTURES LAB

Course Code:20A30505 **Semester III(R20)** **L T P C : 0 0 3 1.5**

Course Objectives:

- The course is designed to develop skills to design and analyze simple linear and non linear data structures.
- It strengthen the ability to the students to identify and apply the suitable data structure for the given real world problem.
- It enables them to gain knowledge in practical applications of data structures.

Course Outcomes:

CO1: Able to design and analyze the time and space efficiency of the data structure.
CO2: Be capable to identity the appropriate data structure for given problem.
CO3: Have practical knowledge on the applications of data structures.

List of Experiments:

1. Implement Linear and Binary search techniques with recursive and non-recursive functions.
2. Implement Insertion and Merge sort techniques.
3. Implement Complex numbers addition and multiplication using structures.
4. Implement single linked list operations (Insert front, Insert rear, Delete front, Delete rear, and Traversal0.
5. Implement Sorted linked list and Delete a node by search.
6. Implement Double linked list operations (Insert front, Insert rear, Delete front, Delete rear, and Traversal).
7. Implement Stack operations using arrays and linked list.
8. Implement convert an infix expression into post fix expression
9. Implement evaluation of post fix expression.
10. Implement Queue operations using arrays and linked list
11. Implement Circular and DeQueue using arrays
12. Implement Priority Queue using arrays
13. Implement Binary Search Tree Operations (Insertion, Deletion, Traversal)
14. Implement AVL Tree Operations.

JNTUA College Of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
OOPS Through JAVA LAB

Course Code:20A30506 **Semester III(R20)** **L T P C : 0 0 3 1.5**

Course Objectives:

- To introduce the concepts of Java.
- To Practice object-oriented programs and build java applications.
- To implement java programs for establishing interfaces.
- To implement sample programs for developing reusable software components.
- To establish database connectivity in java and implement GUI applications.

Course Outcomes:

CO1: Recognize the Java programming environment.
CO2: Select appropriate programming constructs to solve a problem.
CO3: Develop efficient programs using multithreading.
CO4: Design reliable programs using Java exception handling features.
CO5: Extend the programming functionality supported by Java.

Week-1

a. Installation of Java software, study of any Integrated development environment, Use Eclipse orNetbeans platform and acquaint with the various menus. Create a test project, add a test class and run it.

See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with java program to find prime numbers between 1 to n.

b. Write a Java program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$. Read in a, b, c and use the quadratic formula.

c. Develop a Java application to generate Electricity bills. Create a class with the following members: Consumer no., consumer name, previous month reading, current month reading, type of EB connection (i.e domestic or commercial). Commute the bill amount using the following tariff.

If the type of the EB connection is domestic, calculate the amount to be paid as follows:

- First 100 units - Rs. 1 per unit
- 101-200 units - Rs. 2.50 per unit
- 201 -500 units - Rs. 4 per unit
- > 501 units - Rs. 6 per unit

If the type of the EB connection is commercial, calculate the amount to be paid as follows:

- First 100 units - Rs. 2 per unit
- 101-200 units - Rs. 4.50 per unit
- 201 -500 units - Rs. 6 per unit
- > 501 units - Rs. 7 per unit

d. Write a Java program to multiply two given matrices.

Week-2

a. Write Java program on use of inheritance, preventing inheritance using final, abstract classes.

b. Write Java program on dynamic binding, differentiating method overloading and overriding.

c. Develop a java application to implement currency converter (Dollar to INR, EURO to INR, Yen) using
Interfaces.

Week-3

a. Write Java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read, display it only if it's not a duplicate of any number already read display the complete set of unique values input after the user enters each new value.

b. Write a Java Program to create an abstract class named Shape that contains two integers and an empty method named print Area(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

c. Write a Java program to read the time intervals (HH:MM) and to compare system time if the system Time between your time intervals print correct time and exit else try again to repute the same thing. By using StringToknizer class.

Week-4

a. Write a Java program to implement user defined exception handling.

b. Write java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it‘s not a duplicate of any number already read. Display the complete set of unique values input after the user enters each new value.

Week-5

a. Write a Java program that creates a user interface to perform integer division. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 and Num2 were not integers, the program would throw a Number Format Exception. If Num2 were zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

b. Write a Java program that creates three threads. First thread displays ―Good Morning‖ every one second, the second thread displays ―Hello‖ every two seconds and the third thread displays ―Welcome‖ every three seconds.

Week-6

a. Write a java program to split a given text file into n parts. Name each part as the name of the original file followed by .part where n is the sequence number of the part file.

b. Write a Java program that reads a file name from the user, displays information about whetherthe file exists, whether the file is readable, or writable, the type of file and the length of the file
in bytes.

Week-7

a. Write a java program that displays the number of characters, lines and words in a text file.

b. Write a java program that reads a file and displays the file on the screen with line number before each line.

Week-8

a. Write a Java program that correctly implements the producer-consumer problem using the concept of inter thread communication.

b. Develop a Java application for stack operation using Buttons and JOptionPane input and Message dialog box.

c. Develop a Java application to perform Addition, Division, Multiplication and subtraction using the JOptionPane dialog Box and Textfields.

Week-9

a. Develop a Java application for the blinking eyes and mouth should open while blinking.

b. Develop a Java application that simulates a traffic light. The program lets the user select one of thethree lights: Red, Yellow or Green with radio buttons. On selecting a button an appropriatemessage with ―STOP‖ or ―READY‖ or ‖GO‖ should appear above the buttons in the selected color. Initially, there is no message shown.

Week-10

a. Develop a Java application to implement the opening of a door while opening man should present before hut and closing man should disappear.

b. Develop a Java application by using JtextField to read decimal values and converting a decimal number into a binary number then print the binary value in another JtextField.

Week-11

a. Develop a Java application that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. Use adapter classes.

b. Develop a Java application to demonstrate the key event handlers.

Week-12

a. Develop a Java application to find the maximum value from the given type of elements using a generic function.

b. Develop a Java application that works as a simple calculator. Use a grid layout to arrange buttonsfor the digits and for the +, -,*, % operations. Add a text field to display the result.

c . Develop a Java application for handling mouse events.

Week-13

a. Develop a Java application to establish a JDBC connection, create a table student with properties name, register number, mark1, mark2, mark3. Insert the values into the table by using java and display the information of the students at front end.

References:

1. P. J. Deitel, H. M. Deitel, "Java for Programmers", Pearson Education, PHI, 4th Edition, 2007.

2. P. Radha Krishna, "Object Oriented Programming through Java", Universities Press, 2nd Edition, 2007

3. Bruce Eckel, "Thinking in Java", Pearson Education, 4th Edition, 2006.

4. Sachin Malhotra, SaurabhChaudhary, "Programming in Java", Oxford University Press, 5th Edition, 2010.

JNTUA College Of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
IoT Using Python
(Skill Oriented Course-1)

Course Code:20A30507 **Semester III(R20)** **L T P C : 1 0 2 2**

Course Objectives:

- To introduce the concept of Internet of Things.
- To Practice programs and build real time applications.
- Students will be explored to the interconnection and integration of the physical world.
- Students will gain practical experience in the development of Cloud-based IoT systems.
- To get knowledge on cloud platforms

Course Outcomes (CO):

CO1: Design reliable real time applications using microcontrollers and microprocessors .
CO2: Extend the programming functionality and design new modules.
CO3: Able to design & develop IOT Devices.

Experiment -1

a. Introduction to Internet of Things and Arduino UNO
b.Knowing more about Arduino board description
c. Arduino Software Installation.

Experiment -2

a. Write an Arduino program to blink led
b. Write an Arduino program to control led by integer, character and string.
c. Write an Arduino program to control the brightness of an led using potentiometer
d. Write an Arduino program to fast and slow blinking of an led
e. Write an Arduino program for fading
f. Write an Arduino program for traffic light controlling

Experiment -3

a. Write an Arduino program to control led and buzzer by button and we can find how many times we can pressing the button
b. Write an Arduino program to control RGB by giving the user input
c. Write an code for servo motor interfacing with arduino
d. Write an Arduino program to control motor using npn transistor
e. **Control Servo motor with RGB and Arduinouno**

Experiment -4

a. Introduction to Sensors
b. Write a program for Interfacing LDR sensor with Arduino
c. Write a program for Interfacing IR and PIR sensor with Arduino
d. Write a program for Interfacing Ultrasonic HC-05 with Arduino UNO
e. **Implementing real time applications using sensors**

Experiment -5

a. Write a program for Interfacing Gas sensor with arduino
b. Write a program for Interfacing Temperature sensor with Arduino
c. Write a program for Interfacing Flex Sensor
d. Write a program for Interfacing Ambient light sensor
e. Implementing real time application using sensors

Experiment -6

a. Introduction to Displays

b. LCD Introduction and its working description
c. Write a Arduino program to display a data on LCD
d. **Print a Sensor data on LCD display**

Experiment -7

a. Introduction to 7-Segment both Anode and Cathode mode
b. Write a program to control keypad using Arduino UNO
c. Traffic light system using Arduino , 7-Segment and servo motor

Experiment -8

a. Bluetooth interfacing with Arduino
b. Introduction to MIT APP Inventor
c. Control Led or any sensor by using MIT App Inventor
d. Build an IoT application using MIT App Inventor

Experiment -9

a. Introduction to NodeMCU and its board description
b. Write a NodeMCU program to control led
c. Introduction to ThingSpeak and its working
d. Upload a sensor data to ThingSpeak cloud and controlling by it
e. **Publish and Retrive the sensor data using Thingspeak**

Experiment -10

a. Introduction to Blynk cloud
b. Creating an app and controlling it by using nodemcu
c. Develop an Home Automation using NodeMCU and Blynk**-**

Experiment -11

a. Raspberry PI Introduction, OS Installation, Linux basics, Python programming
b. Write a Raspberry pi program for controlling LED
c. Write a Raspberry pi program for controlling button
d. Write a Raspberry pi program for controlling motor
e. Write a Raspberry pi program for controlling DHT11 Sensor
f. **Implementing a sensor application that can be controlled by the user** .

Experiment -12

a. Write a Raspberry pi program for controlling LED by using Socket (server and client) Communication
b. SSH
c. VNC
d. Controlling LED by Socket communication.

Experiment -13

a. Creating AWS Cloud account logins and its introduction
b. Checking the services and how SNS service ny using Raspberry PI
c. Introducing Lambda Function and its working principle
d. IoT Core Service introduction and creating policies, things, certificates.
e. Checking DHT11 sensor data in AWS cloud by using IoT Core service and can know how to publish and retrieve the sensor data

JNTUA College Of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
Universal Human Values
Common to EEE, ECE, CSE

Mandatory non-credit Course-II

Course Code:20A1901 **Semester III(R20)** **L T P C : 3 0 0 0**

Course Objectives:
- Exposure to the value of life, society and harmony
- Leading towards holistic perspective based on self-exploration about themselves (human being), family, and society and nature/existence.
- Bringing transition from the present state to Universal Human Order
- Instill commitment and courage to act.
- Know about appropriate technologies and management patterns

Course Outcomes:

CO1: Analyze th terms like Natural Acceptance, Happiness and Prosperity
CO2: Understand awareness of oneself, and one's surroundings (family, society nature)
CO3: Apply what they have learnt to their own self in different day-to-day settings in real life
CO4: Relate human values with human relationship and human society.
CO5: Justify the need for universal human values and harmonious existence
CO6: Develop as socially and ecologically responsible engineers

UNIT – I: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

Universal Human Values-I - Self-Exploration - content and process; 'Natural Acceptance' and Experiential Validation - self-exploration - Continuous Happiness and Prosperity - Human Aspirations - current scenario - Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT – II: Understanding Harmony among Human Beings & Self Harmony!

Human being as a co-existence of the sentient 'I' and the material' Body' - the needs - happiness and physical facility -the Body as an instrument of 'I' - the characteristics and activities of 'I' and harmony in 'I' - the harmony of I with the Body

UNIT – III:Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship

Values in human relationship; meaning of Justice; Trust and Respect; Difference between intention and competence; the other salient values in relationship - the harmony in the society: Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals - Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

UNIT – IV: **Understanding Harmony in the Nature and Existence - Whole existence as Coexistence**

The harmony in the Nature - Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature - Understanding Existence as Co-existence of mutually interacting units in all- pervasive space - Holistic perception of harmony at all levels of existence.

UNIT – V: Implications of the above Holistic Understanding of Harmony on Professional Ethics
Humanistic Education - Competence in professional ethics: professional competence - people friendly and eco-friendly production systems - appropriate technologies and management patterns for above production systems. Individuals as socially and ecologically responsible engineers, technologists and managers.

Textbooks:

1. A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1

2. Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

Reference Books:

1. JeevanVidya: EkParichaya, ANagaraj, JeevanVidyaPrakashan, Amarkantak, 1999
2. HumanValues, A.N.Tripathi, NewAgeIntl.Publishers, NewDelhi,2004.
3. The Story of Stuff (Book).
4. Economy of Permanence - J C Kumarappa 8. Bharat Mein Angreji Raj - PanditSunderlal 9. Rediscovering India - byDharampal
5. Hind Swaraj or Indian Home Rule - by Mohandas K.Gandhi
6. India Wins Freedom - Maulana Abdul Kalam Azad 12. Vivekananda - Romain Rolland (English)

JNTUA College Of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
PROBABILITY AND STATISTICAL METHODS
Course Code:20A45103 Semester IV(R20) L T P C : 3 0 0 3

Course Objectives:

- To familiarize the students with the foundations of probability and statistical methods
- To impart probability concepts and statistical methods in various engineering applications

Course Outcomes:

CO1: make use of the concepts of probability and their applications (L3)
CO2: apply discrete and continuous probability distributions (L3)
CO3: classify the concepts of data science and its importance (L4)
CO4: interpret the association of characteristics and through correlation and regression tools (L4)
CO5: Design the components of a classical hypothesis test (L6)
CO6: infer the statistical inferential methods based on small and large sampling tests (L6)

UNIT – I: Descriptive statistics and methods for data science
Data science, Statistics Introduction, Population vs Sample, Collection of data, primary and secondary data, Type of variable: dependent and independent Categorical and Continuous variables, Data visualization, Measures of Central tendency, Measures of Variability (spread or variance) Skewness, Kurtosis, correlation, correlation coefficient, rank correlation, regression coefficients, method of least squares, regression lines.

UNIT – II: Probability
Probability, probability axioms, addition law and multiplicative law of probability, conditional probability, Baye's theorem, random variables (discrete and continuous), probability density functions, properties, mathematical expectation.

UNIT – III: Probability distributions
Probability distributions: Binomial, Poisson and Normal-their properties (Chebyshevs inequality).Approximation of the binomial distribution to normal distribution.

UNIT – IV: Estimation and Testing of hypothesis, large sample tests
Estimation-parameters, statistics, sampling distribution, point estimation, Formulation of null hypothesis, alternative hypothesis, the critical and acceptance regions, level of significance, two types of errors and power of the test. Large Sample Tests: Test for single proportion, difference of proportions, test for single mean and difference of means. Confidence interval for parameters in one sample and two sample problems

UNIT – V: Small sample tests
Student t-distribution (test for single mean, two means and paired t-test), testing of equality of variances (F-test), $\chi 2$ - test for goodness of fit, $\chi 2$ - test for independence of attributes**.**

Textbooks:

1. Miller and Freunds, Probability and Statistics for Engineers,7/e, Pearson, 2008.

2. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.

Reference Books:

1. S. Ross, a First Course in Probability, Pearson Education India, 2002.
2. W. Feller, an Introduction to Probability Theory and its Applications, 1/e, Wiley, 1968.
3. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education.
4. N. Bali, M. Goyal, C. Watkins, Advanced Engineering Mathematics, Infinity Science Press.

JNTUA College of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
COMPUTER ORGANIZATION

Course Code:20A40501 **Semester IV(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- To learn the fundamentals of computer organization and its relevance to classical and modern problems of computer design
- To understand the structure and behavior of various functional modules of a computer.
- To learn the techniques that computers use to communicate with I/O devices
- To acquire the concept of pipelining and exploitation of processing speed.
- To learn the basic characteristics of multiprocessors

Course Outcomes:

CO1: Understand computer architecture concepts related to the design of modern processors, memories and I/Os

CO2: Identify the hardware requirements for cache memory and virtual memory

CO3: Design algorithms to exploit pipelining and multiprocessors

CO4: Understand the importance and trade-offs of different types of memories.

CO5: Identify pipeline hazards and possible solutions to those hazards

UNIT – I: Basic Structure of Computer, Machine Instructions and Programs

Basic Structure of Computer: Computer Types, Functional Units, Basic operational Concepts, Bus Structure, Software, Performance, Multiprocessors and Multicomputer.

Machine Instructions and Programs: Numbers, Arithmetic Operations and Programs, Instructions and Instruction Sequencing, Addressing Modes, Basic Input/output Operations, Stacks and Queues, Subroutines, Additional Instructions.

UNIT – II: Arithmetic, Basic Processing Unit

Arithmetic: Addition and Subtraction of Signed Numbers, Design of Fast Adders, Multiplication of Positive Numbers, Signed-operand Multiplication, Fast Multiplication, Integer Division, Floating-Point Numbers and Operations.

Basic Processing Unit: Fundamental Concepts, Execution of a Complete Instruction, Multiple-Bus Organization, Hardwired Control, and Multi programmed Control.

UNIT – III: The Memory System

The Memory System: Basic Concepts, Semiconductor RAM Memories, Read-Only Memories, Speed, Size and Cost, Cache Memories, Performance Considerations, Virtual Memories, Memory Management Requirements, Secondary Storage.

UNIT – IV: Input/Output Organization

Input/Output Organization: Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces.

UNIT – V: Pipelining, Large Computer Systems

Pipelining: Basic Concepts, Data Hazards, Instruction Hazards, Influence on Instruction Sets.

Large Computer Systems: Forms of Parallel Processing, Array Processors, The Structure of General-Purpose multiprocessors, Interconnection Networks.

Textbooks:

1. Carl Hamacher, ZvonkoVranesic, SafwatZaky, “Computer Organization”, 5th Edition, McGraw Hill Education, 2013.

Reference Books:

1. M.Morris Mano, “Computer System Architecture”, 3rd Edition, Pearson Education.
2. Themes and Variations, Alan Clements, “Computer Organization and Architecture”, CENGAGE Learning.
3. SmrutiRanjanSarangi, “Computer Organization and Architecture”, McGraw Hill Education.
4. John P.Hayes, “Computer Architecture and Organization”, McGraw Hill Education

JNTUA College of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
DATABASE MANAGEMENT SYSTEMS

Course Code:20A40502 **Semester IV(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- Train in the fundamental concepts of database management systems, database modeling and design, SQL, PL/SQL and system implementation techniques.
- Enable students to model ER diagrams for any customized application
- Inducting appropriate strategies for optimization of queries.
- Provide knowledge on concurrency techniques
- Demonstrate the organization of Databases

Course Outcomes:

CO1: Demonstrate the basic elements of a relational database management system

CO2: Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data.

CO3: Apply normalization for the development of application software

CO4: Define transactions that preserve the integrity of the database

CO5: Evaluate the expression and estimate statistics of expression results

UNIT – I: Introduction, Introduction to Relational Model

Introduction: Database systems applications, Purpose of Database Systems, view of Data, Database Languages, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Data Mining and Information Retrieval, Specialty Databases, Database users and Administrators,

Introduction to Relational Model:Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations

UNIT – II: Introduction to SQL, Advanced SQL

Introduction to SQL:Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Sub-queries, Modification of the Database. Intermediate SQL: Joint Expressions, Views, Transactions, Integrity Constraints, SQL Data types and schemas, Authorization.

Advanced SQL: Accessing SQL from a Programming Language, Functions and Procedures, Triggers, Recursive Queries, OLAP, Formal relational query languages.

UNIT – III: Database Design and the E-R Model, Relational Database Design

Database Design and the E-R Model: Overview of the Design Process, The Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues.

Relational Database Design:

Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional-Dependency Theory, Algorithms for Decomposition, Decomposition Using Multivalued Dependencies, More Normal Forms.

UNIT – IV: Query Processing, Query optimization
Query Processing: Overview, Measures of Query cost, Selection operation, sorting, Join Operation, other operations, Evaluation of Expressions.
Query optimization: Overview, Transformation of Relational Expressions, Estimating statistics of Expression results, Choice of Evaluation Plans, Materialized views, Advanced Topics in Query Optimization.

UNIT – V: Transaction Management, Concurrency Control, Recovery System
Transaction Management:
Transactions: Concept, A Simple Transactional Model, Storage Structures, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Isolation and Atomicity, Transaction Isolation Levels, Implementation of Isolation Levels, Transactions as SQL Statements.
Concurrency Control: Lock-based Protocols, Deadlock Handling, Multiple granularity, Timestamp-based Protocols, and Validation-based Protocols.
Recovery System: Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with Loss of Nonvolatile Storage, Early Lock Release and Logical Undo Operations.

Textbooks:
1. A.Silberschatz, H.F.Korth, S.Sudarshan, "Database System Concepts",6/e, TMH 2019

Reference Books:
1. Database Management System, 6/e RamezElmasri, Shamkant B. Navathe, PEA
2. Database Principles Fundamentals of Design Implementation and Management, Carlos Coronel, Steven Morris, Peter Robb, Cengage Learning.
3.Database Management Systems, 3/e, Raghurama Krishnan, Johannes Gehrke,TMH

JNTUA College Of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
OPERATING SYSTEMS

Course Code:20A40503 **Semester IV(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- Understand basic concepts and functions of operating systems
- Understand the processes, threads and scheduling algorithms.
- Provide good insight on various memory management techniques
- Expose the students with different techniques of handling deadlocks
- Explore the concept of file-system and Implement various schemes for achieving system protection and security

Course Outcomes:

CO1: Analyze how applications interact with operating system and functioning of a kernel in an Operating system.
CO2: Summarize resource management in operating systems
CO3: Analyze various scheduling algorithms
CO4: Apply memory management techniques in the design of operating systems
CO5: Understand the functionality of the file system and deadlock prevention and avoidance.
CO6: Understand Perform administrative tasks on Linux based systems.

UNIT – I: Operating Systems Overview, System Structures

Operating Systems Overview: Introduction, Operating system functions, Operating systems operations, Computing environments, Open-Source Operating Systems

System Structures: Operating System Services, User and Operating-System Interface, systems calls, Types of System Calls, system programs, Operating system Design and Implementation, Operating system structure, Operating system debugging, System Boot.

UNIT – II: Process Concept, Multithreaded Programming, Process Scheduling, Inter-process Communication

Process Concept: Process scheduling, Operations on processes, Inter-process communication, Communication in client server systems.

Multithreaded Programming: Multithreading models, Thread libraries, Threading issues, Examples.

Process Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple processor scheduling, Thread scheduling, Examples.

Inter-process Communication: Race conditions, Critical Regions, Mutual exclusion with busy waiting, Sleep and wakeup, Semaphores, Mutexes, Monitors, Message passing, Barriers, Classical IPC Problems - Dining philosophers problem, Readers and writers problem.

UNIT – III: Memory-Management Strategies, Virtual Memory Management

Memory-Management Strategies: Introduction, Swapping, Contiguous memory allocation, Paging, Segmentation, Examples.

Virtual Memory Management: Introduction, Demand paging, Copy on-write, Page replacement, Frame allocation, Thrashing, Memory-mapped files, Kernel memory allocation, Examples.

UNIT – IV: Deadlocks, File Systems

Deadlocks: Resources, Conditions for resource deadlocks, Ostrich algorithm, Deadlock detection And recovery, Deadlock avoidance, Deadlock prevention.

File Systems: Files, Directories, File system implementation, management and optimization.

Secondary-Storage Structure: Overview of disk structure, and attachment, Disk scheduling, RAID structure, Stable storage implementation

UNIT – V: System Protection, System Security

System Protection: Goals of protection, Principles and domain of protection, Access matrix, Access control, Revocation of access rights.

System Security: Introduction, Program threats, System and network threats, Cryptography as a security, User authentication, implementing security defenses, firewalling to protect systems and networks, Computer security classification.

Case Studies: Linux, Microsoft Windows.

Textbooks:

1. Silberschatz A, Galvin P B, and Gagne G, Operating System Concepts, 9th edition, Wiley, 2016.
2. Tanenbaum A S, Modern Operating Systems, 3rd edition, Pearson Education, 2008.
(Topics: Inter-process Communication and File systems.)

Reference Books:

1. Tanenbaum A S, Woodhull A S, Operating Systems Design and Implementation, 3rd edition, PHI, 2006.
2. Dhamdhere D M, Operating Systems A Concept Based Approach, 3rd edition, Tata McGraw-Hill, 2012.
3. Stallings W, Operating Systems -Internals and Design Principles, 6th edition, Pearson Education, 2009
4. Nutt G, Operating Systems, 3rd edition, Pearson Education, 2004

JNTUA College of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
SOFTWARE ENGINEERING

Course Code:20A40504 **Semester IV(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- To learn the basic concepts of software engineering and life cycle models
- To explore the issues in software requirements specification and enable to write SRS documents for software development problems
- To elucidate the basic concepts of software design and enable to carry out procedural and object oriented design of software development problems
- To understand the basic concepts of black box and white box software testing and enable to design test cases for unit, integration, and system testing
- To understand and learn the concepts of software quality

Course Outcomes:

CO1: Obtain basic software life cycle activity skills.
CO2: Design software requirements specifications for given problems.
CO3: Implement structure, object oriented analysis and design for given problems.
CO4: Design test cases for given problems.
CO5: Apply quality management concepts at the application level.

UNIT – I: Basic concepts in software engineering and software project management

Basic concepts: abstraction versus decomposition, evolution of software engineering techniques, Software development life cycle (SDLC) models: Iterative waterfall model, Prototype model, Evolutionary model, Spiral model, RAD model, Agile models, software project management: project planning, project estimation, COCOMO, Halstead's Software Science, project scheduling, staffing, Organization and team structure, risk management, configuration management.

UNIT – II: Requirements analysis and specification

The nature of software, The Unique nature of Webapps, Software Myths, Requirements gathering and analysis, software requirements specification, Traceability, Characteristics of a Good SRS Document, IEEE 830 guidelines, representing complex requirements using decision tables and decision trees, overview of formal system development techniques, axiomatic specification, algebraic specification.

UNIT – III: Software Design

Good Software Design, Cohesion and coupling, Control Hierarchy: Layering, Control Abstraction, Depth and width, Fan-out, Fan-in, Software design approaches, object oriented vs. function oriented design. Overview of SA/SD methodology, structured analysis, Data flow diagram, Extending DFD technique to real life systems, Basic Object oriented concepts, UML Diagrams, Structured design, Detailed design, Design review, Characteristics of a good user interface, User Guidance and Online Help, Mode-based vs Mode-less Interface, Types of user interfaces, Component-based GUI development, User interface design methodology: GUI design methodology.

UNIT – IV: Coding and Testing

Coding standards and guidelines, code review, software documentation, Testing, Black Box Testing, White Box Testing, debugging, integration testing, Program Analysis Tools, system testing, performance testing, regression testing, Testing Object Oriented Programs.

UNIT – V: Software quality, reliability, and other issues

Software reliability, Statistical testing, Software quality and management, ISO 9000, SEI capability maturity model (CMM), Personal software process (PSP), Six sigma, Software quality metrics, CASE and its scope, CASE environment, CASE support in software life cycle, Characteristics of software maintenance, Software reverse engineering, Software maintenance processes model, Estimation maintenance cost. Basic issues in any reuse program, Reuse approach, Reuse at organization level.

Textbooks:

1. Rajib Mall, "Fundamentals of Software Engineering", 5th Edition, PHI, 2018.
2. Pressman R, "Software Engineering- Practioner Approach", McGraw Hill.

Reference Books:

1. Somerville, "Software Engineering", Pearson 2.
2. Richard Fairley, "Software Engineering Concepts", Tata McGraw Hill.
3. JalotePankaj, "An integrated approach to Software Engineering", Narosa.

JNTUA College of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
Database Management Systems Lab

Course Code:20A40505 **Semester IV(R20)** **L T P C: 0 0 3 1.5**

Course Objectives:

- To implement the basic knowledge of SQL queries and relational algebra.
- To construct database models for different database applications.
- To apply normalization techniques for refining of databases.
- To practice various triggers, procedures, and cursors usingPL/SQL.
- To design and implementation of a database for an organization

Course Outcomes:

CO1: Design databases
CO2: Define SQL queries and Retrieve information from data bases
CO3: Apply the constraints in queries
CO4: Implement PL/SQL programs
CO5: Investigate for data inconsistency

Week-1: CREATION OF TABLES

1. Create a table called Employee with the following structure.

Name	Type
Empno	Number
Ename	Varchar2(20)
Job	Varchar2(20)
Mgr	Number
Sal	Number

   a. Add a column commission with domain to the Employee table.
   b. Insert any five records into the table.
   c. Update the column details of job
   d. Rename the column of Employ table using alter command.
   e. Delete the employee whose empno is19.

2. Create department table with the following structure.

Name	Type
Deptno	Number
Deptname	Varchar2(20)
location	Varchar2(20)

a. Add column designation to the department table.
b. Insert values into thetable.
c. List the records of emp table grouped bydeptno.
d. Update the record where deptno is9.
e. Delete any column data from thetable

3. Create a table called Customertable

Name	Type
Cust name	Varchar2(20)
Cust street	Varchar2(20)
Cust city	Varchar2(20)

a. Insert records into thetable.
b. Add salary column to thetable.
c. Alter the table columndomain.
d. Drop salary column of the customertable.
e. Delete the rows of customer table whose ust_city is ‘hyd’.
f. Create a table called branchtable.

Name	Type
Branch name	Varchar2(20)
Branch city	Varchar2(20)
asserts	Number

4. Increase the size of data type for asserts to the branch.
   a. Add and drop a column to the branch table.
   b. Insert values to the table.
   c. Update the branch name column
   d. Delete any two columns from the table
5. Create a table called sailor table

Name	Type
Sid	Number
Sname	Varchar2(20)
rating	Varchar2(20)

   a. Add column age to the sailor table.
   b. Insert values into the sailor table.
   c. Delete the row with rating>8.
   d. Update the column details of sailor.
   e. Insert null values into the table.
6. Create a table called reserves table

Name	Type
Boat	Integer

id	
sid	Integer
day	Integer

a. Insert values into the reservestable.
b. Add column time to the reservestable.
c. Alter the column day data type todate.
d. Drop the column time in thetable.
e. Delete the row of the table with somecondition.

Week-2: QUERIES USING DDL AND DML

1. a. Create a user and grant all permissions to theuser.
   b. Insert the any three records in the employee table and use rollback. Check theresult.
   c. Add primary key constraint and not null constraint to the employeetable.
   d. Insert null values to the employee table and verify theresult.
2. a. Create a user and grant all permissions to theuser.
   b. Insert values in the department table and usecommit.
   c. Add constraints like unique and not null to the departmenttable.
   d. Insert repeated values and null values into thetable.
3. a. Create a user and grant all permissions to theuser.
   b. Insert values into the table and use commit.
   c. Delete any three records in the department table and use rollback.
   d. Add constraint primary key and foreign key to thetable.
4. a. Create a user and grant all permissions to theuser.
   b. Insert records in the sailor table and usecommit.
   c. Add save point after insertion of records and verify save point.
   d. Add constraints not null and primary key to the sailortable.
5. a. Create a user and grant all permissions to theuser.
   b. Use revoke command to remove userpermissions.
   c. Change password of the usercreated.
   d. Add constraint foreign key and notnull.
6. a. Create a user and grant all permissions to theuser.
   b. Update the table reserves and use savepointandrollback.
   c. Add constraint primary key , foreign key and not null to the reserves table
   d. Delete constraint not null to the tablecolumn

Week-3:QUERIES USING AGGREGATE FUNCTIONS

1. a. By using the group by clause, display the enames who belongs to deptno 10 alongwithaveragesalary.
   b. Display lowest paid employee details under eachdepartment.
   c. Display number of employees working in each department and their departmentnumber.
   d. Using built in functions, display number of employees working in each department and their department name from dept table. Insert deptname to dept table and insert deptname for each row, do the required thing specified above.
   e. List all employees which start with either B or C.
   f. Display only these ename of employees where the maximum salary is greater than

or equalto 5000.

2. a. Calculate the average salary for each differentjob.
   b. Show the average salary of each job excludingmanager.
   c. Show the average salary for all departments employing more than threepeople.
   d. Display employees who earn more than thelowest salary in department 30
   e. Show that value returned by sign (n)function.
   f. How many days between day of birth to currentdate
3. a. Show that two substring as singlestring.
   b. List all employee names, salary and 15% rise insalary.
   c. Display lowest paid emp details under eachmanager
   d. Display the average monthly salary bill for eachdeptno.
   e. Show the average salary for all departments employing more than twopeople.
   f. By using the group by clause, display the eid who belongs to deptno 05 along withaverage salary.
4. a. Count the number of employees in department20
   b. Find the minimum salary earned byclerk.
   c. Find minimum, maximum, average salary of allemployees.
   d. List the minimum and maximum salaries for each jobtype.
   e. List the employee names in descendingorder.
   f. List the employee id, names in ascending order byempid.
5. a. Find the sids ,names of sailors who have reserved all boats called"INTERLAKE
      Find the age of youngest sailor who is eligible to vote for each rating level with at least two such sailors.
   b. Find the sname , bid and reservation date for eachreservation.
   c. Find the ages of sailors whose name begin and end with B and has at least 3characters.
   d. List in alphabetic order all sailors who have reserved redboat.
   e. Find the age of youngest sailor for each ratinglevel.
6. a. List the Vendors who have delivered products within 6 months from orderdate.
   b. Display the Vendor details who have supplied both Assembled and Subparts.
   c. Display the Sub parts by grouping the Vendor type (Local or NonLocal).
   d. Display the Vendor details in ascendingorder.
   e. Display the Sub part which costs more than any of the Assembledparts.
   f. Display the second maximum cost Assembledpart

Week-4: PROGRAMS ON PL/SQL

1. a. Write a PL/SQL program to swaptwonumbers.
   b. Write a PL/SQL program to find the largest of threenumbers.
2. a. Write a PL/SQL program to find the total and average of 6 subjects and display thegrade.
   b. Write a PL/SQL program to find the sum of digits in a givennumber.
3. a. Write a PL/SQL program to display the number in reverseorder.
   b. Writea PL/SQLprogramtocheckwhetherthegivennumberisprimeornot.
4. a. Write a PL/SQL program to find the factorial of a givennumber.
   b. Write a PL/SQL code block to calculate the area of a circle for a value of radius varying from 3 to 7. Store the radius and the corresponding values of calculated area in an empty table named areas, consisting of two columns radius andarea.
5. a. Write a PL/SQL program to accept a string and remove the vowels from the string. (When 'hello' passed to the program it should display 'Hll' removing e and o from the worldHello).

b. Write a PL/SQL program to accept a number and a divisor. Make sure the divisor is less than
or equal to 10. Else display an error message. Otherwise Display the remainderin words.

Week-5: PROCEDURES AND FUNCTIONS

1. Write a function to accept employee number as parameter and return Basic +HRA together as single column.
2. Accept year as parameter and write a Function to return the total net salary spent for a givenyear.
3. Create a function to find the factorial of a given number and hence findNCR.
4. Write a PL/SQL block o pint prime Fibonacci series using localfunctions.
5. Create a procedure to find the lucky number of a given birthdate.
6. Create function to the reverse of givennumber

Week-6: TRIGGERS

1. Create a row level trigger for the customers table that would fire for INSERT or UPDATE or DELETE operations performed on the CUSTOMERS table. This trigger will display the salary difference between the old values and newvalues:

   CUSTOMERS table:

ID	NAME	AGE	ADDRESS	SALARY
1	Alive	24	Khammam	2000
2	Bob	27	Kadappa	3000
3	Catri	25	Guntur	4000
4	Dena	28	Hyderabad	5000
5	Eeshwar	27	Kurnool	6000
6	Farooq	28	Nellore	7000

2. Creation of insert trigger, delete trigger, update trigger practice triggers using the passenger database.
   Passenger(Passport_ id INTEGER PRIMARY KEY, Name VARCHAR (50) NotNULL, Age Integer Not NULL, Sex Char, Address VARCHAR (50) NotNULL);
   a. Write a Insert Trigger to check the Passport_id is exactly six digits ornot.
   b. Write a trigger on passenger to display messages '1 Record is inserted', '1 record is deleted', '1 record is updated' when insertion, deletion and updation are done on passengerrespectively.
3. Insert row in employee table using Triggers. Every trigger is created with name any trigger have same name must be replaced by new name. These triggers can raised before insert, update or delete rows on data base. The main difference between a trigger and a stored procedure is that the former is attached to a table and is only fired when an INSERT, UPDATE or DELETEoccurs.
4. Convert employee name into uppercase whenever an employee record is inserted or updated. Trigger to fire before the insert orupdate.
5. Trigger before deleting a record from emp table. Trigger will insert the row to be deleted into table called delete _emp and also record user who has deleted the record and date and

time ofdelete.

6. Create a transparent audit system for a table CUST_MSTR. The system must keep track of the records that are being deleted orupdated

Week-7:PROCEDURES

1. Create the procedure for palindrome of givennumber.
2. Create the procedure for GCD: Program should load two registers with two Numbers and then apply the logic for GCD of two numbers. GCD of two numbers is performed by dividing the greater number by the smaller number till the remainder is zero. If it is zero, the divisor is the GCD if not the remainder and the divisors of the previous division are the new set of two numbers. The process is repeated by dividing greater of the two numbers by the smaller number till the remainder is zero and GCD isfound.
3. Write the PL/SQL programs to create the procedure for factorial of givennumber.
4. Write the PL/SQL programs to create the procedure to find sum of N naturalnumber.
5. Write the PL/SQL programs to create the procedure to find Fibonacciseries.
6. Write the PL/SQL programs to create the procedure to check the given number is perfect ornot

Week-8: CURSORS

1. Write a PL/SQL block that will display the name, dept no, salary of fist highest paidemployees**.**
2. Update the balance stock in the item master table each time a transaction takes place in the item transaction table. The change in item master table depends on the item id is already present in the item master then update operation is performed to decrease the balance stock by the quantity specified in the item transaction in case the item id is not present in the item master table then the record is inserted in the item mastertable.
3. Write a PL/SQL block that will display the employee details along with salary usingcursors.
4. To write a Cursor to display the list of employees who are working as a ManagersorAnalyst.
5. To write a Cursor to find employee with given job anddeptno.
6. Write a PL/SQL block using implicit cursor that will display message, the salaries of all the employees in the ‘employee’ table are updated. If none of the employee’s salary are updated we getamessage 'None of the salaries were updated'. Else we get a message like for example, 'Salaries for 1000 employees are updated' if there are 1000 rows in ‘employee’ table

Week-9: CASE STUDY: BOOK PUBLISHING COMPANY

A publishing company produces scientific books on various subjects. The books are written by authors who specialize in one particular subject. The company employs editors who, not necessarily being specialists in a particular area, each take sole responsibility for editing one or more publications.

A publication covers essentially one of the specialist subjects and is normally written by a single author. When writing a particular book, each author works with on editor, but may submit another work for publication to be supervised by other editors. To improve their competitiveness, the company tries to employ a variety of authors, more than one author being a specialist in a particular subject for the above case study, do thefollowing:

1. Analyze the datarequired.

2. Normalize theattributes.

Create the logical data model using E-R diagrams

Week-10: **CASE STUDY GENERAL HOSPITAL**

AGeneralHospitalconsistsofanumberofspecializedwards(suchasMaternity,Pediatric,Oncology, etc.). Each ward hosts a number of patients, who were admitted on the recommendation of their ownGP and confirmed by a consultant employed by the Hospital. On admission, the personal details of every patient are recorded. A separate register is to be held to store the information of the tests undertaken and the results of a prescribed treatment. A number of tests may be conducted for each patient. Each patient is assigned to one leading consultant but may be examined by another doctor, if required. Doctors are specialists in some branch of medicine and may be leading consultants for a number of patients, not necessarily from the same ward. For the above case study, do the following.

1. Analyze the datarequired.
2. Normalize theattributes.

Create the logical data model using E-R diagrams

Week-11: **CASE STUDY: CAR RENTAL COMPANY**

A database is to be designed for a car rental company. The information required includes a description of cars, subcontractors (i.e. garages), company expenditures, company revenues and customers. Cars are to be described by such data as: make, model, year of production, engine size, fuel type, number of passengers, registration number, purchase price, purchase date, rent price and insurance details. It is the company policy not to keep any car for a period exceeding one year. All major repairs and maintenance are done by subcontractors (i.e. franchised garages), with whom CRC has long-term agreements. Therefore the data about garages to be kept in the database includes garage names, addresses, range of services and the like. Some garages require payments immediately after a repair has been made; with others CRC has made arrangements for credit facilities. Company expenditures are to be registered for all outgoings connected with purchases, repairs, maintenance, insurance etc. Similarly the cash inflow coming from all sources: Car hire, car sales, insurance claims must be kept of file. CRC maintains a reasonably stable client base. For this privileged category of customers special creditcard facilities are provided. These customers may also book in advance a particular car. These reservations can be made for any period of time up to one month. Casual customers must pay a deposit for an estimated time of rental, unless they wish to pay by credit card. All major credit cards are accepted. Personal details such as name, address, telephone number, driving license, number about each customer are kept in the database. For the above case study, do thefollowing:

1. Analyze the datarequired.
2. Normalize theattributes.

Create the logical data model using E-R diagrams

Week-12: **CASE STUDY: STUDENT PROGRESS MONITORING SYSTEM**

A database is to be designed for a college to monitor students' progress throughout their course of study. The students are reading for a degree (such as BA, BA (Hons.) M.Sc., etc) within the framework of the modular system. The college provides a number of modules, each being characterized by its code, title, credit value, module leader, teaching staff and the department they come from. A module is coordinated by a module leader who shares teaching duties with one or more lecturers. A lecturer may teach (and be a module leader for) more than one module. Students are free to choose any module they wish but the following rules must be observed: Some modules require pre- requisites modules and some degree programs have compulsory modules. The database is also to contain some information about studentsincludingtheirnumbers,names,addresses,degreestheyreadfor,andtheirpastperformance i.e. modules taken and examination results. For the above case study, do the following:

1. Analyze the datarequired.
2. Normalize theattributes.
3. Create the logical data model i.e., ERdiagrams.
4. Comprehend the data given in the case study by creating respective tables with primary keys and foreign keys whereverrequired.
5. Insert values into the tables created (Be vigilant about Master- Slavetables).
6. Display the Students who have taken M.Sccourse
7. Display the Module code and Number of Modules taught by eachLecturer.
8. Retrieve the Lecturer names who are not Module Leaders.
9. Display the Department name which offers ‘English ‘module.
10. Retrieve the Prerequisite Courses offered by every Department (with Departmentnames).
11. Present the Lecturer ID and Name who teaches‘Mathematics’.
12. Discover the number of years a Module istaught.
13. List out all the Faculties who work for ‘Statistics’Department.
14. List out the number of Modules taught by each ModuleLeader.
15. List out the number of Modules taught by a particularLecturer.
16. Create a view which contains the fields of both Department and Module tables. (Hint- The fields like Module code, title, credit, Department code and itsname).
17. Update the credits of all the prerequisite courses to
18. Delete the Module ‘History’ from the Moduletable

References:

1. RamezElmasri, Shamkant, B. Navathe, “Database Systems”, Pearson Education, 6th Edition, 2013.
2. Peter Rob, Carles Coronel, “Database System Concepts”, Cengage Learning, 7th Edition, 2008.

JNTUA College Of Engineering (Autonomous),Ananthapuramu

Department of Computer Science & Engineering

OPERATING SYSTEMS LAB

Course Code:20A40506 **Semester IV(R20)** **L T P C : 0 0 3 1.5**

Course Objectives:

- To familiarize students with the architecture of OS.
- To provide necessary skills for developing and debugging CPU Scheduling algorithms.
- To elucidate the process management and scheduling and memory management.
- To explain the working of an OS as a resource manager, file system manager, process manager,
  memory manager, and page replacement tool.
- To provide insights into system calls, file systems and deadlock handling.

Course Outcomes:

After completion of the course, students will be able to

CO1: Trace different CPU Scheduling algorithms (L2).
CO2: Implement Bankers Algorithms to Avoid and prevent the Dead Lock (L3).
CO3: Evaluate Page replacement algorithms (L5).
CO4: Illustrate the file organization techniques and shared memory process (L4).
CO5: Design new scheduling algorithms (L6)

List of Experiments:

1. Practicing of Basic UNIX Commands.
2. Write programs using the following UNIX operating system calls
   Fork, exec, getpid, exit, wait, close, stat, opendir and readdir
3. Simulate UNIX commands like cp, ls, grep, etc.,
4. Simulate the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority
5. Implement a dynamic priority scheduling algorithm.
6. Assume that there are five jobs with different weights ranging from 1 to 5.
   Implement round robin algorithm with time slice equivalent to weight.
7. Implement priority scheduling algorithm. While executing, no process should wait for more than 10 seconds. If the waiting time is more than 10 seconds that process has to be executed for at least 1 second before waiting again.
8. Control the number of ports opened by the operating system with
   a) Semaphore b) Monitors.
9. Simulate how parent and child processes use shared memory and address space.
10. Simulate sleeping barber problem.
11. Simulate dining philosopher's problem.
12. Simulate producer-consumer problem using threads.
13. Implement the following memory allocation methods for fixed partition
    a) First fit b) Worst fit c) Best fit
14. Simulate the following page replacement algorithms
    a) FIFO b) LRU c) LFU etc.,

15. Simulate Paging Technique of memory management
16. Simulate Bankers Algorithm for Dead Lock avoidance and prevention
17. Simulate the following file allocation strategies
    a) Sequential b) Indexed c) Linked

18. Simulate all File Organization Techniques
    a) Single level directory b) Two level c) Hierarchical d) DAG

References:

1. "Operating System Concepts", Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth Edition, John Wiley.
2. "Operating Systems: Internals and Design Principles", Stallings, Sixth Edition–2009, Pearson Education
3. "Modern Operating Systems", Andrew S Tanenbaum, Second Edition, PHI.
4. "Operating Systems", S.Haldar, A.A.Aravind, Pearson Education.
5. "Principles of Operating Systems", B.L.Stuart, Cengage learning, India Edition.2013-2014
6. "Operating Systems", A.S.Godbole, Second Edition, TMH.
7. "An Introduction to Operating Systems", P.C.P. Bhatt, PHI.

JNTUA College of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
SOFTWARE ENGINEERING LAB

Course Code:20A40507 **Semester IV(R20)** **L T P C : 0 0 3 1.5**

Course Objectives:

- To learn and implement the fundamental concepts of Software Engineering.
- To explore functional and non-functional requirements through SRS.
- To practice the various design diagrams through the appropriate tool.
- To learn to implement various software testing strategies.

Course Outcomes:

CO1: Acquaint with historical and modern software methodologies
CO2: Understand the phases of software projects and practice the activities of each phase
CO3: Practice object oriented metrics by coding
CO4: Design the document using different types of diagrams
CO5: Adopt skills of unit testing, system testing, integration testing

List of Experiments:

1. Draw the Work Breakdown Structure for the system to be automated
2. Schedule all the activities and sub-activities Using the PERT/CPM charts
3. Define use cases and represent them in use-case document for all the stakeholders of the system to be automated
4. Identify and analyze all the possible risks and its risk mitigation plan for the system to be automated
5. Diagnose any risk using Ishikawa Diagram (Can be called as Fish Bone Diagram or Cause& Effect Diagram)
6. Define Complete Project plan for the system to be automated using Microsoft Project Tool
7. Define the Features, Vision, Businessobjectives, Business rules and stakeholders in the vision document
8. Define the functional and non-functional requirements of the system to be automated by using Use cases and document in SRS document
9. Define the following traceability matrices :
    1. Use case Vs. Features
    2. Functional requirements Vs. Usecases
10. Estimate the effort using the following methods for the system to be automated:
    1. Function point metric
    2. Usecase point metric
11. Develop a tool which can be used for quantification of all the non-functional requirements
12. Write C/C++/Java/Python program for classifying the various types of coupling.
13. Write a C/C++/Java/Python program for classifying the various types of cohesion.
14. Write a C/C++/Java/Python program for object oriented metrics for design proposed by Chidamber and Kremer. (Popularly called CK metrics)
15. Convert the DFD into appropriate architecture styles.
16. Draw a complete class diagram and object diagrams using Rational tools
17. Define the design activities along with necessary artifacts using Design Document.
18. Reverse Engineer any object-oriented code to an appropriate class and object diagrams.

19. Test a piece of code that executes a specific functionality in the code to be tested and asserts a certain behavior or state using Junit.
20. Test the percentage of code to be tested by unit test using any code coverage tools
21. Define appropriate metrics for at least 3 quality attributes for any software application of your interest.
22. Define a complete call graph for any C/C++ code. (Note: The student may use any tool that generates call graph for source code)

References:

1. Software Engineering? A Practitioner" s Approach, Roger S. Pressman, 1996, MGH.
2. Software Engineering by Ian Sommerville, Pearson Edu, 5th edition, 1999
3. An Integrated Approach to software engineering by PankajJalote , 1991 Narosa

JNTUA College Of Engineering (Autonomous),Ananthapuramu
Computer Science & Engineering
Skill Oriented Course-II
Exploratory Data Analytics with R

Course Code:20A40508 **Semester IV(R20)** **L T P C : 1 0 2 2**

Course Objectives:

- How to manipulate data within R and to create simple graphs and charts used in introductory statistics.
- The given data using different distribution functions in R.
- The hypothesis testing and calculate confidence intervals; perform linear regression models for data analysis.
- The relevance and importance of the theory in solving practical problems in the real world.

Course Outcomes:

CO1: Install and use R for simple programming tasks.
CO2: Extend the functionality of R by using add-on packages
CO3: Extract data from files and other sources and perform various data manipulation tasks on them.
CO4: Explore statistical functions in R.
CO5: Apply the knowledge of R gained to data Analytics for real-life applications.

List of Experiments:

1: INTRODUCTION TO COMPUTING

a. Installation of R
b. The basics of R syntax, workspace
c. Matrices and lists
d. Subsetting
e. System-defined functions; the help system
f. Errors and warnings; coherence of the workspace

2: GETTING USED TO R: DESCRIBING DATA

a. Viewing and manipulating Data
b. Plotting data
c. Reading the data from console, file (.csv) local disk and web
d. Working with larger datasets

3: SHAPE OF DATA AND DESCRIBING RELATIONSHIPS

a. Tables, charts and plots.
b. Univariate data, measures of central tendency, frequency distributions, variation, and Shape.
c. Multivariate data, relationships between a categorical and a continuous variable,
d. Relationship between two continuous variables – covariance, correlation coefficients, comparing multiple correlations.
e. Visualization methods – categorical and continuous variables, two categorical variables, two continuous variables.

4: PROBABILITY DISTRIBUTIONS

a. Sampling from distributions – Binomial distribution, normal distribution

b. tTest, zTest, Chi Square test
c. Density functions
d. Data Visualization using ggplot – Box plot, histograms, scatter plotter, line chart, bar chart, heat maps

5: EXPLORATORY DATA ANALYSIS Demonstrate the range, summary, mean, variance, median, standard deviation, histogram, box plot, scatter plot using population dataset.

6: TESTING HYPOTHESES
a. Null hypothesis significance testing
b. Testing the mean of one sample
c. Testing two means

7: PREDICTING CONTINUOUS VARIABLES
a. Linear models
b. Simple linear regression
c. Multiple regression
d. Bias-variance trade-off – cross-validation

8: CORRELATION
a. How to calculate the correlation between two variables.
b. How to make scatter plots.
c. Use the scatter plot to investigate the relationship between two variables

9: TESTS OF HYPOTHESES
a. Perform tests of hypotheses about the mean when the variance is known.
b. Compute the p-value.
c. Explore the connection between the critical region, the test statistic, and the p-value

10: ESTIMATING A LINEAR RELATIONSHIP Demonstration on a Statistical Model for a Linear Relationship
a. Least Squares Estimates
b. The R Function lm
c. Scrutinizing the Residuals

11: APPLY-TYPE FUNCTIONS
a. Defining user defined classes and operations, Models and methods in R
b. Customizing the user's environment
c. Conditional statements
d. Loops and iterations

12: STATISTICAL FUNCTIONS IN R
a. Write Demonstrate Statistical functions in R
b. Statistical inference, contingency tables, chi-square goodness of fit, regression, generalized linear models, advanced modeling methods.

References:

1. SandipRakshit, “Statistics with R Programming”, McGraw Hill Education, 2018.
2. Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, “AN Introduction to Statistical Learning: with Applications in R”, Springer Texts in Statistics, 2017.
3. Joseph Schmuller, “Statistical Analysis with R for Dummies”, Wiley, 2017.
4. K G Srinivasa, G M Siddesh, ChetanShetty, Sowmya B J, “Statistical Programming in R”, Oxford Higher Education, 2017.

JNTUA College Of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
Mandatory non-credit Course-III
Design Thinking for Innovation
Common to All Branches

Course Code:20A49102 **Semester IV(R20)** **L T P C : 2 1 0 0**

Course Objectives:

- The objective of this course is to familiarize students with design thinking process as a tool for breakthrough innovation. It aims to equip students with design thinking skills and ignite the minds to create innovative ideas, develop solutions for real-time problems.

Course Outcomes:

CO1: Define the concepts related to design thinking.
CO2: Apply the design thinking techniques for solving problems in various sectors.
CO3: Analyze to work in a multidisciplinary environment
CO4: Evaluate the value of creativity
CO5: Formulate specific problem statements of real time issues

UNIT – I: Introduction to Design Thinking

Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design.Introduction to design thinking, history of Design Thinking, New materials in Industry.

UNIT – II: Design Thinking Process

Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, costumer, journey map, brain storming, product development

Activity: Every student presents their idea in three minutes, Every student can present design process in the form of flow diagram or flow chart etc. Every student should explain about product development.

UNIT – III: Innovation

Art of innovation, Difference between innovation and creativity, role of creativity and innovation in organizations.Creativity to Innovation.Teams for innovation, Measuring the impact and value of creativity.

Activity: Debate on innovation and creativity, Flow and planning from idea to innovation, Debate on value-based innovation.

UNIT – IV: Product Design

Problem formation, introduction to product design, Product strategies, Product value, Product

planning, product specifications. Innovation towards product design Case studies.
Activity: Importance of modelling, how to set specifications, Explaining their own product design.

UNIT – V: Design Thinking in Business Processes

Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs. Design thinking for Startups. Defining and testing Business Models and Business Cases. Developing & testing prototypes.

Activity: How to market our own product, About maintenance, Relibility and plan for startup.

Textbooks:

1. Change by design, Tim Brown, Harper Bollins (2009)
2. Design Thinking for Strategic Innovation, IdrisMootee, 2013, John Wiley & Sons.

Reference Books:

1. Design Thinking in the Classroom by David Lee, Ulysses press
2. Design the Future, by Shrrutin N Shetty, Norton Press
3. Universal principles of design- William Lidwell, Kritinaholden, Jill Butter.
4. The era of open innovation – Chesbrough.H

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Formal Languages and Automata Theory

Corse Code:20A50501 **Semester V(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- Introduce languages, grammars, and computational models
- Explain the Context Free Grammars
- Enable the students to use Turing machines
- Demonstrate decidability and un-decidability for NP Hard problems

Course Outcomes (CO):

CO1: Apply formal machines, languages and computations
CO2: Design finite state machines for acceptance of strings
CO3: Develop context free grammars for formal languages
CO4: Build pushdown automata for context free grammars
CO5: Validate decidability and undesirability

UNIT – I: Finite Automata
Why Study Automata Theory? The Central Concepts of Automata Theory, Automation, Finite Automation, Transition Systems, Acceptance of a String by a Finite Automation, DFA, Design of DFAs, NFA, Design of NFA, Equivalence of DFA and NFA, Conversion of NFA into DFA, Finite Automata with E-Transition, Minimization of Finite Automata, Mealy and Moore Machines, Applications and Limitation of Finite Automata.

UNIT-2: Regular Expressions
Regular Expressions, Regular Sets, Identity Rules, Equivalence of two Regular Expressions, Manipulations of Regular Expressions, Finite Automata, and Regular Expressions, Inter Conversion, Equivalence between Finite Automata and Regular Expressions, Pumping Lemma, Closers Properties, Applications of Regular Expressions, Finite Automata and Regular Grammars, Regular Expressions and Regular Grammars.

UNIT-III: Context Free Grammars
Formal Languages, Grammars, Classification of Grammars, Chomsky Hierarchy Theorem, Context Free Grammar, Leftmost and Rightmost Derivations, Parse Trees, Ambiguous Grammars, Simplification of Context Free Grammars-Elimination of Useless Symbols, E-Productions and Unit Productions, Normal Forms for Context Free Grammars-Chomsky Normal Form and Greibach Normal Form, Pumping Lemma, Closure Properties, Applications of Context Free Grammars

UNIT-IV: Pushdown Automata
Pushdown Automata, Definition, Model, Graphical Notation, Instantaneous Description Language Acceptance of pushdown Automata, Design of Pushdown Automata, Deterministic and Non – Deterministic Pushdown Automata, Equivalence of Pushdown Automata and Context Free Grammars Conversion, Two Stack Pushdown Automata, Application of Pushdown Automata.

UNIT-V: Turing Machine

Turing Machine, Definition, Model, Representation of Turing Machines-Instantaneous Descriptions, Transition Tables and Transition Diagrams, Language of a Turing Machine, Design of Turing Machines, Techniques for Turing Machine Construction, Types of Turing Machines, Church's Thesis, Universal Turing Machine, Restricted Turing Machine.

Decidable and Undecidable Problems: NP, NP-Hard and NP-Complete Problems.

Textbooks:

1. Introduction to Automata Theory, Languages and Computation, J.E.Hopcroft, R.Motwani and J.D.Ullman, 3rd Edition, Pearson, 2008.
2. Theory of Computer Science-Automata, Languages and Computation, K.L.P.Mishra and N.Chandrasekaran, 3rd Edition, PHI, 2007.

Reference Books:

1. Formal Language and Automata Theory, K.V.N.Sunitha and N.Kalyani, Pearson, 2015.
2. Introduction to Automata Theory, Formal Languages and Computation, ShyamalenduKandar, Pearson, 2013.
3. Theory of Computation, V.Kulkarni, Oxford University Press, 2013.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Computer Science & Engineering
Computer Networks

Corse Code: 20A50502 **Semester V(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- Introduce the basic concepts of Computer Networks.
- Introduce the layered approach for design of computer networks
- Expose the network protocols used in Internet environment
- Explain the format of headers of IP, TCP and UDP
- Familiarize with the applications of Internet
- Elucidate the design issues for a computer network

Course Outcomes (CO):

CO1: Identify the software and hardware components of a Computer network
CO2: Design software for a Computer network
CO3: Develop new routing, and congestion control algorithms
CO4: Analyze the functionality of each layer of a computer network
CO5: Employ the appropriate transport protocol based on the application requirements

UNIT-I:Computer Networks and the Internet

What is the Internet?, The Network Edge, The Network Core, Delay, Loss, and Throughput in Packet-Switched Networks, Protocol Layers and their Service Models, Networks under attack, History of Computer Networking and the Internet.

UNIT-II: **Application Layer**

Principles of Network Applications, The web and HTTP, Electronic mail in the internet, DNS-The Internet's Directory Service, Peer-to-Peer Applications, Video Streaming and Content Distribution Networks

UNIT-III:**Transport Layer**

Introduction and Transport-Layer Services, Multiplexing and De-multiplexing, Connectionless Transport: UDP, Principles of Reliable Data transfer, Connection-Oriented Transport: TCP, Principles of Congestion Control, TCP Congestion Control

UNIT-IV:**The Network Layer**

Data Plane: Overview of Network Layer, the Internet Protocol (IP): IPv4, Addressing, IPv6, Generalized Forwarding and SDN,
Control Plane: Introduction, Routing Algorithms, Intra-AS Routing in the Internet: OSPF, Routing Among the ISPs: BGP, The SDN Control Plane, ICMP: The Internet Control Message Protocol, Network Management and SNMP,

UNIT-V:**The Link Layer and LANs**

Introduction to the Link Layer, Error-Detection and – Correction Techniques, Multiple Access

Links and Protocols, Switched Local Area Networks, Link Virtualization: A Network as a link Layer, Data Center Networking, Retrospective: A Day in the life of a Web Page Request.

TEXTBOOK:

1.James F. Kurose, Keith W. Ross, “Computer Networking: A Top-Down Approach”, 6th edition, Pearson, 2019.

Reference Books:

1. Forouzan, Datacommunications and Networking, 5th Edition, McGraw Hill Publication.
2. Andrew S.Tanenbaum, David j.wetherall, Computer Networks, 5th Edition, PEARSON.
3. YouluZheng, ShakilAkthar, “Networks for Computer Scientists and Engineers”, Oxford Publishers, 2016.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Design and Analysis of Algorithms

Corse Code: 20A50503 **Semester V(20)** **L T P C : 3 0 0 3**

Course Objectives:

- To analyze the asymptotic performance of algorithms.
- To understand the write rigorous correctness proofs for algorithms.
- To familiarity with major algorithms and data structures.
- Apply important algorithmic design paradigms and methods of analysis.
- Synthesize efficient algorithms in common engineering design situations.

Course Outcomes (CO):

CO1: Explain the basic concepts of time and space complexity
CO2: Explain the basic concepts of divide-and-conquer Strategy, dynamics programmings.
CO3:Greedy and Algorithm
CO4:Describe the methodologies of how to analyze the following applications by Dynamics
CO5:Programming Algorithm.
CO6:Discuss the concept of graph coloring and back tracking
CO7:Analyze the performance of algorithms

UNIT-I: **Introduction**

Introduction: Algorithm, Pseudo code for expressing algorithms, performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, probabilistic analysis, Amortized analysis. Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected components and bi-connected components.

UNIT-II:**Divide and Conquer**

General method, applications-Binary search, Quick sort, Merge sort, Stassen's matrix multiplication. Greedy method: General method, applications-Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

UNIT-III:**Dynamic Programming**

General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

UNIT-IV:**Backtracking**

General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT-V:**Branch and Bound**

General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution. NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NP Complete classes, Cook's theorem.

Textbooks:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, SatrajSahni and Rajasekharam, Universities Press
2. The Algorithm Design Manual, 2nd edition, Steven S. Skiena, spinger
   Introduction to Algorithms, second edition, T.H Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, PHI Pvt.Ltd.

Reference Books:

1. Introduction to the Design and Analysis of Algorithms, AnanyLevitin, PEA
2. Design and Analysis of Algorithms, Pearson Education Parag Himanshu Dave, Himansu Dave, HimansuBalachandra Dave
3. Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T. Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc GrawHill.
4. Design and Analysis of algorithms, Pearson education, Aho, Ullman and Hopcroft.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Professional Elective-I
Introduction to Artificial Intelligence

Corse Code:20A50504a **Semester V (R20)** **L T P C : 3 0 0 3**

Course Objectives:

- AI programming focuses on three cognitive skills
- learning, reasoning and self-correction.
- AI is a research field that studies how to realize the intelligent human behaviors on a computer.

Course Outcomes (CO):

CO1: Solve basic AI based problems.
CO2: Define the concept of Artificial Intelligence.
CO3: Apply AI techniques to real-world problems to develop intelligent systems.

UNIT-I:Fundamentals of AI

Introduction: What is AI, Foundations of AI, History of AI, The State of Art.
Intelligent Agents: Agents and Environments, Good Behaviour: The Concept of Rationality, The Nature of Environments, The Structure of Agents.

UNIT-II:**Solving Problems by searching**
Problem Solving Agents, Example problems, Searching for Solutions, Uninformed Search Strategies, Informed search strategies, Heuristic Functions, Beyond Classical Search: Local Search Algorithms and Optimization Problems, Local Search in Continues Spaces, Searching with Nondeterministic Actions, Searching with partial observations, online search agents and unknown environments.

UNIT-III:**Reinforcement Learning**
Introduction, Passive Reinforcement Learning, Active Reinforcement Learning, Generalization in Reinforcement Learning, Policy Search, applications of RL
Natural Language Processing: Language Models, Text Classification, Information Retrieval, Information Extraction.

UNIT-IV:**Natural Language for Communication**
Phrase structure grammars, Syntactic Analysis, Augmented Grammars and semantic Interpretation, Machine Translation, Speech Recognition

Perception: Image Formation, Early Image Processing Operations, Object Recognition by appearance, Reconstructing the 3D World, Object Recognition from Structural information, Using Vision.

UNIT-V:Robotics
Introduction, Robot Hardware, Robotic Perception, Planning to move, Planning uncertain

movements, Moving, Robotic software architectures, application domains
Philosophical foundations: Weak AI, Strong AI, Ethics and Risks of AI, Agent Components, Agent Architectures, Are we going in the right direction, What if AI does succeed

Textbooks:

1.Stuart J.Russell, Peter Norvig, "Artificial Intelligence A Modern Approach", 3rd Edition, Pearson Education, 2019.

Reference Books:

1.Nilsson, Nils J., and Nils Johan Nilsson. Artificial intelligence: a new synthesis. Morgan Kaufmann, 1998.
2. Johnson, Benny G., Fred Phillips, and Linda G. Chase. "An intelligent tutoring system for the accounting cycle: Enhancing textbook homework with artificial intelligence." Journal of Accounting Education 27.1 (2009): 30-39.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Professional Elective-I

Object Oriented Analysis Design

Corse Code: 20A50504b **Semester V (R20)** **L T P C : 3 0 0 3**

Course Objectives:

- Understand the basic concepts of object-oriented techniques
- Build the Model of the software system using UML diagrams
- Elucidate design patterns as templates for good design
- Learn the object-oriented methodology in software design
- Demonstrate activity diagram and their modelling techniques.

Course Outcomes (CO):

CO1: Analyze the problem from object oriented perspective
CO2: Model complex systems using UML Diagrams
CO3: Determine the suitable design patterns in software design
CO4: Adapt Object-Oriented Design Principles
CO5: Apply basic structural modeling concepts for designing real-time applications

UNIT-I:**Basic concepts**
Basic concepts: objects, classes, abstract classes, data types, ADT, encapsulation and information hiding, inheritance, association, aggregation, composition, polymorphism, dynamic binding, object-oriented principles
UNIT-II:
Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.
Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams. Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

UNIT-III:
Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams
Basic Behavioral Modeling-I: Interactions, Interaction diagrams.
Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams.

UNIT-IV:
Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams. Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

UNIT-V:
Patterns and Frameworks, Artifact Diagrams. Case Study: The Unified Library application

Textbooks:

1.Rajib Mall, “Fundamentals of Software Engineering”, 5th Edition, PHI, 2018

Reference Books:

1.Rumbaugh and Blaha, Object-oriented Modeling and design with UML, Pearson, 2007

2. Bernd Bruegge and, Allen H. Dutoit, Object-Oriented Software Engineering Using UML, Patterns, and Java, Pearson, 2009

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Professional Elective-I
OPTIMIZATION TECHNIQUES

Corse Code:20A50504c **Semester V (R20)** **L T P C : 3 0 0 3**

Course Objectives:

- The basic concepts of Optimization
- The emphasis of this course is on different classical Optimization techniques linearprogramming and simplex algorithms.
- About optimality of balanced transportation Problems
- About Constrained and unconstrained nonlinear programming.
- About principle of optimality and dynamic programming

Course Outcomes (CO):

- To know how to formulate statement of optimization problem with or without constraints
- To know about classification of single and multivariable optimization problems
- To know about necessary and sufficient conditions in defining the optimization problems
- To understand how to formulate Kuhn-Tucker conditions and to solve numerical problems

UNIT-I: **Introduction and Classical Optimization Techniques:**

Statement of an Optimization problem – design vector – design constraints – constraint surface – objective function – objective function surfaces – classification of Optimization problems. Classical Optimization Techniques: Single variable Optimization – multi variable Optimization without constraints – necessary and sufficient conditions for minimum /maximum – multivariable Optimization with equality constraints. Solution by method of Lagrange multipliers – multivariable Optimization with inequality constraints – Kuhn – Tucker conditions – Numerical examples.

UNIT-II:**Linear Programming**

Standard form of a linear programming problem – geometry of linear programming problems – definitions and theorems – solution of a system of linear simultaneous equations – pivotal reduction of a general system of equations – motivation to the simplex method – simplex algorithm – Numerical examples.

UNIT-III:**Nonlinear Programming – One Dimensional Minimization methods**

Introduction, Unimodal function, Elimination methods- Unrestricted Search, Exhaustive Search, Dichotomous Search, Fibonacci Method, Golden Section Method and their comparison; Interpolation methods - Quadratic Interpolation Method, Cubic Interpolation Method and Direct Root Methods – Numerical examples.

UNIT-IV:**Unconstrained & Constrained Nonlinear Programming**

Unconstrained Optimization Techniques: Introduction- Classification of Unconstrained Minimization Methods, General Approach, Rate of Convergence, Scaling of Design Variables;

Direct Search methods- Random Search Methods, Grid Search Method, Pattern Directions, Powell's Method and Simplex Method

Constrained Optimization Techniques: Introduction, Characteristics of a Constrained Problem, Direct Search Methods - Random Search Methods, Basic Approach in the Methods of Feasible Directions, Rosen's Gradient Projection Method, Generalized Reduced Gradient Method and Sequential Quadratic Programming.

UNIT-V:**Dynamic Programming**

Dynamic programming multistage decision processes – types – concept of sub optimization and the principle of optimality – computational procedure in dynamic programming – examples illustrating the calculus method of solution - examples illustrating the tabular method of solution – Numerical examples.

Textbooks:

1.S . S. Rao, "Engineering optimization": Theory and practice 3rd edition, New Age International (P) Limited, 1998.

2. H.S. Kasana& K.D. Kumar, "Introductory Operations Research Springer (India)", 2004

Reference Books:

1.R Fletcher, "Practical Methods of Optimization" , 2 ndEdition, Wiley Publishers, 2000.

2. Jorge Nocedal and Wright S, "Numerical Optimization Springer", 1st Edition, 1999.

3. by K.V. Mital and C. Mohan, "Optimization Methods in Operations Research and systems Analysis" 3 rdEdition, New Age International (P) Limited, 1996.

4. by S.D. Sharma, "Operations Research", Kedar Nath, 2012.

5. by H.A. Taha, "Operations Research", 9 thEdition, An Introduction Pearson, 2010.

6. G. Hadley, "Linear Programming", Narosa, 2002.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
OPEN ELECTIVE-I
Common to All Branches
INTRODUCTION TO JAVA PROGRAMMING

Course Code:20A50505 **Semester V(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- To understand object-oriented concepts and problem-solving techniques
- To obtain knowledge about the principles of inheritance and polymorphism
- To implement the concept of packages, interfaces, exception handling and concurrency mechanism.
- To design the GUIs using applets and swing controls.
- To understand the Java Database Connectivity Architecture

Course Outcomes:

CO6: Solve real-world problems using OOP techniques.
CO7: Apply code reusability through inheritance, packages and interfaces
CO8: Solve problems using java collection framework and I/O classes.
CO9: Develop applications by using parallel streams for better performance and develop applets for web applications.
CO10: Build GUIs and handle events generated by user interactions and Use the JDBC API to access the database.

UNIT – I: **Introduction**
Introduction to Object Oriented Programming, The History and Evolution of Java, Introduction to Classes, Objects, Methods, Constructors, this keyword, Garbage Collection, Data Types, Variables, Type Conversion and Casting, Arrays, Operators, Control Statements, Method Overloading, Constructor Overloading, Parameter Passing, Recursion, String Class and String handling methods.

UNIT – II: **Inheritance, Packages, Interfaces**
Inheritance: Basics, Using Super, Creating Multilevel hierarchy, Method overriding, Dynamic Method Dispatch, Using Abstract classes, Using final with inheritance, Object class,
Packages: Basics, Finding packages and CLASSPATH, Access Protection, Importing packages.
Interfaces: Definition, Implementing Interfaces, Extending Interfaces, Nested Interfaces, Applying Interfaces, Variables in Interfaces.

UNIT – III: **Exception handling, Stream based I/O**
Exception handling - Fundamentals, Exception types, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built-in exceptions, creating own exception subclasses.
Stream based I/O (java.io) – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and Writing Files, Random access file operations, The Console class, Serialization, Enumerations, Autoboxing, Generics.

UNIT – IV: **Multithreading, The Collections Framework**

Multithreading: The Java thread model, Creating threads, Thread priorities, Synchronizing threads, Interthread communication.

The Collections Framework (java.util): Collections overview, Collection Interfaces, The Collectionclasses- Array List, Linked List, Hash Set, Tree Set, Priority Queue, Array Deque. Hashtable, Properties, Stack, Vector, String Tokenizer, Bit Set, Date, Calendar, Random, Formatter, Scanner.

UNIT – V: **Applet, GUI Programming with Swings, Accessing Databases with JDBC**

Applet: Basics, Architecture, Applet Skeleton, requesting repainting, using the status window, passing parameters to applets

GUI Programming with Swings – The origin and design philosophy of swing, components and containers, layout managers, event handling, using a push button, jtextfield, jlabel and image icon, the swing buttons, jtext field, jscrollpane, jlist, jcombobox, trees, jtable, An overview of jmenubar, jmenu and jmenuitem, creating a main menu, show message dialog, show confirmdialog, show input dialog, show option dialog, jdialog, create a modeless dialog.

Accessing Databases with JDBC:

Types of Drivers, JDBC Architecture, JDBC classes and Interfaces, Basic steps in developing JDBC applications, Creating a new database and table with JDBC.

Textbooks:

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Java How to Program, 10th Edition, Paul Dietel, Harvey Dietel, Pearson Education.

Reference Books:

9. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.
10. Core Java Volume – 1 Fundamentals, Cay S. Horstmann, Pearson Education.
11. Java Programming for core and advanced learners, Sagayaraj, Dennis, Karthik andGajalakshmi, University Press
12. Introduction to Java programming, Y. Daniel Liang, Pearson Education

JNTUA College of Engineering(Autonomous),Ananthapuramu
Department of Computer Science & Engineering
Computer Networks Lab

Course Code:20A50506 **Semester V(R20)** **L T P C : 0 0 3 1.5**

Course Objectives:

- Understand the different types of networks
- Discuss the software and hardware components of a network
- Enlighten the working of networking commands supported by operating system
- Impart knowledge of Network simulator 2/3
- Familiarize the use of networking functionality supported by JAVA
- Familiarize with computer networking tools.

Course Outcomes:

After completion of the course, students will be able to
CO1: Design scripts for Wired network simulation (L6)
CO2: Design scripts of static and mobile wireless networks simulation (L6)
CO3: Analyze the data traffic using tools (L4)
CO4: Design JAVA programs for client-server communication (L6)
CO5: Construct a wired and wireless networks using the real hardware (L3)

List of Experiments:

1.

- Study different types of Network cables (Copper and Fiber) and prepare cables (Straight and Cross) to connect Two or more systems. Use crimping tool to connect jacks. Use LAN tester to connect
  the cables.
- Install and configure Network Devices: HUB, Switch and Routers. Consider both manageable and non-manageable switches. Do the logical configuration of the system. Set the bandwidth of
  Different ports.
- Install and Configure Wired and Wireless NIC and transfer files between systems in Wired LAN
  And Wireless LAN. Consider both adhoc and infrastructure mode of operation.

2. Work with the commands Ping, Tracert, Ipconfig, pathping, telnet, ftp, getmac, ARP, Hostname,
Nbtstat, netdiag, and Nslookup

3. Use Sniffers for monitoring network communication (Ethereal)

4. Find all the IP addresses on your network. Unicast, Multicast, and Broadcast on your network.

5. Use Packet tracer software to build network topology and configure using Distance vector routing protocol.

6. Use Packet tracer software to build network topology and configure using Link State routing protocol.

7. Using JAVA RMI Write a program to implement Basic Calculator
8. Implement a Chatting application using JAVA TCP and UDP sockets.
9. Hello command is used to know whether the machine at the other end is working or not.
Echo command is used to measure the round trip time to the neighbour. Implement Hello and Echo commands using JAVA.
10. Use Ethereal tool to capture the information about packets.
11. Install Network Simulator 2/3. Create a wired network using dumbbell topology. Attach agents, generate both FTP and CBR traffic, and transmit the traffic. Vary the data rates and evaluate the performance using metric throughput, delay, jitter and packet loss.
12. Create a static wireless network. Attach agents, generate both FTP and CBR traffic, and transmit the traffic. Vary the data rates and evaluate the performance using metric throughput, delay, jitter and packet loss.
13. Create a mobile wireless network. Attach agents, generate both FTP and CBR traffic, and transmit the traffic. Vary the data rates and evaluate the performance using metric throughput, delay, jitter and packet loss.

References Books:

1. **Shivendra S.Panwar, Shiwen Mao, Jeong-dong Ryoo, and Yihan Li, "TCP/IP Essentials A Lab-Based Approach", Cambridge University Press, 2004.**
2. **Cisco Networking Academy, "CCNA1 and CCNA2 Companion Guide", Cisco Networking Academy Program, 3rd edition, 2003.**
3. Ns Manual, Available at: https://www.isi.edu/nsnam/ns/ns-documentation.html, 2011.
4. Elloitte Rusty Harold, "Java Network Programming", 3rd edition, O'REILLY, 2011.

JNTUA College of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
Design and Analysis of Algorithms Lab

Course Code:20A50507 Semester V(R20) L T P C : 0 0 3 1.5

Course Objectives:

- Implement the various algorithms that are being studied in Design and Analysis of Algorithms subject in C++/Java.
- Analyze the asymptotic performance of algorithms.
- Write rigorous correctness proofs for algorithms.
- Demonstrate a familiarity with major algorithms and data structures.
- Apply important algorithmic design paradigms and methods of analysis.
- Synthesize efficient algorithms in common engineering design situations

Course Outcomes:

After completion of the course, students will be able to

- Argue the correctness of algorithms using inductive proofs and invariants.
- Analyze worst-case running times of algorithms using asymptotic analysis
- Explain what competitive analysis is and to which situations it applies. Perform competitive analysis

List of Experiments:

1. Write a program that implements Prim's algorithm to generate minimum cost spanning tree.
2. Write a program that implements Kruskal's algorithm to generate minimum cost spanning tree.
3. Write a program to implement Huffman's algorithm for text compression.
4. Write a program to implement Dijkstra's algorithm for Single source shortest path problem.
5. Write a program to implement Floyd's algorithm for the All pairs shortest path problem.
6. Write a program to implement Floyd's algorithm for the All pairs shortest path problem.
7. Write a program to implement greedy algorithm for job sequencing with deadlines.
8. Write programs for the implementation of bfs and dfs for a given graph.
9. Write a program to find Minimum Cost Binary Search Tree.
10. Write a program to implement Dynamic Programming algorithm for 0/1 Knapsack problem.
11. Write a program to implement the Backtracking algorithm for the sum of subsets problem.
12. Write programs to implement backtracking algorithms for
    a) N-queens problem
    b) The Hamiltaonian cycles problem
    c) The m-colourings graph problem

Reference Books:

1. Data structures and Algorithms in java,3^{rd}edition,A.Drozdek,Cengage Learning.
2. Data structures with Java,J.R.Hubbard,2^{nd}edition,Schaum'sOutlines,TMH.
3. Data structures and algorithms in Java, 2^{nd} Edition, R.Lafore, Pearson Education.
4. Data Structures using Java, D.S.Malik and P.S. Nair, Cengage Learning.
5. Data structures, Algorithms and Applications in java, 2nd Edition, S.Sahani, Universities Press.
6. Data structures, Algorithms and Applications in C++, 2nd Edition, S.Sahani, Universities Press.
7. Data structures and Algorithm Analysis in C++,2nd Edition,M.A.Weiss,Pearson education.
8. Design and Analysis of Algorithms, P.H.Dave and H.B.Dave, Pearson education.
9. Data structures and java collections frame work,W.J.Collins,Mc Graw Hill.
10. A Practical guide to Data structures and Algorithms using Java,Goldman&Goldman, Chapman and Hall/CRC,Taylor and Francis Group.

JNTUA College Of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
Skill Advanced Course-III
Soft Skills

Course Code:20A55502 **Semester V(R20)** **L T P C : 1 0 2 2**

Course Objectives:
- To encourage all round development of the students by focusing on soft skills
- To make the students aware of critical thinking and problem-solving skills
- To develop leadership skills and organizational skills through group activities
- To function effectively with heterogeneous teams

Course Outcomes:

- Define various elements of effective communicative skills
- Understanding people using emotional intelligence
- apply critical thinking skills in problem solving
- ·analyse the needs of an organization for team building
- ·Assess the situation and take necessary decisions as a leader
- Creating a productive work place atmosphere using social and work-life skills ensuring personal and emotional well-being

UNIT – I: Soft Skills & Communication Skills

Introduction, meaning, significance of soft skills – definition, significance, types of communication skills - Intrapersonal & Inter-personal skills - Verbal and Non-verbal Communication

Activities:

Intrapersonal Skills- Narration about self- strengths and weaknesses- clarity of thought – self-expression – articulating with felicity

(The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes and literary sources)

Inter personal Skills- Group Discussion – Debate – Team Tasks - Book and film Reviews by groups - Group leader presenting views (non- controversial and secular) on contemporary issues or on a given topic.

Verbal Communication- Oral Presentations- Extempore- brief addresses and speeches- convincing- negotiating- agreeing and disagreeing with professional grace.

Non-verbal communication – Public speaking – Mock interviews – presentations with an objective to identify non- verbal clues and remedy the lapses on observation

UNIT – II: Critical Thinking

Active Listening – Observation – Curiosity – Introspection – Analytical Thinking – Open-mindedness – Creative Thinking

Activities
Gathering information and statistics on a topic - sequencing – assorting – reasoning – critiquing issues –placing the problem – finding the root cause - seeking viable solution – judging with rationale – evaluating the views of others - Case Study, Story Analysis

UNIT – III:Problem Solving & Decision Making
Meaning & features of Problem Solving – Managing Conflict – Conflict resolution –
Methods of decision making – Effective decision making in teams – Methods & Styles
Activities:

Placing a problem which involves conflict of interests, choice and views – formulating the problem – exploring solutions by proper reasoning – Discussion on important professional, career and organizational decisions and initiate debate on the appropriateness of the decision.
Case Study & Group Discussion

UNIT – IV: **Emotional Intelligence & Stress Management**
Managing Emotions – Thinking before Reacting – Empathy for Others – Self-awareness – Self-Regulation – Stress factors – Controlling Stress – Tips

Activities:

Providing situations for the participants to express emotions such as happiness, enthusiasm, gratitude, sympathy, and confidence, compassion in the form of written or oral presentations.

Providing opportunities for the participants to narrate certain crisis and stress –ridden situations caused by failure, anger, jealousy, resentment and frustration in the form of written and oral presentation, Organizing Debates

UNIT – V: Leadership Skills

Team-Building – Decision-Making – Accountability – Planning – Public Speaking – Motivation – Risk-Taking - Team Building - Time Management

Activities

Forming group with a consensus among the participants- choosing a leader- encouraging the group members to express views on leadership- democratic attitude- sense of sacrifice – sense of adjustment – vision – accommodating nature- eliciting views on successes and failures of leadership using the past knowledge and experience of the participants, Public Speaking, Activities on Time Management, Motivation, Decision Making , Group discussion etc.

NOTE-:

1. The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes, epics, scriptures, autobiographies and literary sources which bear true relevance to the prescribed skill.

2. Case studies may be given wherever feasible for example for Decision Making- The decision of King Lear or for good Leadership – Mahendar Singh Dhoni etc.

Textbooks:

1.Personality Development and Soft Skills (English, Paperback, Mitra Barun K.) Publisher : Oxford University Press; Pap/Cdr edition (July 22, 2012)

2. Personality Development and Soft Skills: Preparing for Tomorrow, Dr Shikha KapoorPublisher : I K International Publishing House; 0 edition (February 28, 2018)

Reference Books:

1. Soft skills: personality development for life success by prashantsharma, BPB publications 2018.
2. Soft Skills By Alex K. Published by S.Chand
3. Soft Skills: An Integrated Approach to Maximise Personality Gajendra Singh Chauhan, Sangeetha Sharma Published by Wiley.
4. Communication Skills and Soft Skills (Hardcover, A. Sharma) Publisher: Yking books
5. SOFT SKILLS for a BIG IMPACT (English, Paperback, RenuShorey) Publisher: Notion Press
6. Life Skills Paperback English Dr. Rajiv Kumar Jain, Dr. Usha Jain Publisher : Vayu Education Of India

Online Learning Resources:

1.https://youtu.be/DUlsNJtg2L8?list=PLLy_2iUCG87CQhELCytvXh0E_y-bOO1_q

2.https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel_j2PUy0pwjVUgj7KlJ

3.https://youtu.be/-Y-R9hDl7lU

4.https://youtu.be/gkLsn4ddmTs

5.https://youtu.be/2bf9K2rRWwo

6.https://youtu.be/FchfE3c2jzc

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Compiler Design

Course Code20A60501 **Semester VI(20)** **L T P C : 3 0 0 3**

Course Objectives:

- This course in Computer Science, as it combines skills in software design, programming, data structures and algorithms, theory of computing, documentation, and machine architecture to produce a functional compiler. Realize that computing science theory can be used as the basis for real.

Course Outcomes:

- Able to understand the various phases of compiler and analyze the lexical tool.
- Students should be in a position to understand the different types of parsing Techniques and apply
- Lex tool & YAAC tools.
- Design syntax directed translations for semantic analysis of various language features and produce intermediate code.
- Students should be able to understand and design different code generation technique and algorithms.
- Apply various optimization techniques to the intermediate code/machine code.

UNIT – I: Introduction & Lexical Analysis

Language processors, Phases of a compiler, Pass and phase, Bootstrapping, Compiler construction tools, Applications of compiler technology.

Lexical Analysis: Role and Responsibility, Input buffering, Specification of tokens, Recognition of tokens, LEX tool.

UNIT – II: Syntax Analysis, Top Down Parsing, Bottom up parsing

Syntax Analysis: Role of the parser, Context Free Grammars: Definition, Derivations, Parse trees, Ambiguity, Eliminating ambiguity, Left recursion, Left factoring.

TOP Down Parsing: Recursive descent parsing, Non-recursive predictive parsing, LL(1) grammars, Error recovery in predictive parsing.

Bottom up Parsing: Handle pruning, Shift-Reduce parsing, Conflicts during shifts- reduce parsing, SLR Parsing, Canonical LR (1) parsers, LALR parsers, Using ambiguous grammars, YACC tool.

UNIT – III: Syntax Directed Translations, Intermediate Code Generation

Syntax Directed Translation: Syntax Directed Definitions, Evaluation orders for SDD‘s, Application of SDT, SDT schemes

Intermediate Code Generation: Need for intermediate code, Types of intermediate code, Three address code, Quadruples, Triples, Type expressions, Type equivalence, Type checking, Translation of expressions, control flow statements, switch statement, procedures, back patching.

UNIT – IV: Run Time Storage Organization, Code Generation

Run Time Storage Organization: Storage Organization, Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management, Symbol table organization.

Code Generation: Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code, A Simple Code Generator.

UNIT – V: Code Optimization

Principle source of Optimization, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, Introduction to Data-Flow Analysis, Constant Propagation, Partial-Redundancy Elimination, Loops in Flow Graphs.

Textbooks:

1. Compilers Principles, Techniques and Tools, Second Edition, Alfred V.Aho, Monica S.Lam, Ravi Sethi, Jeffrey D. Ullman, Pearson

Reference Books:

I. Compiler Construction‖, K.V.N. Sunitha, Pearson, 2013

II. EngineeringACompiler‖,SecondEdition,KeithD.Cooper&LindaTorczon.,MK(MorganKaufmann)(ELSEVIER)

III. Compilers Principles and Practice‖, ParagH. Dave, HimanshuB. Dave.,PEARSON

IV. CompilerDesign‖, SandeepSaxena, RajkumarSinghRathore, S.Chandpublication

V. Compiler Design‖, SantanuChattopadhyay., PHI

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Machine Learning

Course Code:20A60502 **Semester VI(R20)** **L T P C: 3 0 0 3**

Course Objectives:

- Understand the basic theory underlying machine learning
- Formulate machine learning problems corresponding to different applications.
- Illustrate a range of machine learning algorithms along with their strengths and weaknesses
- Apply machine learning algorithms to solve problems of moderate complexity.

Course Outcomes:

CO1: Identify machine learning techniques suitable for a givenproblem.
CO2: Solve the real world problems using various machine learningtechniques.
CO3: Apply Dimensionality reductiontechniques for data preprocessing.
CO4: Explain what is learning and why it is essential in the design of intelligent machines.
CO5: Implement Advanced learning models for language, vision, speech, decision making etc.

UNIT – I: Introduction

Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

UNIT – II: Neural networksand genetic Algorithms

Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evolution and Learning.

UNIT – III: Bayesian and computational learning

Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

UNIT - IV: Instance based learning

K- Nearest Neighbor Learning – Locally weighted Regression – Radial Bases Functions – Case Based Learning.

UNIT – V: Advanced learning

Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm –Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning.

Textbooks:

1. T.M. Mitchell, "Machine Learning", McGraw-Hill,1997.

Reference Books:

1. EthernAlpaydin, "Introduction to Machine Learning", MIT Press,2004.
2. Stephen Marsland, "Machine Learning -An Algorithmic Perspective", Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series,2014

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Cryptography and network Security

Course Code:20A60503 Semester VI(R20) L T P C : 3 0 0 3

Course Objectives:

- Introduce the basic categories of threats to computers and networks
- Illustrate various cryptographic algorithms.
- Demonstrate public-key cryptosystem.
- Discuss the fundamental ideas of public-key cryptography.

Course Outcomes:

CO1: Identify various type of vulnerabilities of a computer network
CO2: Illustrate various cryptographic algorithms.
CO3: Demonstrate public-key cryptosystem.
CO4: Discuss the fundamental ideas of public-key cryptography.
CO5: Explore Web security threats and protection mechanisms .

UNIT – I: Attacks on Computers and Computer Security,Cryptography: Concepts and Techniques

Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security. Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT – II: Symmetric key Ciphe, Asymmetric key Ciphers

Symmetric key Ciphe: rs Block Cipher principles &Algorithms (DES, AES, Blowfish), Differential and Linear Cryptanalysis, Block cipher modes of operation, Stream ciphers, RC4,Location and placement of encryption function, Key distribution

Asymmetric key Ciphers: Principles of public key cryptosystems, Algorithms(RSA, Diffie-Hellman,ECC), Key Distribution.

UNIT – III: MessageAthentication Algorithms and Hash Functions

Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures, knapsack algorithm.

UNIT – IV: E-Mail Security, IP Security

E-Mail Security: Pretty Good Privacy, S/MIME

IP Security: IP Security overview, IP Security architecture, Authentication Header, encapsulating security payload, combining security associations, key management.

UNIT – V: Web Security, Intruders, Virus and Firewalls,Case Studies on Cryptography and security

Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction

Intruders, Virus and Firewalls: Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls

Case Studies on Cryptography and security: Secure Inter-branch Payment Transactions, Cross site

Scripting Vulnerability, Virtual Elections.

Textbooks:

- William Stallings, "Cryptography and Network Security", 5th Edition, Pearson Education, 2011.
- AtulKahate, "Cryptography and Network Security", 2nd Edition, Mc Graw Hill, 2010.
- Bernard Menezes "Network Security and Cryptography", 1stEdition, CENGAGE Learning, 2010.

Reference Books:

- C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, "Cryptography and Network Security",1st Edition, Wiley India Pvt Ltd, 2011.
- ForouzanMukhopadhyay "Cryptography and Network Security", 2nd Edition , Mc Graw Hill, 2010.
- Mark Stamp, Wiley India, "Information Security, Principles and Practice", 2nd Edition, Wiley, 2011.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Software testing
Professional Elective-II

Course Code:20A60504 **Semester VI(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- Finding defects which may get created by the programmer while developing the software.
- Gaining confidence in and providing information about the level of quality.
- To prevent defects.
- To make sure that the end result meets the business and user requirements.
- Execute specific software tests with well-defined objectives and targets.

Course Outcomes (CO):

Upon completion of the course, the students should be able to:
CO1: Acquire knowledge on distinct types of testing methodologies.
CO2: Describe the principles and procedures for designing test cases.
CO3: Understand the stages of testing from Development to acceptance testing
CO4: Formulate test cases for testing different programming constructs.
CO5: Test the applications using different testing methods and automation tools.

UNIT – I: **Introduction, Flow graphs and Path testing**
Introduction: Purpose of Testing, Dichotomies, Model for Testing, Consequences of Bugs, Taxonomy of Bugs.
Flow graphs and Path testing: Basics Concepts of Path Testing, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Application of Path Testing.

UNIT – II: **Transaction Flow Testing, Dataflow testing**
Transaction Flow Testing: Transaction Flows, Transaction Flow Testing Techniques.
Dataflow testing: Basics of Dataflow Testing, Strategies in Dataflow Testing, Application of Dataflow Testing.

UNIT – III: **Domain Testing**
Domain Testing: Domains and Paths, Nice & Ugly Domains, Domain testing, Domains and Interfaces Testing, Domain and Interface Testing, Domains and Testability.

UNIT – IV: **Paths, Path products and Regular expressions, Logic Based Testing**
Paths, Path products and Regular expressions: Path Products & Path Expression, Reduction Procedure, Applications, Regular Expressions & Flow Anomaly Detection.
Logic Based Testing: Overview, Decision Tables, Path Expressions, KV Charts, Specifications.

UNIT – V: **State, State Graphs and Transition Testing, Graph Matrices and Application**
State, State Graphs and Transition Testing: State Graphs, Good & Bad State Graphs, State Testing, Testability Tips.
Graph Matrices and Application: Motivational Overview, Matrix of Graph, Relations, Power of a Matrix, Node Reduction Algorithm, Building Tools.

Textbooks:

1. Boris Beizer, “Software testing techniques”, Dreamtech, second edition, 2002.

Reference Books:

1. Brian Marick, “The craft of software testing”, Pearson Education.
2. Yogesh Singh, “Software Testing”, Camebridge
3. P.C. Jorgensen, “Software Testing” 3rd edition, Aurbach Publications (Dist.by SPD).
4. N.Chauhan, “Software Testing”, Oxford University Press.
5. P.Ammann&J.Offutt, “Introduction to Software Testing” , Cambridge Univ. Press.
6. Perry, “Effective methods of Software Testing”, John Wiley, 2nd Edition, 1999.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Fundamentals of AR/VR
Professional Elective-II

Course Code:20A60504b Semester VI(R20) L T P C : 3 0 0 3

Course Objec**tives**:

1. To Teach about human interaction with computers
2. To Demonstrate Virtual reality
3. To introduce to the current state of VR Hardware and Software.
4. To explain how to apply VR/MR/AR for various applications.

Course Outcomes:

CO1: Study the fundamentals of VR, AR and MR
CO2: Select appropriate software and hardware for developing VR Applications
CO3: Design audio and video interaction paradigms
CO4: Design VR Applications
CO5: Create game objects using unity.

UNIT – I: **Introduction to Virtual Reality**
What is Virtual Reality, Modern VR experiences, History Repeats.
Unity: Virtually Everything for you, what is virtual reality to you, types of head-mounted displays: Desktop VR, Mobile VR, The difference between virtual reality and augmented reality, Applications vs Games, Types of VR experiences, and Technical skills that are important to VR.
UNIT – II: **Bird's-Eye View**
Hardware, Software, Human Physiology and Perception.
Unity: Objects and Scale: Getting started with unity, creating a simple Diorama, Measurement tools, First Person Character: Understanding the Unity characters, Unity standard assets.
UNIT – III: **The Geometry of Virtual Worlds & Light and Optics:**
Geometric Models, Changing Position and Orientation, Axis-Angle Representations of Rotation, Viewing Transformations, Chaining the Transformations.
Light and Optics: Basic behavior of light, lenses, Optical Aberrations**,** Human Eye, Cameras, and Displays.
UNIT – IV: **The Physiology of Human Vision**
From the Cornea to Photoreceptors, From Photoreceptors to the Visual Cortex, Eye Movements, Implications for VR.
UNIT – V: **Motion in Real and Virtual Worlds**
Motion in Real and Virtual Worlds :The Vestibular System, Physics in the Virtual World.
Audio: The Physics of Sound, the Physiology of Human Hearing, Auditory Perception.

Textbooks:
1. Virtual Reality, Steven M. LaValle, Cambridge University Press, 2016

Reference Books:
1..Unity Virtual reality Projects, Jonathan Linowes, PACKT Publishing.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
IMAGE AND VIDEO PROCESSING
Professional Elective-II

Course Code:20A60505 **Semester VI(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- Comprehend the image processing fundamentals and enhancement techniques in spatial and frequency domain.
- Describe the color image fundamentals, models and various restoration techniques.
- Design and Analyze the image compression systems.
- Outline the various image segmentation and morphology operations.

Course Outcomes:

- After completion of this course, students will be able to –
- Understand theory and models in Image and Video Processing.
- Explain the need of spatial and frequency domain techniques for image compression.
- Illustrate quantitative models of image and video segmentation.
- Apply the process of image enhancement for optimal use of resources.

UNIT-I: Digital image fundamentals

A simple image formation model, Image sampling and quantization, Some basic relationships between pixels, Basic intensity transformation functions, Sampling and fourier transform of sampled functions, The discrete fourier transform of one variable, Extensions to functions of two variables(2-D discrete fourier transform, Properties of 2-D DFT and IDFT, 2-D Discrete Convolution Theorem.

UNIT-II: Image Enhancement(spatial domain)

Histogram processing, Fundamentals of spatial filtering, Smoothing spatial filters, Sharpening spatial filters,The Laplacian-use of second order derivative for image sharpening, The Gradient-use of first order derivative for image sharpening

Image Enhancement(frequency domain): Basics of filtering in frequency domain, Image smoothing using lowpass frequency domain filters, Image sharpening using highpass filters

UNIT-III: Image restoration

Noise Models, Restoration in the presence of noise only – Spatial filters, Periodic noise reduction using Frequency domain filtering, Estimating the degradation function, inverse filtering, Minimum Least square error filtering,constrained least square filters

Wavelet and Multiresolution processing: Matrix-based transform, Walsh-Hadamard Transform, Slant transform, Haar transform

UNIT- IV: Image compression

Lossy and lossless compression schemes: Huffman coding, Run-length coding, Arithmetic coding, Block transform coding, JPEG

Image Morphology: Fundamental operations, Morphological Algorithms

Image segmentation: Point, Line and Edge detection, Canny edge detection, Hough Transform,Edge linking, Thresholding, Region-based segmentation, Pixel-based segmentation.

UNIT-V: Feature Extraction
Boundary preprocessing, Boundary feature descriptor, Region feature descriptor, Principal components as feature descriptor, Whole image feature
Video Processing: Video Formats, Video Enhancement and Restoration, Video Segmentation

Text Books:
1. Digital Image Processing, R. C. Gonzalez and R. E. woods, Pearson Education.
2. Handbook of Image and Video Processing, AL Bovik, Academic Press.

References:
1. Digital Image Processing and Analysis, B. Chanda and D. Dutta Mazumdar, PHI.
2. Digital Image Processing, W. K. Pratt, Wiley-Interscience.
3. Fundamentals of Digital Image Processing, A. K. Jain, Pearson India Education.
4. Pattern Classification and Scene Analysis, R. O. Duda and P. E. Hart, Wiley.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Introduction to Linux Programming
Common to All Branches
Open Elective-II

Course Code:20A60505 Semester VI(R20) L T P C : 3 0 0 3

Course Objectives:

- To study the commands according to user requirements.
- To utilize Shell scripts to perform the given task.
- To enable writing own programs in UNIX.
- To know AWK programs.

Course Outcomes:

CO1: Develop text data processing applications using Unix commands and filters.
CO2: Design and develop text based user interface components
CO3: Understand user management, network management and backup utilities
CO4: Use the system calls for file management
CO5: Understands the Concept of Process Threads and File Structure.

UNIT-I: Introduction,Unix File System,Unix Commands

Operating System, History of UNIX, Overview and Features of Unix System,Structure of Unix System, Unix Environment. **Unix File System**: Introduction of Files, Organization of File Systems, Accessing File Systems, Structure of File Systems. **Unix Commands**: Basic Commands, Advanced Unix Commands: File Access Permissions, Pipe Operator, cut, paste, wc, sort, head, tail, diff, cmp, uniq, comm, time, Conversions between DOS and Unix, man.

UNIT-II: File management and Compression Techniques,Manipulating Processes and Signals

Managing and Compressing Files, Computer Devices, Disk related Commands, Compression and Uncompressing Files, Important Unix System Files, Shell Variables, Export of Local and Global Shell Variables.

Manipulating Processes and Signals: Process Basics, Processes States and Transitions, Zombie Process, Context switching, Threads, ps-status of Process.

UNIT-III: System calls

Introduction, File-related System calls (open, create, read, write, lseek), File-related System calls (close, mknod, link and unlink, access, and chown, chmod), Directory Handling System calls (mkdir, rmdir, chdir, opendir, readdir, telldir, closedir), Process related System calls (exec, fork, wait,exit).

Editors in Unix: introduction, Stream editor, Emacs Editor.

UNIT-IV: AWK Script,Burne Shell

AWK Command, print, printf, Displaying Content of Specified Patterns, Comparison Operators, Compound Expressions, Arithmetic Operators, Begin and end Sections, User-defined Variables, if else Statement, Built-in Variables, Changing Input Filed Separator, Functions, Loops, Getting Input from User, Search and Substitute Functions, Copying results into Another file.

Bourne Shell: Introduction, beginning Bourne Shell Scripting, Writing Shell Scripts, Command Line Parameters, read, for Loop, While Loop, if Statement, Bourne Shell Commands.

UNIT-V: InterprocessCommunicaation, Unix System Administration and Networking
Interprocess Communication, Synchronization, Filters.
Unix System Administration and Networking: Unix Booting Procedure,Mounting Unix File System, Unmounting Unix File System, Managing User Accounts, Networking Tools, mail Command, Distributed File System, Firewalls, Backup and Restore.

TEXT BOOKS

1. "UNIX and SHELL Programming", B.M. HARWANI, OXFORD UNIVERSITY PRESS.

REFERENCES

1. "UNIX and Linux System Administration Handbook", Evi Nemeth, Garth Snyder, Trent R. Hein and Ben Whaley, PHI

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Cryptography & Network Security Lab

Course Code:20A60506 **Semester VI(R20)** **L T P C : 0 0 3 1.5**

Course Objectives:

- o understand the working principle of various communication protocols.
- To analyze the various routing algorithms.
- To know the concept of data transfer between nodes.
- To implement Lexical Analyzer using Lex tool & Syntax Analyzer or parser using YACC Tool
- To implement front end of the compiler by means of generating Intermediate codes.

Course Outcomes:

CO1: o understand the working principle of various communication protocols.
CO2: To analyze the various routing algorithms.
CO3: To know the concept of data transfer between nodes.
CO4: To implement Lexical Analyzer using Lex tool & Syntax Analyzer or parser using YACC Tool

List of Experiments:

1. Working with Sniffers for monitoring network communication (Ethereal)
2. Understanding of cryptographic algorithms and implementation of the same in C or C++
3. Using openssl for web server - browser communication
4. Using GNU PGP
5. Performance evaluation of various cryptographic algorithms
6. Using IPTABLES on Linux and setting the filtering rules
7. Configuring S/MIME for e-mail communication .
8. Understanding the buffer overflow and format string attacks
9. Using NMAP for ports monitoring
10. Implementation of proxy based security protocols in C or C++ with features like confidentiality, integrity and authentication.

Online Learning Resources:

Following are some of the web links, which help to solve the above assignments
http://linuxcommand.org/man_pages/openssl1.html
http://www.openssl.org/docs/apps/openssl.html
http://www.queen.clara.net/pgp/art3.html
http://www.ccs.ornl.gov/~hongo/main/resources/contrib/gpg-howto/gpg-howto.html
https://netfiles.uiuc.edu/ehowes/www/gpg/gpg-com-0.htm
http://www.ethereal.com/docs/user-guide/

JNTUA College of Engineering(Autonomous),Ananthapuramu
Department of Computer Science & Engineering
Software Testing Lab
Professional Elective-II

Course Code:20A60507a **Semester VI(R20)** **L T P C : 0 0 3 1.5**

Course Objectives:

- To discuss the distinctions between validation testing and defect testing.
- To describe the principles of system and component testing .
- To describe strategies for generating system test cases.
- To understand the essential characteristics of tool used for test automation.

Course Outcomes:

CO1: Identify suitable tests to be carried out.
CO2: Prepare test planning based on the document.
CO3: Document test plans and test cases designed
CO4: Use automatic testing tools.
CO5: Develop and validate a test plan.

List of Experiments:

1. 1.Understand The Automation Testing Approach (Theory Concept).
2. Using Selenium IDE, Write a test suite containing minimum 4 test cases.
3. Understanding Test Automation. Using Selenium write a simple test script to validate each field of the registration page (Eg: Facebook Registration Page)
4. Install Selenium server and demonstrate it using a script in Java/PHP.
5. Conduct a test suite for any two web sites.
6. Write and test a program to login a specific web page.
7. Write test cases to validate a mobile number using one time pin identification(OTP)
8. Write and Test a program to find out list of employees having salary greater than Rs 50,000 and age between 30 to 40 years.
9. Write and test a program to update 10 student records into table into Excel file.
10. Write and test a program to select the number of students who have scored more than 60 in any one subject (or all subjects).
11. Write and test a program to provide total number of objects present / available on the page.
12. Write and test a program to get the number of list items in a list / combo box.
13. Write and test a program to count number of items present on a desktop.
14. Understanding the use of bug tracking and testing tool Bugzilla and Jira
15. Open ended Experiment: Mini Project – Not for exam but to compulsory to be included in Record. (Test cases for Admission form, Shopping cart, Travel Booking, Hotel Booking, Utility Bill Payment)

Reference Books:

- Testing in 30+ Open Source Tools, Rahul Shende, Shroff Publishers & Distributor Pvt. Ltd, ISBN 13: 9789350231005 (page numbers from 15 to 117)
- http://seleniumhq.org/
- http://sourceforge.net/projects/sahi/
- http://testng.org/doc/index.html

JNTUA College of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
Fundamentals of AR/VR Lab
Professional Elective-II

Course Code:20A60507b **Semester VI(R20)** **L T P C : 0 0 3 1.5**

Course Objectives:

- The objective of this course is to explore the concepts of Virtual reality and develop 3D virtual environment.

Course Outcomes:

CO1: Create and deploy a VR application
CO2: understand the physical principles of VR
CO3: Create a comfortable, high-performance VR application using Unity
CO4: Identify, examine and develop software that reflects fundamental techniques for the design and deployment of VR experiences.

List of Experiments:

I. Installation of Unity and Visual Studio, setting up Unity for VR development, understanding documentation of the same.
II. Demonstration of the working of HDMs
III. Develop a scene in Unity that includes:
i. a cube, plane and sphere, apply transformations on the 3 game objects. ii. add a video and audio source
IV. Develop a scene in Unity that includes a cube, plane and sphere. Create a new material and texture separately for three Game objects. Change the colour, material and texture of each Game object separately in the scene. Write a C# program in visual studio to change the colour and material/texture of the game objects dynamically onbutton click.
V. Develop a scene in Unity that includes a sphere and plane . Apply Rigid body component, material and Box collider to the game Objects. Write a C# program to grab and throw the sphere using vr controller.
VI. Develop a simple UI(User interface) menu with images, canvas, sprites and button. Write a C# program to interact with UI menu through VR trigger button such that on each successful trigger interaction display a score on scene.
VII. Create a Simple Mini Project

Reference Book:

1. Virtual Reality, Steven M. LaValle, Cambridge University Press, 2016

JNTUA College Of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
Image and Video Processing Lab
Professional Elective-II

Course Code:20A60507c **Semester VI(R20)** **L T P C : 0 0 3 1.5**

Course Objectives:

- The objective of this course is to explore the concepts of Virtual reality and develop 3D virtual environment.
- Provide the student with the fundamentals of image processing
- Give the students a taste of the applications of the theories taught in the subject. This will be achieved through the project and some selected lab sessions.

Course Outcomes:

CO1: Be able to implement basic image processing algorithms in MATLAB.
CO2: Have the skill base necessary to further explore advanced topics of Digital Image Processing.
CO3: Be in a position to make a positive professional contribution in the field of Digital Image Processing

List of Experiments:

1.To study the Image Processing concept.
CO1: To obtain histogram equalization image.
CO2: To Implement smoothing or averaging filter in spatial domain.
CO3: Program for opening and closing of the image.
CO4: To fill the region of interest for the image.
CO5: Program for edge detection algorithm.
CO6: Program of sharpen image using gradient mask.
CO7: Program for morphological operation: erosion and dilation
CO8: Program for DCT/IDCT computation.

References:

1. Digital Image Processing and Analysis, B. Chanda and D. Dutta Mazumdar, PHI.
2. Digital Image Processing, W. K. Pratt, Wiley-Interscience.
3. Fundamentals of Digital Image Processing, A. K. Jain, Pearson India Education.
4. PatternClassification and Scene Analysis, R. O. Duda and P. E. Hart, Wiley.

JNTUA College Of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
Machine Learning Lab

Course Code:20A60508 **Semester VI(R20)** **L T P C : 0 0 3 1.5**

Course Objectives:

- Make use of Data sets in implementing the machine learning algorithms.

Implement the machine learning concepts and algorithms in any suitable language of choice

Course Outcomes (CO):

CO1: Understand the implementation procedures for the machine learning algorithms.

CO2: Design Java/Python programs for various Learning algorithms.

CO3: Apply appropriate data sets to the Machine Learning algorithms.

CO4: Identify and apply Machine Learning algorithms to solve real world problems.

Description (if any):

The programs can be implemented in either JAVA or Python

For problems 1 to 6 and 10, programs are to be developed without using the built-in classes or APIs of Java/Python.

List of Experiments:

1. Implement and demonstratethe FIND-Salgorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithmto output a description of the set of all hypotheses consistent with the training examples.
3. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
4. Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.
5. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
6. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.
7. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.
8. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.
9. Write a program to implement k-Nearest Neighbor algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.
10. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.

Reference Books:

1. EthernAlpaydin, “Introduction to Machine Learning”, MIT Press,2004.
2. Stephen Marsland, “Machine Learning -An Algorithmic Perspective”, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series,2014.
3. Andreas C. Müller and Sarah Guido “Introduction to Machine Learning with Python:A Guide for Data Scientists”,Oreilly.

JNTUA College Of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering

Full Stack Development

Skill Advanced Course -IV

Course Code:20A60509 **Semester VI(R20)** **L T P C : 1 0 2 2**

Course Objectives:

- Develop front end website architecture
- Design user interactions on web pages
- Develop back end website applications
- Create servers and databases for functionality
- Develop adaptive content for multiple devices (cell phone, tablets, etc.)Ensure cross-platform optimization for mobile phones
- Use their learned skills, knowledge and abilities to develop web sites for the internet
- Apply basic design principles to present ideas, information, products, and services on websites
- Apply basic programming principles to the construction of websites
- Effectively manage website projects using available resource.

Course Outcomes:

CO1: Analyze th terms like Natural Acceptance, Happiness and Prosperity
CO2: Understand awareness of oneself, and one's surroundings (family, society nature)
CO3: Apply what they have learnt to their own self in different day-to-day settings in real life
CO4: Relate human values with human relationship and human society.
CO5: Justify the need for universal human values and harmonious existence
CO6: Develop as socially and ecologically responsible engineers

UNIT – I: The Modern Web,Planning your Work

The Modern Web: Rise of the Web , Mobile Web , The State of HTML, Applications vs Web Sites, Keeping Up.

Planning Your Work : Identifying Requirements, Defining the Work, Tracking the WorkContinuous Improvement, Prioritization &Estimation , Managing Bugs , Continuous Delivery

User Experience : Information Architecture , Getting the User Experience Right , Polishing the User Experience, Implementing the User Experience.

UNIT – II: Designing Systems

System Architectures, Identifying Concepts, Identifying User Interactions, Handling Commonalities, Working with Legacy and External Dependencies, Component Interactions, Applications vs. Modules, Cross-Functional Requirements, Caching , Designing for Failure, Designing Modules, Refactoring, Tools, Changing Your Architecture.

Ethics: Privacy, Cognitive Load, Energy Usage, Trust.

Front End: HTML, From Server to Browser, Styling, Components, Responsive Design, Progressive Enhancement To Progressively Enhance, or Not? , Mobile First, Feature Detection , Progressive Enhancement of Style, When Not Using Progressive Enhancement, Search Engine Optimization, Build Tools.

UNIT – III:Testing,JavaScript

Test-Driven Development, Test Pyramid, Behavior-Driven Development, Three Amigos, Manual Testing, Visual Testing, Cross-Functional Testing,

JavaScript: Asynchronicity, JavaScript in the Browser, Offline-First Development, Document Object Model, Server-Side JavaScript, Table of Contents viii JavaScript Modules, Structuring Your JavaScript , JavaScript Types , Object-Oriented Programming, Functional Programming, Communicating Between Components, Connecting Components Together , Testing, Build Tools.

Accessibility: Accessible from the Start, Working with Assistive Technologies, Dealing with Interactive UI, Testing for Accessibility , Avoiding Common Mistakes.

UNIT – IV: **APIs,StoringData,Security**

APIs:API Responsibilities, Designing a REST API, Securing Your API, Event-Based APIs, Discovering APIs , Using APIs

Storing Data: Types Of Databases,ToSQL?Where to store your data,Accessing data from your App,managing your Data, Protecting Your Data.

Security: Trust and Secrets, responding To Incidents, The Golden Rule,Threats,Security,Passwoerds,Indirect Attacks.

UNIT – V: Deployment,InProduction,ConstantLrarning

Deployment :Twelve Factor Apps, Developer Machines, Production Environments, Moving Code into Production, Configuring Your Box, Infrastructure, Immutable Infrastructure, Continuous Delivery & Continuous Deployment.

In Production: Fire Drills, Run Books, Monitoring, Responding to Incidents

Constant Learning: Collecting Analytics, Experiments, Analyzing Results, Hypothesis-Driven.

Textbooks:

1.Chris Northwood, The full Stack Developer, Apress , Copy Right, 2018.

JNTUA College Of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering

INDIAN CONSTITUTION

Course Code: 20A65901 **Semester VI(R20)** **L T P C : 2 0 0 0**

Course Objectives:

- **To Enable the student to understand the importance of constitution**
- **To understand the structure of executive, legislature and judiciary**
- **To understand philosophy of fundamental rights and duties**
- **To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of India and Election Commission of India.**
- **To understand the central-state relation in financial and administrative control**

Syllabus

UNIT-I: Introduction to Indian Constitution

Constitution -Meaning of the term - Indian Constitution- Sources and constitutional history - Features– Citizenship – Preamble - Fundamental Rights and Duties - Directive Principles of State Policy.

LEARNING OUTCOMES: -After completion of this unit student will

a. Understand the concept of Indian constitution
b. Apply the knowledge on directive principle of state policy
c. Analyze the History and features of Indian constitution
d. Learn about Preamble, Fundamental Rights and Duties

UNIT-II Union Government and its Administration

Structure of the Indian Union - Federalism - Centre-State relationship – President's Role, power and position - PM and Council of ministers - Cabinet and Central Secretariat –Lok Sabha - Rajya Sabha - The Supreme Court and High Court - Powers and Functions

LEARNING OUTCOMES: -After completion of this unit student will

a. Understand the structure of Indian government
b. Differentiate between the state and central government
c. Explain the role of President and Prime Minister
d. Know the Structure of supreme court and High court

UNIT-III State Government and its Administration

Structure of the State Govt. - Governor - Role and Position -CM and Council of Ministers – State Secretariat- Organization Structure and Functions

LEARNING OUTCOMES: -After completion of this unit student will

a. Understand the structure of state government
b. Analyze the role of Governor and Chief Minister
c. Explain the role of State Secretariat
d. Differentiate between structure and functions of state secretariat

UNIT-IV Local Administration

District's Administration Head - Role and Importance - Municipalities - Mayor and role of Elected Representatives -CEO of Municipal Corporation Panchayati Raj - Functions– PRI –Zilla Parishath - Elected officials and their roles – CEO, ,ZillaParishath - Block level Organizational Hierarchy - (Different departments) - Village level - Role of Elected and Appointed officials - Importance of grass root democracy

LEARNING OUTCOMES: -After completion of this unit student will

1. Understand the local Administration
2. Compare and contrast district administration's role and importance
3. Analyze the role of Mayor and elected representatives of Municipalities
4. Learn about the role of Zilla Parishath block level organization

UNIT-V Election Commission

Election Commission- Role of Chief Election Commissioner and Election Commissionerate - State Election Commission -Functions of Commissions for the welfare of SC/ST/OBC and Women

LEARNING OUTCOMES: -After completion of this unit student will

- Know the role of Election Commission
- Contrast and compare the role of Chief Election commissioner and Commissionerate
- Analyze the role of state election commission
- Evaluate various commissions viz SC/ST/OBC and women

TEXT BOOKS

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd.. New Delhi

2. Subash Kashyap, Indian Constitution, National Book Trust

REFERENCES:

1. J.A. Siwach, Dynamics of Indian Government & Politics
2. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
3. .J.C. Johari, Indian Government and Politics, Hans India
4. M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd.. New Delhi

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering

Agile Methodologies

Professional Elective Course– III

Course Code:20A70501a **Semester VII(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- To provide students with a theoretical as well as practical understanding of agile software development practices and how small teams can apply them to create high-quality software.
- To provide a good understanding of software design and a set of software technologies and API's.
- To do a detailed examination and demonstration of Agile development and testing techniques.
- To understand the benefits and pitfalls of working in an Agile team.
- To understand Agile development and testing.

Course Outcomes:

- Realize the importance of interacting with business stakeholders in determining the requirements for a software system
- Perform iterative software development processes: how to plan them, how to execute them.
- Point out the impact of social aspects on software development success.
- Develop techniques and tools for improving team collaboration and software quality.
- Perform Software process improvement as an ongoing task for development teams.
- Show how agile approaches can be scaled up to the enterprise level.

UNIT – I:Agile Methodology

Theories for Agile Management – Agile Software Development – Traditional Model vs. Agile Model - Classification of Agile Methods – Agile Manifesto and Principles – Agile Project Management – Agile Team Interactions – Ethics in Agile Teams - Agility in Design, Testing – Agile Documentations – Agile Drivers, Capabilities and Values.

UNIT – II: Agile Processes

Lean Production - SCRUM, Crystal, Feature Driven Development- Adaptive Software Development - Extreme Programming: Method Overview – Lifecycle – Work Products, Roles and Practices.

UNIT – III: Agility and Knowledge Management

Agile Information Systems – Agile Decision Making - Earls Schools of KM – Institutional Knowledge Evolution Cycle – Development, Acquisition,Refinement, Distribution, Deployment, leveraging – KM in Software Engineering – Managing Software Knowledge – Challenges of Migrating to Agile Methodologies – Agile Knowledge Sharing – Role of Story-Cards – Story-Card Maturity Model

(SMM).

UNIT – IV: Agility and Requirements Engineering

Impact of Agile Processes in RE–Current Agile Practices – Variance – Overview of RE Using Agile – Managing Unstable Requirements – Requirements Elicitation – Agile Requirements Abstraction Model – Requirements Management in Agile Environment, Agile Requirements Prioritization – Agile Requirements Modelling and Generation – Concurrency in Agile Requirements Generation.

UNIT – V: Agility and Quality Assurance

Agile Product Development – Agile Metrics – Feature Driven Development (FDD) – Financial and Production Metrics in FDD – Agile Approach to Quality Assurance - Test Driven Development – Agile Approach in Global Software Development.

Textbooks:

1. David J. Anderson and Eli Schragenheim, ―Agile Management for Software Engineering: Applying the Theory of Constraints for Business Results‖, Prentice Hall, 2003.
2. Hazza and Dubinsky, ―Agile Software Engineering, Series: Undergraduate Topics in Computer Science‖, Springer, 2009.

Reference Books:

1.Craig Larman, ―Agile and Iterative Development: A Manager_s Guide‖, Addison-Wesley, 2004.

2.Kevin C. Desouza, ―Agile Information Systems: Conceptualization, Construction, and Management‖, Butterworth-Heinemann, 2007

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Cloud Computing
Professional Elective III

Course Code:20A7501b **Semester VII(R20)** **L T P C: 3 0 0 3**

Course Objectives:

1.To develop cloud applications.
2.To demonstrate the design of the architecture for a new cloudapplication.
3.To teach how to re-architect the existing application for the cloud.

Course Outcomes:

- CO1: Outline the procedure for Cloud deployment
- Investigate different cloud service models and deployment models
- Compare different cloud services.
- Design applications for an organization that use a cloud environment.
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UNIT – I: Introduction
Introduction to Cloud Computing, Characteristics of Cloud Computing, Cloud Models, Cloud Services Examples, Cloud based services and Applications, Cloud Concepts and Technologies, Virtualization, Load Balancing, Scalability and Elasticity, Deployment, Replication, Monitoring, Software defined networking, Network function virtualization, Map Reduce, Identity and Access Management, Service Level Agreements, Billing.

UNIT – II: Cloud Services and Platforms
Cloud Services and Platforms: Compute Services, Storage Services, Database Services, Application Services, Content Delivery Services, Analytics Services, Deployment and Management Services, Identity and Access Management Services, Open Source Private Cloud Software, Apache Hadoop, Hadoop MapReduce Job Execution, Hadoop Schedulers, Hadoop Cluster Setup.

UNIT – III: Cloud Application Design

Cloud Application Design: Design Considerations, Reference Architectures, Cloud Application Design Methodologies, Data StorageApproaches,
Multimedia Cloud: Introduction, Case Study: Live Video Streaming App, Streaming Protocols, Case Study: Video Transcoding APP.

UNIT – IV:Python for cloud computing
Python for Amazon Web Services, Python for Google Cloud Platform, Python for Windows Azure, Python for MapReduce, Python Packages of Interest, Python Web Application Framework – Django, Designing a RESTful Web API.

UNIT – V: Code Generation
Cloud Application Development in Python, Design Approaches, Image Processing APP, Document Storage App, MapReduce App, Social Media Analytics App, Cloud Application Benchmarking and Tuning, Cloud Security, Cloud Computing for Education.

Textbooks:

1.Arshadeep Bhaga, Vijay Madisetti, “Cloud Computing AHandson Approach”, Universities Press, 2018.

Reference Books:

- Chris Hay, Brian Prince, “Azure in Action” Manning Publications [ISBN: 9781935182481],2010.
- Henry Li, “Introducing Windows Azure” Apress; 1 edition [ISBN: 978-14302-2469-3],2009.
- Eugenio Pace, Dominic Betts, Scott Densmore, Ryan Dunn, Masashi Narumoto, MatiasWoloski, “Developing Applications for the Cloud on the Microsoft Windows Azure Platform” Microsoft Press; 1 edition [ISBN: 9780735656062],2010.
- Eugene Ciurana, “Developing with Google App Engine” Apress; 1 edition [ISBN: 978-1430218319],2009.
- Charles Severance, “Using Google App Engine” O'Reilly Media; 1 edition, [ISBN: 978-0596800697], 2009.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Pattern Recognition
Professional Elective Course–III

Course Code:20A70501c **Semester VII(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- To understandthePRimportance in various real time applications
- To understand the basic model and fundamental steps of PR system
- To understand the use of different classifiers/algorithms/tech
- To learn the different methods for combining classifiers.
- To provide an introduction to various clustering algorithms

Course Outcomes:

- Explain the paradigms for PR problems
- Classify the patterns using NN, Bayes, HMM, Decision trees and SVM classifiers
- Apply ensemble of classifiers for certain PR problems
- Differentiate between supervised and unsupervised classifiers.
- Design an application: Handwritten Digit Recognition

UNIT – I: IntroductiontoPatternRecognition

IntroductiontoPatternRecognition: DataSetsforPatternRecognition,DifferentParadigmsforPattern Recognition,
PatternRepresentation: DataStructuresforPatternRepresentation,RepresentationofClusters,Proximity Measures,SizeofPatterns,AbstractionsoftheDataSet,Feature,FeatureSelection, EvaluationofClassifiers,EvaluationofClustering

UNIT – II: Classifier

Nearest Neighbour Based Classifiers: Nearest Neighbour Algorithm, Variants of the NNAlgorithm, Use of the Nearest Neighbour Algorithm for Transaction Databases, EfficientAlgorithms,DataReduction, PrototypeSelection,
Bayes Classifier: Bayes Theorem, Minimum error rate classifier, Estimation of Probabilities,ComparisonwiththeNNC,NaiveBayesClassifier,BayesianBeliefNetwork.

UNIT – III: Pattern Recognition Models

HiddenMarkovModels: MarkovModelsforClassification,HiddenMarkovModels,ClassificationUsingHMMs, ClassificationofTest Patterns.
DecisionTrees: Introduction,DecisionTreesforPatternClassification,ConstructionofDecision Trees, Splitting at the Nodes, Over fitting and Pruning, Example of Decision TreeInduction.

UNIT – IV: SVM & Combination of Classifiers

SupportVectorMachines: Introduction,LinearDiscriminantFunctions,LearningtheLinear Discriminant Function, Neural Networks, SVM for Classification, Linearly SeparableCase,Non-linearlySeparableCase.
CombinationofClassifiers:Introduction,MethodsforConstructingEnsemblesofClassifiers,Methods forCombiningClassifiers,EvaluationofClassifiers,EvaluationofClustering.

UNIT – V: Clustering

Clustering: Clustering and its Importance, Hierarchical Algorithms, Partitional Clustering,ClusteringLarge Data Sets, An Application to Handwritten Digit Recognition: Description oftheDigitData,Pre-processingofData,ClassificationAlgorithms,SelectionofRepresentativePatterns.

Textbooks:

1. PatternRecognitionanIntroduction,V.SusheelaDeviM.NarasimhaMurty,UniversityPress (India) Pvt Ltd, 2011.
2. PatternRecognition,SegriosTheodoridis, KonstantinosKoutroumbas,FourthEdition, Academic Press, 2009

Reference Books:

1. PatternClassification,R.O.Duda,P.E.HartandD.G.Stork,JohnWiley, 2002.
2. Andrew Webb, “Statistical Pattern Recognition”, Arnold publishers, London, 1999
3. C.M.Bishop, “Pattern Recognition and Machine Learning”, Springer, 2006.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Professional Elective Course–IV
Dev Ops

Course Code:2070502a **Semester VII(R20)** **L T P C : 3 0 0 3**

Course Objectives:
- Explain the DevOps Concepts for business cases.
- Prepare the model canvas for DevOps use cases.
- Introduce the virtual machines and containers for designing of applications.
- Familiar with cloud provisioning and management services.
- Testing the code with various aspects in continuous deployment / development.

Course Outcomes:

CO1: Understands the DevOps concepts in continuous delivery / development of applications.
CO2: Create the DevOps applications using various tools and technologies.
CO3: Examine the virtual machines and containers for managing the files.
CO4: Apply cloud services for deployment the applications in a real-time.
CO5: Perform web security and testing the code with appropriate tools.

UNIT – I: **DevOps Concepts**
Understanding DevOps movement, DevOps with changing time, the water fall model, Agile Model, Collaboration, Why DevOps, Benefits of DevOps, DevOps life cycle- all about continuous, Build Automation, Continuous Integration, Continuous Management, Continuous Delivery / Continuous Development, The agile wheel of wheels.

UNIT – II: **DevOps Tools and Technologies**
Code Repositories : Git, Differences between SVN and Git, Build tools – Maven, Continuous integration tools – Jenkins, Container Technology – Docker, Monitoring Tools – Zenoss, Continuous integration with Jenkins 2, Creating built-in delivery pipelines, Creating Scripts, Creating a pipeline for compiling and executing test units, Using the Build Pipeline plugin, Integrating the deployment operation, Getting started with Chef, Overview of hosted Chef, Installing and configuring a Chef workstation. Converging a Chef node using a Chef workstation, installing software

UNIT – III: **Docker Containers**
Overview of Docker containers, Understanding the difference between virtual machines and containers, Installation and configuration of Docker on CentOS, creating your first Docker container, managing containers, creating a Docker image from Docker file, an overview of Docker's elements, creating a Docker file, writing a Docker file, Building and running a container on a local machine, testing a container locally, Pushing an image to Docker Hub

UNIT – IV: **Cloud Provisioning and Configuration Management with Chef, Managing Containers Effectively with Kubernetes**

Chef and cloud provisioning, installing knife plugins for Amazon EC2 and Microsoft Azure, Creating

and configuring a virtual machine in Amazon Web Services, Creating and configuring a virtual machine in Microsoft Azure, Managing Docker containers with Chef, Prerequisite – deploying our application on a remote server, Deploying the application on AWS, Deploying the application on Microsoft Azure, Deploying the application in a Docker container.
Kubernetes architecture overview, Installing Kubernetes on a local machine, Installing the Kubernetes dashboard, Kubernetes application deployment, Using AKS, creating an AKS service, configuring kubectl for AKS,the build and push of the image in the Docker Hub,Advantages of AKS, Creating a CI/CD pipeline for Kubernetes with Azure Pipelines,

UNIT – V: **Testing the Code**
Manual testing, Unit testing, JUnit in general and JUnit in particular, A JUnit example, Automated integration testing, Docker in automated testing,Performancetesting,Automated acceptance testing, Automated GUI testing, Integrating Selenium tests in Jenkins, JavaScript testing, Testing backend integration points, Test-driven development,A complete test automation scenario,Manually testing our web application, Security and Performance Tests: Applying web security and penetration testing with ZAP, Running performance tests with Postman

Textbooks:

1. Mitesh Soni, DevOps for Web Development, Packet Publishing, 2016.
2. Mikael Krief, Learning DevOps- The complete guide to accelerate collaboration with Jenkins, Kubernetes, Terraform and Azure DevOps, Packet Publishing, 2019.

Reference Books:

3. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.
4. Core Java Volume – 1 Fundamentals, Cay S. Horstmann, Pearson Education.
5. Java Programming for core and advanced learners, Sagayaraj, Dennis, Karthik andGajalakshmi, University Press
6. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
7. Object Oriented Programming through Java, P. Radha Krishna, University Press.
8. Programming in Java, S. Malhotra, S. Chaudhary, 2nd edition, Oxford Univ. Press.
9. Java Programming and Object-oriented Application Development, R.A. Johnson,
10. Cengage Learning.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Advance Network Technologies
Professional Elective Course– IV

Course Code: 2070502b **Semester VII(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- To inculcate the basic knowledge of micro economics and financial accounting
- To make the students learn how demand is estimated for different products, input-output relationship for optimizing production and cost
- To know the various types of Market Structures & pricing methods and its strategies
- To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
- To provide fundamental skills on Accounting and to explain the process of preparing Financial statements

Course Outcomes:

CO1: Define the concepts related to Managerial Economics, financial accounting and management.
CO2: Understand the fundamentals of Economics viz., Demand, Production, cost, revenue and markets
CO3: Apply the concepts of production, cost and revenues for effective business decisions
CO4: Analyze how to invest their capital and maximize returns
CO5: Evaluate the capital budgeting techniques
CO6: Develop theaccounting statements and evaluate the financial performance of business entity.

UNIT-I: Network Layer

Network layer: Network Layer Services, Packet Switching, Performance, provided transport layers, implementation connectionless services, implementation connection-oriented services, comparison of virtual –circuit and datagram subnets. IPV4 Address, Forwarding of IP Packets, Internet Protocol, ICMP v4, Mobile IP

UNIT-II: Routing Algorithms

Routing Algorithms–Distance Vector routing, Link State Routing, Path Vector Routing, Unicast Routing Protocol-Internet Structure, Routing Information Protocol, Open-Source Path First, Border Gateway Protocol V4, Broadcast routing, Multi casting routing, Multicasting Basics, Intradomain Multicast Protocols, IGMP.

UNIT-III: IPv6

IPv6 Addressing, IPv6 Protocol, Transition from IPv4 to IPv6.Transport Layer Services, connectionless versus connection-oriented protocols. Transport Layer Protocols: Simple Protocol, Stop and Wait, Go-Back-N, Selective repeat, Piggy Backing. UDP: User datagram, Services, Applications. TCP: TCP services, TCP features, segment, A TCP connection, Flow control, error control, congestion control.

UNIT- IV: SCTP

SCTP: SCTP services SCTP features, packet format, An SCTP association, flow control, error control. QUALITY OF SERVICE: flow characteristics, flow control to improve QOS: scheduling, traffic shaping, resource reservation, admission control.

UNIT-V:Internet

WWW and HTTP, FTP, Telnet, Domain name system, SNMP, Multimedia data, Multimedia in the Internet.

Text Books:

1. Varshney&Maheswari: Managerial Economics, Sultan Chand, 2013.
2. Aryasri: Business Economics and Financial Analysis, 4/e, MGH, 2019

References:

1. Ahuja Hl Managerial economics Schand,3/e,2013
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International, 2013.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage, 2013.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Design Patterns
Professional Elective Course– IV

Course Code:20A70502c **Semester VII(R20)** **L T P C : 3 0 0 3**

Course Objectives:
- Understand design patterns and their underlying objects-oriented concepts.
- Learn the day-to-day problems faced by object-oriented designers and how design patterns solve them
- Provide an interface for creating families of related objects without specifying their concrete classes.
- To know the consequences of combining patterns on the overall quality of a system

Course Outcomes:

CO1: Define the Concepts related to the Entrepreneurship and Incubators
CO2: Understand the concept of Entrepreneurship and challenges in the world of competition.
CO3: Apply the Knowledge in generating ideas for New Ventures.
CO4: Analyze various sources of finance and subsidies to entrepreneur/women Entrepreneurs.
CO5: Evaluate the role of central government and state government in promoting Entrepreneurship.
CO6: Create and design business plan structure through incubations.

UNIT-I: Design Patterns
DesignpatternsinSmalltalkModel/View/Controller,describing design patterns, the catalog of design patterns, Organizing the catalog, Design patterns to solve design problems, select a design pattern, Use a designpattern.

UNIT-II: **Document Editor**
Designing a document editor, Design problems, Document structure,Formatting,Embellishingtheuserinterface,supporting multiple look-and-feel standards, supporting multiple window systems,Useroperationsspellingcheckingandhyphenation

UNIT-III:Creational Patterns
Abstract Factory, Builder, Factory method, Prototype, Singleton, Discussion of creational patterns.

UNIT-IV: Structural Patterns
Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy, Discussion of structural patterns.

UNIT-V: Behavioural Patterns
Chain of responsibility, Command, Interpreter, Iterator,Mediator, Memento,Observer,State,Strategy,Templatemethod,Visitor

TEXT BOOKS
1. D F Kuratko and T V Rao, Entrepreneurship - A South-Asian Perspective – Cengage Learning, 2012. (For PPT, Case Solutions Faculty may visit : login.cengage.com)

2 .Nandan H, Fundamentals of Entrepreneurship, PHI, 2013

REFERENCES

1. VasantDesai,Small Scale Industries and Entrepreneurship, Himalaya Publishing 2012.
2. Rajeev Roy Entrepreneurship, 2nd Edition, Oxford, 2012.
3. B.JanakiramandM.Rizwana‖ Entrepreneurship Development: Text & Cases, Excel Books, 2011.
4. Stuart Read, Effectual Entrepreneurship, Routledge, 2013.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Deep Learning
Professional Elective Course– v (MOOC)

Course Code:20A70503a **Semester VII(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- To make the student understand the principles of business ethics
- To enable them in knowing the ethics in management
- To facilitate the student's role in corporate culture
- To impart knowledge about the fair-trade practices
- To encourage the student in creating knowing about the corporate governance

Course Outcomes:

CO1: Define the Ethics and Types of Ethics.
CO2: Understand business ethics and ethical practices in management
CO3: Understand the role of ethics in management
CO4: Apply the knowledge in cross cultural ethics
CO5: Analyze law and ethics
CO6: Evaluate corporate governance

UNIT-I: Linear Algebra & Probability and Information Theory

Scalars, Vectors, Matrices and Tensors, Matrix operations, types of matrices, Norms, Eigen decomposition, Singular Value Decomposition, Principal Components Analysis.

Random Variables, Probability Distributions, Marginal Probability, Conditional Probability, Expectation, Variance and Covariance, Bayes' Rule, Information Theory. Numerical Computation: Overflow and Underflow, Gradient-Based Optimization, Constrained Optimization, Linear Least Squares.

UNIT-II: Machine Learning

Basics and Under fitting, Hyper parameters and Validation Sets, Estimators, Bias and Variance, Maximum Likelihood, Bayesian Statistics, Supervised and Unsupervised Learning, Stochastic Gradient Descent, Challenges Motivating Deep Learning. Deep Feedforward Networks: Learning XOR, Gradient-Based Learning, Hidden Units, Architecture. Design, Back-Propagation and other Differentiation Algorithms.

UNIT-III: Regularization for Deep Learning

Parameter Norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised Learning, Multi-Task Learning, Early Stopping, Parameter Tying and Parameter Sharing, Sparse Representations, Bagging and Other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, Tangent Prop and Manifold Tangent Classifier. Optimization for Training Deep Models: Pure Optimization, Challenges in Neural Network Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates, Approximate Second-Order Methods, Optimization Strategies and Meta-Algorithms.

UNIT- IV: Convolutional Networks

The Convolution Operation, Pooling, Convolution, Basic Convolution Functions, Structured Outputs, Data Types, Efficient Convolution Algorithms, Random or Unsupervised Features, Basis for Convolutional Networks

UNIT -V: Sequence Modelling

Recurrent and Recursive Nets: Unfolding Computational Graphs, Recurrent Neural Networks, Bidirectional RNNs, Encoder-Decoder Sequence-to-Sequence Architectures, Deep Recurrent Networks, Recursive Neural Networks, Echo State Networks, LSTM, Gated RNNs, Optimization for Long-Term Dependencies, Auto encoders, Deep Generative Models.

Text books.

1. Murthy CSV: Business Ethics and Corporate Governance, HPH
2. BholananthDutta, S.K. Podder – Corporation Governance, VBH.

Reference books

1. Dr. K. Nirmala, Karunakara Reddy: Business Ethics and Corporate Governance, HPH
2. H.R.Machiraju: Corporate Governance
3. K. Venkataramana, Corporate Governance, SHBP.
4. N.M.Khandelwal : Indian Ethos and Values for Managers

JNTUA College of Engineering(Autonomous),Ananthapuramu
Department of Computer Science & Engineering
Block Chain Technology and Applications
Professional Elective - V(MOOC)

Course Code:20A70503b **Semester VI(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- To present a problem oriented introductory knowledge of Digital circuits and its applications.
- Explain the elements of digital system abstractions such as digital representations of information, digital logic, Boolean algebra, state elements and finite state machine (FSMs).
- Design simple digital systems based on these digital abstractions, using the "digital paradigm" including discrete sampled information.
- Work in a design team that can propose, design, successfully implement and report on a digital systems project.
- Train the students to build IoT systems using sensors, single board computers and open source IoT platforms.

Course Outcomes:

CO1: Design, Test and evaluate various combinational circuits such as adders, subtractors, multipliers, comparators, parity generators, multiplexers and de-Multiplexers.

CO2: Construct flips-flops, counters and shift registers and verify its functionality

CO3: Realize and implementation of Asynchronous and Synchronous counters using Flip-Flop IC's .

CO4: Implementation of different combinational logic circuits using IC's.

CO5: Design and develop IoT based sensor systems.

UNIT-I: Introduction

Introduction, Scenarios, Challenges Articulated, Blockchain, Blockchain Characteristics, Opportunities Using Blockchain, History of Blockchain. Evolution of Blockchain: Evolution of Computer Applications, Centralized Applications, Decentralized Applications, Stages in Blockchain Evolution, Consortia, Forks, Public Blockchain Environments, Type of Players in Blockchain Ecosystem, Players in Market.

UNIT-II: Blockchain Concepts

Blockchain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding on blockchain: smart contracts, peer-to-peer network, types of blockchain nodes, risk associated with blockchain solutions, life cycle of blockchain transaction.

UNIT-III: Architecting Blockchain solutions

Architecting Blockchain solutions: Introduction, Obstacles for Use of Blockchain, Blockchain Relevance Evaluation Framework, Blockchain Solutions Reference Architecture, Types of Blockchain Applications. Cryptographic Tokens, Typical Solution Architecture for Enterprise Use Cases, Types of Blockchain Solutions, Architecture Considerations, Architecture with Blockchain Platforms, Approach for Designing Blockchain Applications.

UNIT-VI: Ethereum Blockchain Implementation

Ethereum Blockchain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, MyEther Wallet, Ethereum Networks/Environments, Infura, Etherscan, Ethereum Clients, Decentralized Application, Metamask, Tuna Fish Use Case Implementation, OpenZeppelin Contracts

UNIT-V: Hyperledger Blockchain Implementation

Hyperledger Blockchain Implementation, Introduction, Use Case – Car Ownership Tracking, Hyperledger Fabric, Hyperledger Fabric Transaction Flow, FabCar Use Case Implementation, Invoking Chaincode Functions Using Client Application.

Advanced Concepts in Blockchain: Introduction, InterPlanetary File System (IPFS), Zero-Knowledge Proofs, Oracles, Self-Sovereign Identity, Blockchain with IoT and AI/ML Quantum Computing and Blockchain, Initial Coin Offering, Blockchain Cloud Offerings, Blockchain and its Future Potential

References:

1. K. A. Navas, "Electronics Lab Manual", Volume I, PHI, 5th Edition, 2015, ISBN:9788120351424
2. Cyril Prasanna Raj P., "CMOS digital circuit design manual", Volume 1, MSEC E-publication, Edition 2016

JNTUA College of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
Natural Language Processing
Professional Elective Course– V(MOOC)

Course Code:20A70503c **Semester VII(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- The course is designed to develop skills to design and analyze simple linear and non linear data structures.
- It strengthen the ability to the students to identify and apply the suitable data structure for the given real world problem.
- It enables them to gain knowledge in practical applications of data structures.

Course Outcomes:

CO1: Able to design and analyze the time and space efficiency of the data structure.
CO2: Be capable to identity the appropriate data structure for given problem.
CO3: Have practical knowledge on the applications of data structures.

UNIT-I: Introduction to Natural language

The Study of Language, Applications of NLP, Evaluating Language Understanding Systems, Different Levels of Language Analysis, Representations and Understanding, Organization of Natural language Understanding Systems, Linguistic Background: An outline of English Syntax.

UNIT-II: Grammars and Parsing

Grammars and Parsing- Top- Down and Bottom-Up Parsers, Transition Network Grammars, Feature Systems and Augmented Grammars, Morphological Analysis and the Lexicon, Parsingwith Features, Augmented Transition Networks, Bayes Rule, Shannon game, Entropy and Cross Entropy.

UNIT-III: Grammars for Natural Language

Grammars for Natural Language, Movement Phenomenon in Language, Handling questions inContext Free Grammars, Hold Mechanisms in ATNs, Gap Threading, Human Preferences inParsing, Shift Reduce Parsers, Deterministic Parsers.

UNIT-VI:

Semantic Interpretation

Semantic & Logical form, Word senses & ambiguity, the basic logical form language, Encodingambiguity in the logical Form, Verbs & States in logical form, Thematic roles, Speech acts &embedded sentences, Defining semantics structure model theory.

Language Modelling

Introduction, n-Gram Models, Language model Evaluation, Parameter Estimation, Language Model Adaption, Types of Language Models, Language-Specific Modelling Problems,

Multilingual and Cross lingual Language Modelling.

UNIT-V:

Machine Translation

Survey: Introduction, Problems of Machine Translation, Is Machine Translation Possible, BriefHistory, Possible Approaches, Current Status. Anusaraka or Language Accessor: Background, Cutting the Gordian Knot, The Problem, Structure of Anusaraka System, User Interface, Linguistic Area, Giving up Agreement in Anusarsaka Output, Language Bridges.

Multilingual Information Retrieval

Introduction, Document Pre-processing, Monolingual Information Retrieval, CLIR, MLIR, Evaluation in Information Retrieval, Tools, Software and Resources.

Multilingual Automatic Summarization

Introduction, Approaches to Summarization, Evaluation, How to Build a Summarizer, Competitions and Datasets.

Textbooks:

a. James Allen, Natural Language Understanding, 2nd Edition, 2003, Pearson Education.
b. Multilingual Natural Language Processing Applications: From Theory To Practice-Daniel M. Bikel and ImedZitouni, Pearson Publications.
c. Natural Language Processing, A paninian perspective, Akshar Bharathi, Vineetchaitanya, Prentice–Hall of India.

JNTUA College Of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering

Cyber Security
Common to All Branches
(Open Elective Course– III)

Course Code:20A70504 **Semester VII(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- To introduce the concepts of Java.
- To Practice object-oriented programs and build java applications.
- To implement java programs for establishing interfaces.
- To implement sample programs for developing reusable software components.
- To establish database connectivity in java and implement GUI applications.

Course Outcomes:

CO1: Recognize the Java programming environment.
CO2: Select appropriate programming constructs to solve a problem.
CO3: Develop efficient programs using multithreading.
CO4: Design reliable programs using Java exception handling features.
CO5: Extend the programming functionality supported by Java.

UNIT-I: Cybercrime

Cybercrime and information security, Cybercriminals, Classifications of cybercrimes, Need for Cyberlaws in Indian context, Legal perspectives of cybercrime, Indian perspective of cybercrimes, Cybercrime and the Indian ITA 2000, Positive aspects and weak areas of ITA 2000, Amendments made in Indian ITA 2000 for admissibility of e- records, Amendments to the Indian IT Act, Global perspective on cybercrimes, Intellectual property in cyberspace, Ethical dimension of cybercrimes.

UNIT-II: Cyber Offenses

Cybercrime and information security, Cybercriminals, Classifications of cybercrimes, Need for Cyberlaws in Indian context, Legal perspectives of cybercrime, Indian perspective of cybercrimes, Cybercrime and the Indian ITA 2000, Positive aspects and weak areas of ITA 2000, Amendments made in Indian ITA 2000 for admissibility of e- records, Amendments to the Indian IT Act, Global perspective on cybercrimes, Intellectual property in cyberspace, Ethical dimension of cybercrimes.

UNIT-III: Cybercrime in Mobile and Wireless Devices

Proliferation of mobile and wireless devices, Trends in mobility, Credit card frauds in mobile and wireless computing era, Security challenges posed by mobile devices, Registry settings for mobile devices, Authentication service security, Attacks on mobile/cell phones, Security implications of mobile devices for organizations, Organizational measures for handling mobile devices related security issues.

UNIT-VI: Tools and Methods Used in Cybercrime

Proxy servers and anonymizers, Password cracking, Keyloggers and spywares, Virus and worms, Trojan horses and backdoors, Steganography, DoS and DDoS attacks, SQL Injection, Buffer Overflow, Attacks on wireless networks

UNIT-V: Cyber Forensics, Cybercrime in Real-World

Forensics of Computer and Handheld Devices: Cyber forensics, Cyber forensics and digital evidence, Forensics analysis of e-mail, Forensics and social networking sites, Forensics of handheld devices – Smartphone forensics, EnCase, Device Seizure, MOBIL edit.

Cybercrime examples, mini-cases, online scams: Real-life examples - Official website of Maharashtra Government hacked, Indian banks lose millions of rupees, Game source code stolen; Mini-cases - Indian Case of online gambling, Indian case of intellectual property crime; Online scams - Cheque cashing scam, Charity scams.

References:

3. K. A. Navas, "Electronics Lab Manual", Volume I, PHI, 5th Edition, 2015, ISBN:9788120351424
4. Cyril Prasanna Raj P., "CMOS digital circuit design manual", Volume 1, MSEC E-publication, Edition 2016

JNTUA College Of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
Introduction to Database Management Systems
Common to All Branches
(Open Elective Course– IV)

Course Code:20A70505 **Semester VII(R20)** **L T P C : 3 0 0 3**

Course Objectives:

- To introduce the concept of Internet of Things.
- To Practice programs and build real time applications.
- Students will be explored to the interconnection and integration of the physical world.
- Students will gain practical experience in the development of Cloud-based IoT systems.
- To get knowledge on cloud platforms

Course Outcomes (CO):

CO1: Design reliable real time applications using microcontrollers and microprocessors .
CO2: Extend the programming functionality and design new modules.
CO3: Able to design & develop IOT Devices.

UNIT-I: Introduction

Introduction to database systems; Characteristics of databases, File system V/s Database system, Users of Database
system, approaches to building a database, data models, database management system, Data Independence, DBMS
system architecture, challenges in building a DBMS, various components of a DBMS
Introduction to database systems; Characteristics of databases, File system V/s Database system, Users of Database
system, approaches to building a database, data models, database management system, Data Independence, DBMS
system architecture, challenges in building a DBMS, various components of a DBMS
Introduction to database systems; Characteristics of databases, File system V/s Database system, Users of Database
system, approaches to building a database, data models, database management system, Data Independence, DBMSsystem architecture, challenges in building a DBMS, various components of a DBMS
Introduction to database systems; Characteristics of databases, File system V/s Database system, Users of Database
system, approaches to building a database, data models, database management system, Data Independence, DBMS
system architecture, challenges in building a DBMS, various components of a DBMS.
Introduction to database systems; Characteristics of databases, File system V/s Database system, Users of Database
system, approaches to building a database, data models, database management system, Data Independence, DBMS
system architecture, challenges in building a DBMS, various components of a DBMS.
Introduction to database systems; Characteristics of databases, File system V/s Database system, Users of Database
system, approaches to building a database, data models, database management system, Data Independence, DBMSsystem architecture, challenges in building a DBMS, various components of a

DBMS.
Introduction to database systems, Characteristics of databases, File system V/s Database system, Users of Database system, approaches to building a database, data models, database management system, Data
Independence, DBMS system architecture, challenges in building a DBMS, various components of a DBMS.

UNIT-II: E/R Model
Conceptual Data Modeling – motivation, entities, entity types, various types of attributes, relationships, relationship
types, Entity set types, Participation constraints, E/R diagram notation, Extended E/R Model, Examples
Conceptual Data Modeling – motivation, entities, entity types, various types of attributes, relationships, relationship
types, Entity set types, Participation constraints, E/R diagram notation, Extended E/R Model, Examples
Conceptual Data Modeling - motivation, entities, entity types, various types of attributes, relationships, relationship types, Entity set types, Participation constraints, E/R diagram notation, Extended E/R Model, Examples.

UNIT-III: Relational Data Model
Concepts of relations, schema-instance distinction, keys, referential integrity & foreign keys, converting the database specification in ER notation to the relational schema, Relational algebra operators: selection, projection, cross product, various types of joins, division, set operations, example queries, tuple relational calculus, domain relational calculus, Fundamentals of SQL.

UNIT-VI: Relational Database Design
Importance of a good schema design, problems encountered with bad schema designs, motivation for normal forms, dependency theory - functional dependencies, Armstrong's axioms for FD's, closure of a set of FD's, minimal covers, Normalization, Normal Forms - INF, 2NF, 3NF and BCNF, decompositions and desirable properties of them, multi valued dependencies and 4NF, join dependencies and 5NF, Concept of Denormalization.

UNIT-V: Transaction Processing,Data Storage & Indexing
Transaction processing and Error recovery-Concepts of transaction processing, ACID properties, concurrency control, Serializability, locking based protocols, Timestamp based protocols, recovery and logging methods.
Data Storage and Indexes - File organizations, primary, secondary index structures, various index structures - hasb based, dynamic hashing techniques, multi-level indexes, B and B-trees.

References:
5. K. A. Navas, "Electronics Lab Manual", Volume I, PHI, 5th Edition, 2015, ISBN:9788120351424
6. Cyril Prasanna Raj P., "CMOS digital circuit design manual", Volume 1, MSEC E-publication, Edition 2016

JNTUA College Of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering

MANAGEMENT SCIENCE

Common to All Branches

(Human Elective)

Course Code:20A75401a **Semester VII(R20)** **L T P C : 3 0 0 3**

COURSE OBJECTIVES:

- To provide fundamental knowledge on management, administration, organization & its concepts.
- To make the students understand the role of management in Production process and marketing management
- To impart the concept of HRM in order to have an idea on Recruitment, Selection, Training & Development, job evaluation and Merit rating concepts
- To create awareness on identify Strategic Management areas & the PERT/CPM for better Project Management
- To make the students aware of the contemporary issues in management

Course Outcomes (CO): At the end of the course, students will be able to

- Define the Management, and its Functions
- Understand the concepts & principles of management and designs of organization in a practical world
- Apply the knowledge of Work-study principles & Quality Control techniques in industry
- Analyse the concepts of HRM in Recruitment, Selection and Training & Development.
- Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time & cost of project & to analyse the business through SWOT.
- Create Modern technology in management science.

UNIT - I **INTRODUCTION TO MANAGEMENT**

Management - Concept and meaning - Nature-Functions - Management as a Science and Art and both. Schools of Management Thought - Taylor's Scientific Theory-Henry Fayol's principles - Elton Mayo's Human relations - Systems Theory - **Organizational Designs** - Line organization - Line & Staff Organization - Functional Organization - Committee form of Organization - Social responsibilities of Management.

LEARNING OUTCOMES: At the end if the Unit, the learners will be able to

- Understand the concept of management and organization
- Analyze the organization chart & structure for an enterprise.
- Apply the concepts & principles of management in real life industry.
- Evaluate and interpret the theories and the modern organization theory.

UNIT - II **OPERATIONS & MARKETING MANAGEMENT**

Principles and Types of Plant Layout - Methods of Production (Job, batch and Mass Production), - Statistical Quality Control- **Materials Management -** Objectives - Inventory-Functions - Types, Inventory Techniques - EOQ-ABC Analysis - Purchase Procedure - **Marketing Management -** Concept - Meaning - Nature-Functions of Marketing - Marketing Mix - Channels of Distribution - Advertisement and Sales Promotion - Marketing Strategies based on Product Life Cycle.

LEARNING OUTCOMES: At the end of the Unit, the learners will be able to

- Understand the core concepts of Management Science and Operations Management
- Apply the knowledge of Method of Production principles in real life industry.
- Analyze Marketing Mix Strategies for an enterprise
- Evaluate Materials departments & Determine EOQ
- Create and design advertising and sales promotion

UNIT - III **HUMAN RESOURCES MANAGEMENT (HRM)**

HRM - Evolution of HRM - Definition and Meaning – Nature - Managerial and Operative functions - - Job Analysis - Human Resource Planning (HRP) – Process of Recruitment & Selection - Training and Development - Performance Appraisal - Methods of Performance Appraisal – Placement - Employee Induction - Wage and Salary Administration.

LEARNING OUTCOMES: At the end if the Unit, the learners will

- Understand the concepts of HRM in Recruitment, Selection, Training & Development
- Apply Managerial and operative Functions of HRM
- Analyze the need of training
- Evaluate performance appraisal Techniques
- Design the basic structure of salaries and wages Administration.

UNIT - IV **STRATEGIC & PROJECT MANAGEMENT**

Strategy Definition & Meaning - Vision - Mission - Goals - Steps in Strategy Formulation and Implementation - SWOT Analysis **Project Management -** Network Analysis - Programme Evaluation and Review Technique (PERT) - Critical Path Method (CPM) Identifying Critical Path - Project Crashing (Simple problems).

LEARNING OUTCOMES: At the end of the Unit, the learners will be able to

- Understand Mission, Objectives, Goals & strategies for an enterprise
- Apply SWOT Analysis to strengthen the project
- Analyze Strategy formulation and implementation
- Evaluate PERT and CPM Techniques
- Creative in completing the projects within given time

UNIT - V **Contemporary Issues In Management**

The concept of Management Information System (MIS) - Materials Requirement Planning (MRP) - Customer Relations Management (CRM) - Total Quality Management (TQM) - Six Sigma Concept - Supply Chain Management (SCM) - Enterprise Resource Planning (ERP) - Business Process Outsourcing (BPO) - Business Process Re-engineering - knowledge Management.

LEARNING OUTCOMES At the end if the Unit, the learners will be able to

- Understand modern management techniques
- Apply Knowledge in Understanding in modern management techniques
- Analyze Concept of CRM, MRP, TQM
- Evaluate Six Sigma concept and SCM

Textbooks:

1. A.R Aryasri, Management Science, TMH, 2013
2. Stoner, Freeman, Gilbert, Management, Pearson Education, New Delhi, 2012.

Reference Books:

1. Koontz & Weihrich, Essentials of Management, 6/e, TMH, 2005.
2. Thomas N.Duening & John M.Ivancevich, Management Principles and Guidelines, Biztantra.
3. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2004.
4. Samuel C.Certo, Modern Management, 9/e, PHI, 2005

Online Learning Resources:

www.slideshare.net/jhayabesamis/chapter-1-the-nature-and-concept-of-management-122625641?
www.slideshare.net/vivekpratapsingh14/school-of-management-thoughts?
https://www.slideshare.net/89ajpaul/organizational-design-anf-structure
https://www.slideshare.net/sujeet2685/plant-layout-46555840#
https://www.slideshare.net/drmadhurverma/materials-38395397
https://www.slideshare.net/ShaliniShetty3/introduction-to-marketing-management-72210724?
https://www.slideshare.net/srinidhiraman/human-resource-management-ppt-43320777
https://www.slideshare.net/wicaksana/training-and-development-33535063
https://www.slideshare.net/ayushijain107/strategic-management-ppt-58012275

JNTUA College Of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
BUSINESS ENVIRONMENT
(Human Elective)
Common to All Branches

Course Code:20A75401b **Semester VII(R20)** **L T P C : 3 0 0 3**

Course Objectives:

1. To make the student understand about the business environment
2. To enable them in knowing the importance of fiscal and monitory policy
3. To facilitate them in understanding the export policy of the country
4. To Impart knowledge about the functioning and role of WTO
5. To Encourage the student in knowing the structure of stock markets

Course Outcomes (CO): At the end of the course, students will be able to

- Define Business Environment and its Importance.
- Understand various types of business environment.
- Apply the knowledge of Money markets in future investment
- Analyse India's Trade Policy
- Evaluate fiscal and monitory policy
- Develop a personal synthesis and approach for identifying business opportunities

UNIT - I **Overview of Business Environment**

Introduction – meaning Nature, Scope, significance, functions and advantages. Types - Internal & External, Micro and Macro. Competitive structure of industries - Environmental analysis - advantages & limitations of environmental analysis & Characteristics of business.

Learning Outcomes: - After completion of this unit student will

- ➢ Understand the concept of Business environment
- ➢ Classify various types of business environment
- ➢ Evaluate the environmental analysis in business
- ➢ Discuss the Characteristics of Business.

UNIT - II **Fiscal Policy**

Introduction – Nature, meaning, significance, functions and advantages. Public Revenues - Public Expenditure - Public debt - Development activities financed by public expenditure - Evaluation of recent fiscal policy of GOI. Highlights of Budget - Monetary Policy - Demand and Supply of Money – RBI - Objectives of monetary and credit policy - Recent trends - Role of Finance Commission.

Learning Outcomes: - After completion of this unit student will

- ➢ Understand the concept of public revenue and public Expenditure
- ➢ Identify the functions of RBI and its role
- ➢ Analyze the Monitory policy in India

- Know the recent trends and the role of Finance Commission in the development of our country
- Differentiate between Fiscal and Monitory Policy

UNIT - III **India's Trade Policy**

Introduction – Nature, meaning, significance, functions and advantages. Magnitude and direction of Indian International Trade - Bilateral and Multilateral Trade Agreements - EXIM policy and role of EXIM bank - Balance of Payments– Structure & Major components - Causes for Disequilibrium in Balance of Payments - Correction measures.

Learning Outcomes: - After completion of this unit student will

- Understand the role of Indian international trade
- Understand and explain the need for Export and EXIM Policies
- Analyze causes for Disequilibrium and correction measure
- Differentiate between Bilateral and Multilateral Trade Agreements

UNIT - IV **World Trade Organization**

Introduction – Nature, meaning, significance, functions and advantages. Organization and Structure - Role and functions of WTO in promoting world trade - Agreements in the Uruguay Round – TRIPS, TRIMS, and GATT - Disputes Settlement Mechanism - Dumping and Anti-dumping Measures.

Learning Outcomes: - After completion of this unit student will

- Understand the role of WTO in trade
- Analyze Agreements on trade by WTO
- Understand the Dispute Settlement Mechanism
- Compare and contrast the Dumping and Anti-dumping Measures.

UNIT - V **Money Markets and Capital Markets**

Introduction – Nature, meaning, significance, functions and advantages. Features and components of Indian financial systems - Objectives, features and structure of money markets and capital markets - Reforms and recent development – SEBI - Stock Exchanges - Investor protection and role of SEBI.

Learning Outcomes: - After completion of this unit student will

- Understand the components of Indian financial system
- Know the structure of Money markets and Capital markets
- Analyze the Stock Markets
- Apply the knowledge in future investments
- Understand the role of SEBI in investor protection.

Textbooks:

1.Business Environment Text & Cases: JUNE 2017
2. Francis Cherunilam (2009), International Business: Text and Cases, Prentice Hall of India.
3. K. Aswathappa, Essentials of Business Environment: Texts and Cases & Exercises 13th Revised Edition.HPH2016

Reference Books:

1.K. V. Sivayya, V. B. M Das (2009), Indian Industrial Economy, Sultan Chand Publishers, New Delhi, India.
2. Sundaram, Black (2009), International Business Environment Text and Cases, Prentice Hall of India, New Delhi, India.
3. Chari. S. N (2009), International Business, Wiley India.
4.E. Bhattacharya (2009), International Business, Excel Publications, New Delhi.

Online Learning Resources:
https://www.slideshare.net/ShompaDhali/business-environment-53111245
https://www.slideshare.net/jitenparmar313/fiscal-policy-65521889
https://www.slideshare.net/ShikhaGupta31/indias-trade-policyppt
https://www.slideshare.net/prateeknepal3/ppt-mo

JNTUA College Of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
ORGANIZATIONAL BEHAVIOUR
(Human Elective)
Common to All Branches

Course Code:20A75401c **Semester VII(R20)** **L T P C : 3 0 0 3**

Course Objectives:
- To make them aware of concepts & analysis in organizational behaviour
- To offer knowledge to students on self-motivation, leadership and management
- To facilitate them to become powerful leaders
- To Impart knowledge about group dynamics
- To make them understand the importance of change and development

COURSE OUTCOMES: At the end of the course, students will be able to
- Define the Organizational Behaviour, its nature and scope
- Understand the nature and concept of Organizational behaviour
- Apply theories of motivation to analyse the performance problems
- Analyse the different theories of leadership
- Evaluate group dynamics
- Develop as powerful leader

UNIT - I **Introduction Of Organizational Behavior and Various Concepts**

Meaning, definition, nature, scope and functions - Organizing Process – Making organizing effective - Understanding Individual Behavior – Attitude - Perception - Learning – Personality.

LEARNING OUTCOMES: - After completion of this unit student will

- Understand the concept of Organizational Behavior
- Contrast and compare Individual & Group Behavior and attitude
- Evaluate personality types

UNIT - II **Motivation and Organization Outcome**

Theories of Motivation - Maslow's Hierarchy of Needs - Hertzberg's Two Factor Theory - Vroom's theory of expectancy - McClelland's theory of needs – Mc Gregor's theory X and theory Y – Adam's equity theory – Locke's goal setting theory –

LEARNING OUTCOMES: - After completion of this unit student will

- Understand the concept of Motivation
- Analyze the Theories of motivation
- Explain how employees are motivated according to Maslow's Needs Hierarchy

UNIT - III **Leadership**

Introduction – Meaning, scope, definition, Nature - Organizational Climate - Leadership - Traits Theory–Managerial Grid - Transactional Vs Transformational Leadership - Qualities of good Leader - Alderfer's ERG theory – traits - Leaders Vs Managers.

Conflict Management - Evaluating Leader - Women and Corporate leadership.

LEARNING OUTCOMES: - After completion of this unit student will

- Understand the concept of Leadership
- Contrast and compare Trait theory and Managerial Grid
- Distinguish the difference between Transactional and Transformational Leadership
- Evaluate the qualities of good leaders

UNIT - IV **Organizational Culture**

Introduction – Nature, Meaning, scope, definition and functions - Organizational Culture - Changing the Culture – Change Management – Work Stress Management - Organizational management – Managerial implications of organization's change and development

LEARNING OUTCOMES: - After completion of this unit student will

- Understand the importance of organizational change and development
- Apply change management in the organization
- Analyze work stress management
- Evaluate Managerial implications of organization

UNIT - V **Organizational Change and Development**

Introduction – Nature, Meaning, scope, definition and functions - Organizational Culture - Changing the Culture – Change Management – Work Stress Management - Organizational management – Managerial implications of organization's change and development

LEARNING OUTCOMES: - After completion of this unit student will

- Understand the importance of organizational change and development
- Apply change management in the organization
- Analyze work stress management
- Evaluate Managerial implications of organization

Textbooks:

1. Luthans, Fred, Organisational Behaviour, McGraw-Hill, 12 Th edition 2011
2. P Subba Rao, Organisational Behaviour, Himalya Publishing House 2017

Reference Books:

- McShane, Organizational Behaviour, TMH 2009
- Nelson, Organisational Behaviour, Thomson, 2009.
- Robbins, P.Stephen, Timothy A. Judge, Organisational Behaviour, Pearson 2009.
- Aswathappa, Organisational Behaviour, Himalaya, 2009

https://www.slideshare.net/payalrchhabra/organisational-behavior-15668552
https://www.slideshare.net/nilendrakumar7/motivation-and-team-building
https://www.slideshare.net/Knight1040/organizational-culture-9608857
https://www.slideshare.net/harshrastogi1/group-dynamics-159412405
https://www.slideshare.net/kohlisudeep18/organisational-developmet

JNTUA College Of Engineering (Autonomous),Ananthapuramu
Department of Computer Science & Engineering
Skill Oriented Course-V
Mobile Application Development

Course Code: 20A70506 **Semester VII(R20)** **L T P C : 1 0 2 2**

Course Objectives:
- Exposure to the value of life, society and harmony
- Leading towards holistic perspective based on self-exploration about themselves (human being), family, and society and nature/existence.
- Bringing transition from the present state to Universal Human Order
- Instill commitment and courage to act.
- Know about appropriate technologies and management patterns

Course Outcomes:

CO1: Analyze th terms like Natural Acceptance, Happiness and Prosperity
CO2: Understand awareness of oneself, and one's surroundings (family, society nature)
CO3: Apply what they have learnt to their own self in different day-to-day settings in real life
CO4: Relate human values with human relationship and human society.
CO5: Justify the need for universal human values and harmonious existence
CO6: Develop as socially and ecologically responsible engineers

Week - 1:

Mobile web presence, Mobile applications, Marketing, App as a mobile web app; User interface design - Effective use of screen real estate, Mobile application users, Mobile information design, Mobile platforms, Tools of mobile interface design.
Task: Test the android development environment by performing the followingoperations.

- Add the sample application to a project in Androidstudio.
- Create an Android Virtual Device (AVD) for sampleproject.
- Create a launch configuration for sampleproject.
- Run a sample application in AndroidEmulator.

Week - 2:

Android versions, Features and architecture, required tools, Android application launching.
Task: Develop a program which will implement Activities in androidapplication.

Week - 3:

Activities, linking activities using intents, Calling Built – In Applications Using Intents, displaying notifications, Components of a screen, adapting to display orientation

Task: Develop a program which will implement Intents in androidapplication.

Week - 4:

Managing changes to screen orientation, Utilizing the action bar, Listening for UI notifications.

Task: Develop a program which will implement screen orientation in androidapplication.

Week - 5:

Basic views, Picker views, List view, Image view, Menus with views, Web view.
Task: Develop a program which will implement Sub menu in androidapplication.

Week - 6:

Saving and loading user preferences, persisting data to files, Creating and using databases.

Task: Develop a program to insert, delete, display, and update the employeedetails using AndroidSQLite.

Week - 7:
SMS messaging, sending e-mail, getting location data, Consuming web services using HTTP.
Task: Develop a program to implement a Custom Button and handle the displayed message on buttonpress.

Week - 8:

Layouts (Linear, Relative, Table, Absolute, Table).

Task: Develop a program to implement Email service by using All Layout Views with differentattributes

Week 9:
Google maps and its child views displaying maps, monitoring a location.
Task: Develop Google Maps application by using Linear Layout Views with differentattributes.

Week 10:
List and Picker views and Date views.
Task: Develop a program to implement the List View in androidapplication.

Week 11:
Services, Communication between a service and an activity, Binding activities to services.
Task: Design and develop a program to create sign-up and sign-in pages and maintain the user details withSQLite.

Week 12:
Threading, preparing for publishing, Deploying APKfiles.

Task: Develop the following applications using Android.

- Alarm b. Calculator c. Weather application d. VideoPlayer

Week 13:
Database Connectivity with MySql: Establish a database Connection using mysqli, Prepare SQL Statement, bind parameters, Execute the statement, bind the result.
Task: Develop a program which will implement databases in androidapplication

Week 14:
HTTP is a Stateless Protocol: Handling Cookies and Sessions, Implementation of JSON Web Tokens (JWT), SMS API.
Task: Design and develop a User Authentication System (Login-Logout functionality) using cookies, sessions, JSON using Android studio.

Textbooks:

1. J. F. DiMarzio, "Beginning Android Programming with Android Studio," Wiley India, Fourth Edition,2017.
2. Wei – Meng Lee, ―Beginning Android 4 Application Development‖, Wrox,2017.

References:

1. JeevanVidya: EkParichaya, ANagaraj, JeevanVidyaPrakashan, Amarkantak, 1999
2. HumanValues, A.N.Tripathi, NewAgeIntl.Publishers, NewDelhi,2004.
3. The Story of Stuff (Book).
4. Economy of Permanence - J C Kumarappa 8. Bharat Mein Angreji Raj - PanditSunderlal 9. Rediscovering India - byDharampal
5. Hind Swaraj or Indian Home Rule - by Mohandas K.Gandhi
6. India Wins Freedom - Maulana Abdul Kalam Azad 12. Vivekananda - Romain Rolland (English)

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Edge and Fog Computing

Course Code:20A05H11 **Honor Degree(R20)** **L T P C : 3 1 0 4**

Course Objectives:

- To move computing and storage away from the confines of a centralized data center and distribute those resources to one or more additional locations across the wider networked environment. Ideally, the decentralized resources will be closer to the point where work is being performed. This work could be data collection or user request processing

Course Outcomes:

CO1: Explore research, frameworks, applications in edge and fog computing.

C02: Review underlying technologies, limitations, and challenges along with future research direction and discuss generic conceptual framework for optimization problems in fog computing.

CO3: Design and develop simulation scenarios for Edge and Fog Computing using network simulator

UNIT – I:

Internet of Things (IoT) and New Computing Paradigms: Introduction, Relevant Technologies, Fog and Edge Computing Completing the Cloud, Advantages of FEC: SCALE, How FEC Achieves These Advantages: SCANC, Hierarchy of Fog and Edge Computing, Business Models, Opportunities and Challenges.

Addressing the Challenges in Federating Edge Resources: Introduction, The Networking Challenge, The Management Challenge, Miscellaneous Challenges.

Integrating IoT + Fog + Cloud Infrastructures: System Modeling and Research Challenges: Introduction, Methodology, Integrated C2F2T Literature by Modeling Technique, Integrated C2F2T Literature by Use-Case Scenarios, Integrated C2F2T Literature by Metrics.

UNIT – II:Management and Orchestration of Network Slices in 5G, Fog, Edge, and Clouds
Introduction, Background, Network Slicing in 5G, Network Slicing in Software-Defined Clouds Network Slicing Management in Edge and Fog.

Optimization Problems in Fog and Edge Computing: Introduction, Background / Related Work, Preliminaries, The Case for Optimization in Fog Computing, Formal Modeling Framework for Fog Computing, Metrics, Further Quality Attributes, Optimization Opportunities along the Fog Architecture, Optimization Opportunities along the Service Life Cycle, Toward a Taxonomy of Optimization Problems in Fog Computing, Optimization Techniques

Middlewares: Introduction, Need for Fog and Edge Computing Middleware, Design Goals, State-of-the-Art Middleware Infrastructures, System Model, Proposed Architecture

UNIT – III A Lightweight Container Middleware for Edge Cloud
Introduction, Background/RelatedWork, Clusters for Lightweight Edge Clouds, Architecture Management – Storage and Orchestration, IoT Integration, Security Management for Edge Cloud Architectures.

Data Management in Fog Computing : Introduction, Background , Fog Data Management

Predictive Analysis to Support Fog Application Deployment: Introduction, Motivating Example: Smart Building, Predictive Analysis with Fog Torch Motivating Example (continued).

Using Machine Learning for Protecting the Security and Privacy of Internet of Things (IoT) Systems: Introduction Background, Survey of ML Techniques for Defending IoT Devices, Machine Learning in Fog Computing

Fog Computing Realization for Big Data Analytics: Introduction, Big Data Analytics, Data Analytics in the Fog, Prototypes and Evaluation, Architecture.

UNIT – IV Exploiting Fog Computing in Health Monitoring
Introduction, An Architecture of a Health Monitoring IoT-Based System with Fog Computing , Fog Computing Services in Smart E-Health Gateways, System Implementation Case Studies, Experimental Results, and Evaluation , Discussion of Connected Components , Related Applications in Fog Computing 313
Smart Surveillance Video Stream Processing at the Edge for Real-Time Human Objects Tracking : Introduction, Human Object Detection, Object Tracking, Lightweight Human Detection.
Fog Computing Model for Evolving Smart Transportation Applications :Introduction, Data-Driven Intelligent Transportation Systems, Mission-Critical Computing Requirements of Smart Transportation Applications, Fog Computing for Smart Transportation Applications, Case Study: Intelligent Traffic Lights Management (ITLM) System, Fog Orchestration Challenges and Future Directions .

UNIT – V Testing Perspectives of Fog-Based IoT Applications
Introduction, Background, Testing Perspectives
Legal Aspects of Operating IoT Applications in the Fog : Introduction, Related Work, Classification of Fog/Edge/IoT Applications, Restrictions of the GDPR Affecting Cloud, Fog, and IoT Applications, Data Protection by Design Principles
Modeling and Simulation of Fog and Edge Computing Environments Using iFogSim Toolkit: Introduction ,iFogSim Simulator and Its Components, Installation of iFogSim, Building Simulatio with iFogSim, Example Scenarios, Simulation of a Placement Policy, A Case Study in Smart Healthcare

Textbooks:
1. Fog and Edge Computing: Principles and Paradigms by Rajkumar Buyya, Satish Narayana Srirama, wiley publication, 2019, ISBN: 9781119524984.

Reference Books:
1. David Jensen, “Beginning Azure IoT Edge Computing: Extending the Cloud to the Intelligent Edge, MICROSOFT AZURE.
2. Fog Computing: Theory and Practice by Assad Abbas, Samee U. Khan, Albert Y. Zomaya

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Quantum Computing

Course Code:20A05H12 **Honor Degree(R20)** **L T P C : 3 1 0 4**

Course Objectives:

- Quantum computers have the potential to revolutionize computation by making certain types of classically intractable problems solvable. While no quantum computer is yet sophisticated enough to carry out calculations that a classical computer can't, great progress is under way.

Course Outcomes (CO):

CO1: Concepts of Classical Vs Quantum Computing Systems.
CO2:Quantum theory and Quantum Circuits, Quantum Algebra in relation to Computer Science.
CO3: Quantum bits, super position, entanglement, Quantum gates.
CO4: Significance of Quantum Algorithms.
CO5: Quantum Programming Languages.
CO6: Quantum Computing Use cases.

UNIT – I **Introduction**

Introduction – The leap from classical to Quantum, Classical deterministic systems, Probabilistic Systems, Quantum Systems, Assembling systems, Global Perspectives- History of Quantum computation and Quantum information, Nomenclature and Notation- Linear Algebra and Quantum Mechanics, Information theory and probability, frequently used quantum gates and circuit symbols, Quantum supremacy.

UNIT – II **Basic Quantum theory**

Quantum states: Superposition, Entanglement, the role of Quantum Physics: Quantum interference, Quantum entanglement, Quantum decoherence, Quantum bit: Qubit, Multiple Qubits, The state of Quantum system, Observables, Measurements, Quantum Dynamics, Assembling Quantum systems, Super conducting Quantum Interface Devices (SQUID), Superconducting Qubits.

UNIT – III **Quantum model of computation**

Classical Gates, Reversible gates, Quantum gates, Quantum circuit model, Quantum Gates: 1-Qubit Gates, Controlled-U Gates, Universal Sets of Quantum Gates, Measurements with Quantum Circuits, Quantum Error Correction, Introduction to Quantum Communication and Quantum Cryptography.

UNIT – IV **Quantum Algorithms**

Deutsch's Algorithm, Deutsch-Jozsa Algorithm, Simon's periodicity Algorithm, Grover's Search Algorithm, Shor's Factoring Algorithm, Quantum computing use cases: Search, Quantum Simulations, Optimization, Cryptography, Image Processing, Healthcare, Finance, Chemical and biological engineering, Artificial Intelligence.

UNIT – V **Quantum Programming Languages**

Programming in Quantum world, Quantum Assembly Programming, Quantum Turing Machine, Quantum Random Access Memory Model (QRAM), Quantum Hardware Interface (QHI), Higher-level Quantum Programming, Introduction to Qiskit and IBM Quantum Experience, Introduction to Quantum python Library Pennylane.

Textbooks:

[1] Quantum Computing for Computer Scientists, Noson S. Yanofsky, Mirco A. Mannucci, Cambridge University Press,2008.

[2] An Introduction to Quantum Computing, Phillip Kaye, Raymond Laflamme, Michele Mosca, Oxford University press, 2007.

[3] Quantum Computing in Practice with Qiskit and IBM Quantum Experience, HassiNorlen, 2020.

Reference Books:

[1] Quantum Computation and Quantum Information, Michael A. Nielsen & Isaac, I. Chuang, Cambridge University Press, 2010.

[2] Swayam NPTEL, https://onlinecourses.nptel.ac.in/noc22_cs79/

[3] A cross platform Python library for differential Programming of Quantum computers, Pennylane

Online Learning Resources:

https://pennylane.ai/

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Introduction to Autonomous Navigation Systems

Course Code:20A5H13 **Honor Degree(R20)** **L T P C : 3 1 0 4**

Course Objectives:

Practical advances in Artificial Intelligence are ushering in a new era of digital automation. In the forth coming years, drones, robotics and driverless vehicles and artificial intelligence will used to transport goods, perform surveillance, transport people in efficient and safe way. This course will enable the students to under the concepts and algorithms that underlie an autonomous vehicle's understanding of itself and the world around it.

Course Outcomes (CO):

CO1:Concepts of UAV/Drones, UGV/Robotics and Autonomous vehicles.
CO2:Overall understanding of significant elements of UAV/UGV and Autonomous vehicles, the basics of flight, navigation, guidance, sensors, design concepts etc., and various AI algorithms useful in building the Autonomous systems.
CO3:Build/integrate small to medium size UAV/UGV.
CO4:Concepts of various sensor elements, data collection, processing and various software tools.
CO5:Understanding of AI algorithms for autonomous systems, followed by design and development of autonomous systems and algorithms as a case study system.

UNIT – I

Introduction to Autonomous systems: Definition, Characteristics, differences between non autonomous Vs autonomous, Types of vehicles, Introduction to navigation and communication.

UNIT – II

Basics of navigation (Aerial and Ground) : Different types of flight vehicles; Components and functions of an airplane; Forces acting on Airplane; Physical properties and structure of the atmosphere; Aerodynamics – aerofoil nomenclature, aerofoil characteristics, Angle of attack, Mach number, Lift and Drag, Propulsion and airplane structures.

UNIT – III

UAV Elements: DGCA Classification of UAVs; Types and Characteristics of Drones: Fixed, Multi-rotor, and Flapping Wing; Applications: Defense, Civil, Environmental monitoring. Components: Arms, motors, propellers, electronic speed controller (ESC), flight controller; Propulsion; Flight controller Software, MAVLINK protocol

UNIT – IV

Unmanned Ground Vehicles/Robotics : Introduction to Unmanned Ground Vehicles: Back ground, Robot Arm Kinematics and Dynamics, Manipulator Trajectory planning and Motion Control, Robot Sensing, Robotic Operating System, Robotic Programming Languages.

UNIT – V

Navigation and guidance: Data Link; Sensors and Payloads: GPS, IMU, Light Detection and Ranging (LiDAR), Imaging cameras, Classification of payload based on applications; Hyper-spectral sensors; Laser Detection and Range (LiDAR); cameras; ultra-sonic detectors; Case study on payloads. Introduction to navigation systems and types of guidance; Mission Planning and Control.

Textbooks:

1. Handbook of unmanned aerial vehicles, K Valavanis; George J Vachtsevanos, New York, Springer, Boston, Massachusetts : Credo Reference, 2014. 2016.
2. Building Your Own Drones: A Beginners' Guide to Drones, UAVs, and ROVs, John Baichtal
3. DGCA RPAS Guidance Manual, Revision 3 – 2020

Reference Books:

1. K.S. Fu, R.C. Gonzalez, C.S.G. Lee, Robotics : Control, Sensing, Vision and Intelligence

2.Aaron Martinez, Enrique Fernandez, Learning ROS for Robotics Programming: A practical, instructive, and comprehensive guide to introduce yourself to ROS, the top-notch, leading robotics framework, PACKT publishing, Open Source.

3. John J. Craig, Introduction to Robotics: Mechanics and Control, Addison Wesley publication, Third Edition

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering

Reinforcement Learning

Course Code:20A05H14 **Honor Degree(R20)** **L T P C : 3 1 0 4**

Course Objectives

Reinforcement Learning is a subfield of Machine Learning, but is also a general-purpose formalism for automated decision-making and AI.

This course introduces you to statistical learning techniques where an agent explicitly takes actions and interacts with the world.

Course Outcomes (CO):

CO1: Formulate Reinforcement Learning problems
CO2: Apply various Tabular Solution Methods to Markov Reward Process Problems
CO3: Apply various Iterative Solution methods to Markov Decision Process Problems
CO4: Comprehend Function approximation methods

UNIT – I

Introduction: Introduction to Reinforcement Learning (RL) – Difference between RL and Supervised Learning, RL and Unsupervised Learning. Elements of RL, Markov property, Markov chains, Markov reward process (MRP).

UNIT – II

Evaluative Feedback - Multi-Arm Bandit Problem: An n-Armed Bandit Problem, Exploration vs Exploitation principles, Action value methods, Incremental Implementation, tracking a non-stationary problem, optimistic initial values, upper-confidence-bound action selection, Gradient Bandits. Introduction to and proof of Bellman equations for MRPs

UNIT – III

Introduction to Markov decision process (MDP), state and action value functions, Bellman expectation equations, optimality of value functions and policies, Bellman optimality equations.
Dynamic Programming (DP): Overview of dynamic programming for MDP, principle of optimality, Policy Evaluation, Policy Improvement, policy iteration, value iteration, asynchronous DP , Generalized Policy Iteration.

UNIT – IV

Monte Carlo Methods for Prediction and Control: Overview of Monte Carlo methods for model free RL, Monte Carlo Prediction, Monte Carlo estimation of action values, Monto Carlo Control, On policy and off policy learning, Importance sampling.
Temporal Difference Methods: TD Prediction, Optimality of TD(0), TD Control methods - SARSA, Q-Learning and their variants.

UNIT – V

Eligibility traces: n-Step TD Prediction, Forward and Backward view of TD(λ), Equivalence of forward and backward view, Sarsa(λ),, Watkins's Q(λ), Off policy eligibility traces using importance of sampling.

Function Approximation Methods: Value prediction with function approximation, gradient descent methods, Linear methods, control with function approximation

.

Textbooks:

1. Richard S. Sutton and Andrew G. Barto, Reinforcement Learning: An Introduction", 2nd Edition, The MIT Press.
2. CsabaSzepesvari – Algorithms for Reinforcement Learning – Morgan & Claypool, 2010.

Reference Books:

1. Reinforcement Learning By Richard S. (University Of Alberta) Sutton,Andrew G. (Co-Director Autonomous Learning Laboratory) Barto

JNTUA College of Engineering(Autonomous),Ananthapuramu
Department of Computer Science & Engineering
MINOR DEGREE (R20)
Introduction to Data Science

Course Code20A05M11 **L T P C : 3 1 0 4**

Course Objectives:

- The objective of the data scientist is to explore, sort and analyze mega data from various sources in order to take advantage of them and reach conclusions to optimize business processes or for decision support.

Course Outcomes:

After completion of the course, students will be able to

- Students will develop relevant programming abilities.
- Students will demonstrate proficiency with statistical analysis of data.
- Students will develop the ability to build and assess data-based models.
- Students will execute statistical analyses with professional statistical software.
- Students will demonstrate skill in data management.
- Students will apply data science concepts and methods to solve problems in real-world contexts and will communicate these solutions effectively

UNIT – I

High dimension space: introduction, the law of large numbers, the geometry of high dimensions, properties if the unit ball, generating points uniformly at random from a ball, Gaussians in high dimension, random projection and Johnson lindenstrauss lemma, separating gaussians, fitting a spherical Gaussian to data

Best fit subspaces and singular value decomposition: introduction, preliminaries, singular vectors, SVD, best rank-k approximations, left singular vectors, and power method for singular value decomposition, singular vectors and Eigen vectors, applications of SVD

UNIT – II

Random walks and Markov chains: stationary distribution, markov chain Monte carlo, areas and volumes, convergence of random walks on undirected graphs, electrical networks and random walks ,random walks on undirected graphs with unit weight edge weights, random walks in Euclidean space, the web as a markov chain.

UNIT - III

Machine learning: introduction, the perceptron algorithm, kernel functions and non linearly separable data, generalizing to new data, Vc-dimension, Vc-dimension and, machine learning, other measures of complexity, deep learning, Gradient descent, online learning, boosting

Algorithm for massive data problems: sampling, streaming, and sketching introduction, frequency moments, matrix algorithms using sampling, sketches of documenting.

UNIT – IV

Machine learning: introduction, the perceptron algorithm, kernel functions and non linearly separable data, generalizing to new data, Vc-dimension, Vc-dimension and, machine learning, other measures of complexity, deep learning, Gradient descent, online learning, boosting

Algorithm for massive data problems: sampling, streaming, and sketching introduction, frequency moments, matrix algorithms using sampling, sketches of documenting.

UNIT – IV

Clustering: introduction, k-means clustering-center clustering, finding low error clustering ,spectral clustering, approximation stability, high density clustering, kernel methods, recursive clustering based on sparse cuts, dense submatrics and communities, community finding and graph partitioning, spectral clustering applied to social networks

Random graphs: the G(n,p) Model, phase transitions, Giant component, cycle and full connectivity, phase transitions for increasing properties branching process, CNF-SAT, non uniform models for Random Graphs, growth models, small world graphs.

UNIT - V

Topic models: An idealized model, Nonnegative matrix factorization, NMF with Anchor terms, Hard and soft clustering, the latent Dirichlet Allocation model for topics, the Dominant Admixture model, formal assumptions, finding the term topic matrix, hidden markov models, graphical models and belief propagation, Bayesian or belief networks, markov random fields, factor graphs, Tree algorithms, message passing in general graphics, warning propagation, correlation between variables.

Textbooks:

1 .Fundamentals of data science by Arvim Blum, john hope croft, Ravindran Kannan

Reference Books:

1. High-Dimensional Probability: An Introduction with Applications in Data Science: 47 (Cambridge Series in Statistical and Probabilistic Mathematics, Series Number 47) by Roman Vershynin Hardcover.

2. Understanding Machine Learning: From Theory to Algorithms by shaiselvshawrtaz, shai ben David

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Introduction to AI/ML

Course Code20A05M12 **MINOR DEGREE (R20)** **L T P C : 3 1 0 4**

Course Objectives:

- AI programming focuses on three cognitive skills learning, reasoning and self-correction.
- AI is a research field that studies how to realize the intelligent human behaviors on a computer.
- Understand the basic theory underlying machine learning
- Formulate machine learning problems corresponding to different applications.

Course Outcomes:

After completion of the course, students will be able to

CO1: Solve basic AI based problems.

CO2: Define the concept of Artificial Intelligence.

CO3: Apply AI techniques to real-world problems to develop intelligent systems.

CO4: Identify machine learning techniques suitable for a given problem.

CO5: Solve the real world problems using various machine learning techniques.

UNIT – I: **Fundamentals of AI**

Introduction: What is AI, Foundations of AI, History of AI, The State of Art.

Intelligent Agents: Agents and Environments, Good Behaviour: The Concept of Rationality, The Nature of Environments, The Structure of Agents.

UNIT – II: **Solving Problems by searching**

Problem Solving Agents, Example problems, Searching for Solutions, Uninformed Search Strategies, Informed search strategies, Heuristic Functions, Beyond Classical Search: Local Search Algorithms and Optimization Problems, Local Search in Continues Spaces, Searching with Nondeterministic Actions, Searching with partial observations, online search agents and unknown environments.

UNIT – III: **Reinforcement Learning**

Introduction, Passive Reinforcement Learning, Active Reinforcement Learning, Generalization in Reinforcement Learning, Policy Search, applications of RL

Natural Language Processing: Language Models, Text Classification, Information Retrieval, Information Extraction.

UNIT – IV: **Introduction**

Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

UNIT – V: **Neural networks and genetic Algorithms**

Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evolution and Learning.

Textbooks:

1. Stuart J.Russell, Peter Norvig, “Artificial Intelligence A Modern Approach”, 3rd Edition, Pearson Education, 2019.
2. T.M. Mitchell, “Machine Learning”, McGraw-Hill, 1997.

Reference Books:

1. Nilsson, Nils J., and Nils Johan Nilsson. Artificial intelligence: a new synthesis. Morgan Kaufmann, 1998.
2. Johnson, Benny G., Fred Phillips, and Linda G. Chase. "An intelligent tutoring system for the accounting cycle: Enhancing textbook homework with artificial intelligence." Journal of Accounting Education 27.1 (2009): 30-39.
3. EthernAlpaydin, “Introduction to Machine Learning”, MIT Press, 2004.
4. Stephen Marsland, “Machine Learning -An Algorithmic Perspective”, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Data Analytics with R

Course Code:20A05M13 **MINOR DEGREE (R20)** **L T P C : 3 1 0 4**

Course Objectives:

- How to manipulate data within R and to create simple graphs and charts used in introductory statistics.
- The given data using different distribution functions in R.
- The hypothesis testing and calculate confidence intervals; perform linear regression models for data analysis.
- The relevance and importance of the theory in solving practical problems in the real world.

Course Outcomes:

- Install and use R for simple programming tasks.
- Extend the functionality of R by using add-on packages
- Extract data from files and other sources and perform various data manipulation tasks on them.
- Explore statistical functions in R.
- Use R Graphics and Tables to visualize results of various statistical operations on data.
- Apply the knowledge of R gained to data Analytics for real-life applications.

UNIT – I: **INTRODUCTION TO COMPUTING**

a. Installation of R
b. The basics of R syntax, workspace
c. Matrices and lists
d. Subsetting
e. System-defined functions; the help system
f. Errors and warnings; coherence of the workspace

UNIT-II: **GETTING USED TO R: DESCRIBING DATA**

a. Viewing and manipulating Data
b. Plotting data
c. Reading the data from console, file (.csv) local disk and web
d. Working with larger datasets

UNIT-III: **SHAPE OF DATA AND DESCRIBING RELATIONSHIPS**

a. Tables, charts and plots.
b. Univariate data, measures of central tendency, frequency distributions, variation, and Shape.
c. Multivariate data, relationships between a categorical and a continuous variable,
d. Relationship between two continuous variables – covariance, correlation coefficients, comparing multiple correlations.
e. Visualization methods – categorical and continuous variables, two categorical variables, two continuous variables.

UNIT-IV: **PROBABILITY DISTRIBUTIONS**

a. Sampling from distributions – Binomial distribution, normal distribution
b. tTest, zTest, Chi Square test

c. Density functions
d. Data Visualization using ggplot – Box plot, histograms, scatter plotter, line chart, bar chart, heat maps

UNIT-V: **EXPLORATORY DATA ANALYSIS**

Demonstrate the range, summary, mean, variance,
median, standard deviation, histogram, box plot, scatter plot using population dataset.

UNIT-VI: **TESTING HYPOTHESES**

a. Null hypothesis significance testing
b. Testing the mean of one sample
c. Testing two means

UNIT-VII: **PREDICTING CONTINUOUS VARIABLES**

a. Linear models
b. Simple linear regression
c. Multiple regression
d. Bias-variance trade-off – cross-validation

UNIT-VIII**: CORRELATION**

a. How to calculate the correlation between two variables.
b. How to make scatter plots.
c. Use the scatter plot to investigate the relationship between two variables

UNIT-IX**: TESTS OF HYPOTHESES**

a. Perform tests of hypotheses about the mean when the variance is known.
b. Compute the p-value.
c. Explore the connection between the critical region, the test statistic, and the p-value

UNIT-X: **ESTIMATING A LINEAR RELATIONSHIP**

Demonstration on a Statistical Model for
a Linear Relationship
a. Least Squares Estimates
b. The R Function lm
c. Scrutinizing the Residuals

UNIT-XI**: APPLY-TYPE FUNCTIONS**

a. Defining user defined classes and operations, Models and methods in R
b. Customizing the user&# 39 ; s environment
c. Conditional statements
d. Loops and iterations

UNIT-XII: **STATISTICAL FUNCTIONS IN R**

a. Write Demonstrate Statistical functions in R
b. Statistical inference, contingency tables, chi-square goodness of fit, regression, generalized linear models, advanced modeling methods.

Reference Books:

1. SandipRakshit, “Statistics with R Programming”, McGraw Hill Education, 2018.
2. Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, “AN Introduction to Statistical Learning: with Applications in R”, Springer Texts in Statistics, 2017.
3. Joseph Schmuller, “Statistical Analysis with R for Dummies”, Wiley, 2017.
4. K G Srinivasa, G M Siddesh, ChetanShetty, Sowmya B J, “Statistical Programming in R”, Oxford Higher Education, 2017.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering
Software project Management

Course Code:20A05M14 MINOR DEGREE (R20) L T P C : 3 1 0 4

Course Objectives:

- Understanding the specific roles within a software organization as related to project and process management
- Learn the principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience-based creation & improvement of models (process management).
- Understanding the basic infrastructure competences (e.g., process modeling and measurement)Analyze the basic steps of project planning, project management, quality assurance, and process management and their relationships

Course Outcomes:

After completion of the course, students will be able to

CO1: Understand the purpose and importance of project management from the perspectives of planning, tracking and completion of project.

CO2: Apply, analyze, design and develop the software project and design various estimation levels of cost and effort.

CO3: Compare and differentiate organization structures and project structures.

CO4: Acquire the knowledge of managing, economics for conventional, modern and future software projects. Sketch various artifacts sets for better understanding of software development

UNIT – I: **Conventional Software Management**

The waterfall model, conventional software Management performance.

Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

UNIT – II: **Improving Software Economics**

Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

The old way and the new: The principles of conventional software engineering, principles of modern software management, transitioning to an iterative process

UNIT – III: **Life cycle phases**

Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts. Model based software architectures: A Management perspective and technical perspective.

UNIT – IV: **Work Flows of the process**

Software process workflows, Inter Trans workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic status assessments. Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Interaction planning process, Pragmatic planning. Project **Organizations and Responsibilities:** Line-of-Business Organizations, Project Organizations, evolution of Organizations. Process Automation: Automation Building Blocks, The Project Environment

UNIT – V: **Project Control and Process instrumentation**

The server care Metrics, Management indicators, quality indicators, life cycle expectations pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminates, Example. Future **Software Project Management:** Modern Project Profiles Next generation Software economics, modern Process transitions.

Case Study: The Command Center Processing and Display System-Replacement (CCPDS-R)

Textbooks:

1. Software Project Management, Walker Royce, Pearson Education.
2. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition,Tata Mc-Graw Hill

Reference Books:

1. Applied Software Project Management, Andrew Stellman& Jennifer Greene, O"Reilly,2006
2. Head First PMP, Jennifer Greene & Andrew Stellman, O"Reilly,2007
3. Software Engineering Project Managent, Richard H. Thayer & Edward Yourdon, second edition,Wiley India, 2004.
4. Agile Project Management, Jim Highsmith, Pearson education, 2004 5. The art of Project management, Scott Berkun, O"Reilly, 2005.
6. Software Project Management in Practice, Pankaj Jalote, Pearson Education,2002

JNTUA College of Engineering (Autonomous), Ananthapuramu
Department of Computer Science & Engineering

MOOC I **Design and Analysis of Algorithms**
Course Code:20A5M15a **MINOR DEGREE (R20)** **L T P C :0 0 0 2**

Course Objectives:

- To analyze the asymptotic performance of algorithms.
- To understand the write rigorous correctness proofs for algorithms.
- To familiarity with major algorithms and data structures.
- Apply important algorithmic design paradigms and methods of analysis.
- Synthesize efficient algorithms in common engineering design situations.

Course Outcomes:

Course Outcomes (CO):

After completion of the course, students will be able to

- Explain the basic concepts of time and space complexity
- Explain the basic concepts of divide-and-conquer Strategy, dynamic programming,
- Greeedy and Algorithm.
- Describe the methodologies of how to analyze the following applications by Dynamic
- Programming Algorithm.
- Discuss the concept of graph coloring and back tracking
- Analyze the performance of algorithms

UNIT – I: **Introduction**

Algorithm, Pseudo code for expressing algorithms, performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, probabilistic analysis, Amortized analysis. Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected components and bi- connected components.

UNIT-II:

Divide and Conquer, General method, applications-Binary search, Quick sort, Merge sort, Stassen's matrix multiplication. Greedy method: General method, applications-Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

UNIT-III: **Dynamic Programming**

General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design

UNIT-IV: **Backtracking**

General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT-V: **Branch and Bound**

General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution. NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NP Complete classes, Cook's theorem.

Textbooks:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, SatrajSahni and Rajasekharam, Universities Press
2. The Algorithm Design Manual, 2nd edition, Steven S. Skiena, Springer
3. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson,R.L.Rivest and C.Stein, PHI Pvt. Ltd

Reference Books:

1. Introduction to the Design and Analysis of Algorithms, Anany Levitin, PEA
2. Design and Analysis of Algorithms, Pearson Education, Parag Himanshu Dave, HimansuBalachandra Dave
3. Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T. Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc GrawHill.
4. Design and Analysis of algorithms, Pearson education, Aho, Ullman and Hopcroft.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Computer Science & Engineering

MOOC II **Deep Learning**

Course Code:20A05M16a **MINOR DEGREE (R20)** **L T P C :0 0 0 2**

Course Objectives:

- Demonstrate the major technology trends driving Deep Learning
- Build, train, and apply fully connected deep neural networks
- Implement efficient (vectorized) neural networks
- Analyse the key parameters and hyperparameters in a neural network's architecture

Course Outcomes:

After completion of the course, students will be able to

- Demonstrate the mathematical foundation of neuralnetwork
- Describe the machine learningbasics
- Differentiate architecture of deep neuralnetwork
- Build a convolutional neuralnetwork Build and train RNN andLSTMs

UNIT-I**: Linear Algebra & Probability and Information Theory**

Scalars, Vectors, Matrices and Tensors, Matrix operations, types of matrices, Norms, Eigen decomposition, Singular Value Decomposition, Principal Components Analysis.
Random Variables, Probability Distributions, Marginal Probability, Conditional Probability, Expectation, Variance and Covariance, Bayes' Rule, Information Theory. Numerical Computation: Overflow and Underflow, Gradient-Based Optimization, Constrained Optimization, Linear Least Squares.

UNIT-II: **Machine Learning**

Basics and Under fitting, Hyper parameters and Validation Sets, Estimators, Bias and Variance, Maximum Likelihood, Bayesian Statistics, Supervised and Unsupervised Learning, Stochastic Gradient Descent, Challenges Motivating Deep Learning. Deep Feedforward Networks: Learning XOR, Gradient-Based Learning, Hidden Units, Architecture Design, Back-Propagation and other Differentiation Algorithms.

UNIT-III: **Regularization for Deep Learning**

Parameter Norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised Learning, Multi-Task Learning, Early Stopping, Parameter Tying and Parameter Sharing, Sparse Representations, Bagging and Other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, Tangent Prop and Manifold Tangent Classifier. Optimization for Training Deep Models: Pure Optimization, Challenges in Neural Network Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates, Approximate Second-Order Methods, Optimization Strategies and Meta-Algorithms.

UNIT-IV: **Convolutional Networks**

The Convolution Operation, Pooling, Convolution, Basic Convolution Functions, Structured Outputs, Data Types, Efficient Convolution Algorithms, Random or Unsupervised Features, Basis for Convolutional Networks.

UNIT-V: **Sequence Modelling**

Recurrent and Recursive Nets: Unfolding Computational Graphs, Recurrent Neural Networks, Bidirectional RNNs, Encoder-Decoder Sequence-to-Sequence Architectures, Deep Recurrent

Networks, Recursive Neural Networks, Echo State Networks, LSTM, Gated RNNs, Optimization for Long-Term Dependencies, Auto encoders, Deep Generative Models.

Textbooks:

1) Ian Goodfellow, YoshuaBengio, Aaron Courville, “Deep Learning”, MIT Press,2016.

2) Josh Patterson and Adam Gibson, “Deep learning: A practitioner's approach”, O'Reilly Media, First Edition,2017.

Reference Books:

1) Fundamentals of Deep Learning, Designing next-generation machine intelligence algorithms, Nikhil Buduma, O’Reilly, Shroff Publishers,2019.

2) Deep learning Cook Book, Practical recipes to get started Quickly, DouweOsinga, O’Reilly, Shroff Publishers,2019.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – I Civil

III B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

Course Code	Experimental Stress Analysis	L	T	P	C
20A50105		**3**	**0**	**0**	**3**
	Semester		**V**		

Course Objectives:

1. To understand different methods of experimental stress analysis
2. To understand the use of strain gauges for measurement of strain
3. To be exposed to different Non destructive methods of concrete
4. To understand the theory of photo elasticity and its applications in analysis of structures
5. To understand different methods of photo elasticity

Course Outcomes (CO):

1. Understand different methods of experimental stress analysis
2. Understand the use of strain gauges for measurement of strain
3. Expose to different Non destructive methods of concrete
4. Understand the theory of photo elasticity and its applications in analysis of structures
5. Understand different methods of photo elasticity

UNIT - I

PRINCIPLES OF EXPERIMENTAL APPROACH:Merits of Experimental Analysis Introduction, uses of experimental stress analysisAdvantages of experimental stress analysis, Different methods –Simplification of problems.

UNIT - II

STRAIN MEASUREMENT USING STRAIN GAUGES :Definition of strain and its relation of experimental Determinations Properties of Strain-

Gauge Systems-Types of Strain Gauges –Mechanical, Acoustic and Optical Strain Gauges. Introduction to Electrical strain gauges - Inductance strain gauges – LVDT – Resistance strain gauges – Various types –Gauge factor – Materials of adhesion base.

UNIT - III

STRAIN ROSSETTES AND NON – DESTRUCTIVE TESTING OF CONCRETE: Introduction – The three elements Rectangular Rosette – The Delta Rosette Corrections for Transverse Strain Gauge.

Ultrasonic Pulse Velocity method –Application to Concrete. Hammer Test – Application to Concrete.

UNIT - IV

THEORY OF PHOTOELASTICITY: Introduction –Temporary Double refraction – The stress Optic Law –Effects of stressed model in a polar scope for various arrangements – Fringe Sharpening. Brewster's Stress Optic law.

UNIT - V

TWO DIMENSIONAL PHOTOELASTICITY:Introduction – Isochramic Fringe patterns-Isoclinic Fringe patterns passage of light through plane Polariscope and Circular polariscope Isoclinic Fringe patterns – Compensation techniques – Calibration methods – Separation methods – Scaling Model to prototype Stresses – Materials for photo – Elasticity Properties of Photoelastic Materials.

Textbooks:

1. Experimental stress analysis by J.W.Dally and W.F.Riley, College House Enterprises2005
2. Experimental stress analysis by Dr.SadhuSingh.khanna Publishers 4^{th} edition

Reference Books:

1. Experimental Stress analysis by U.C.Jindal, Pearson Pubilications 2012 edition
2. Experimental Stress Analysis by L.S.Srinath, MC.Graw Hill Company Publishers.

Online Learning Resources:

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – I EEE
III B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

Course Code	ELECTRIC VEHICLE ENGINEERING (OE-I) EEE		L	T	P	C
20A50205			3	0	0	3
Pre-requisite	AC & DC Machines	**Semester**	V			

Course Objectives: The student will be able to:

- Understand latest trends in Electric Vehicles; parameters used in EV and types of EVs.
- Analyze various energy sources available to run EV like batteries, fuels cells etc.
- Analyze the dynamics and the propulsion system used in EVs, working of fuel cells, battery charging concept.
- Design a electromechanical system using various control techniques.

Course Outcomes (CO): At the end of the course, the student will be able to:

CO1: Understand the difference between conventional and latest trends in Electric Vehicles; understand the various parameters used in EV, types of HEVs.
CO2: Analyze various energy sources available to run EV like batteries, fuels cells etc.
CO3: Analyze the propulsion system of EV, its dynamics and the concept of battery charging.
CO4: Design EV system with battery charger using various fundamental concepts.

UNIT - I	INTRODUCTION TO EV SYSTEMS AND PARAMETERS	Lecture Hrs: 10

Past, Present and Future EV, EV Concept, EV Technology, State-of-the Art EVs, EV configuration, EV system, Fixed and Variable gearing, single and multiple motor drive, in-wheel drives, EV parameters: Weight, size, force and energy, performance parameters.

UNIT - II	EV AND ENERGY SOURCES	Lecture Hrs: 08

Electro mobility and the environment, history of Electric power trains, carbon emissions from fuels, green houses and pollutants, comparison of conventional, battery, hybrid and fuel cell electric systems

UNIT - III	EV PROPULSION AND DYNAMICS	Lecture Hrs: 10

Choice of electric propulsion system, block diagram, concept of EV Motors, single and multi motor configurations, fixed and variable geared transmission, In-wheel motor configuration, classification, Electric motors used in current vehicle applications, Recent EV Motors, Vehicle load factors, vehicle acceleration.

UNIT - IV	FUEL CELLS	Lecture Hrs: 10

Introduction of fuel cells, basic operation, model, voltage, power and efficiency, power plant system – characteristics, sizing, Example of fuel cell electric vehicle.
Introduction to HEV, brake specific fuel consumption, comparison of series, series-parallel hybrid systems, examples

UNIT - V	BATTERY CHARGING AND VEHICLE CONTROL	Lecture Hrs: 10

Battery charging: Battery Chemistry, Basic requirements, charger architecture, charger functions, wireless charging, power factor correction.
Battery Management System: Introduction and BMS functionality, Battery pack topology, Voltage, Temperature and Current Sensing.

Control: Introduction, modelling of electro mechanical system, feedback controller design approach, PI controllers designing, torque-loop, speed control loop compensation, acceleration of battery electric vehicle
Textbooks:C.C Chan, K.T Chau: Modern Electric Vehicle Technology, Oxford University Press Inc., New York 2001. 1. James Larminie, John Lowry, Electric Vehicle Technology Explained, Wiley, 2003.
Reference Books:
1. Electric and Hybrid Vehicles Design Fundamentals, Iqbal Husain, CRC Press 2005. 2. Ali Emadi, Advanced Electric Drive Vehicles, CRC Press, 2015. 3. Tom Denton, “Electric and Hybrid Vehicles”, TAYLOR & FRANCIS; 2nd edition, CBS PUBLISHERS, 2nd Edition, 2020. 4. MehrdadEhsani, Yimin Gao, Ali Emadi, “Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals”, CRC Press, 2010. 5. Bergveld, H.J., Kruijt, W.S., Notten, P.H.L “Battery Management Systems -Design by Modelling” Philips Research Book Series 2002.
Online Learning Resources:
1. https://onlinecourses.nptel.ac.in/noc22_ee53/preview

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – I Mechanical
III B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

Subject Code	Title of the Subject	L	T	P	C
2050305	**OPTIMIZATION TECHNIQUES**	3	0	0	3

Course Objectives:

To introduce various optimization techniques i.e classical, linear programming,

Transportation problem, simplex algorithm, dynamic programming Constrained and unconstrained optimization techniques for solving and optimizing.

Electrical and electronic engineering circuits design problems in real world situations.

To explain the concept of Dynamic programming and its applications to project

Learn the knowledge to formulate optimization problems

UNIT - I

Classical optimization techniques: Single variable optimization with and without constraints, multi – variable optimization without constraints, multi – variable optimization with constraints– method of Lagrange multipliers, Kuhn-Tucker conditions.

UNIT - II

Numerical methods for optimization: Nelder Mead's Simplex search method, Gradient of a function, Steepest descent method, Newton's method, types of penalty methods for handling constraints.

UNIT - III

Genetic algorithm (GA) : Differences and similarities between conventional and evolutionary algorithms, working principle, reproduction, crossover, mutation, termination criteria, different reproduction and crossover operators, GA for constrained optimization, draw backs of GA,

Multi-Objective GA: Pareto's analysis, Non-dominated front, multi – objective GA, Non-dominated sorted GA, convergence criterion, applications of multi-objective problems

UNIT – IV

Genetic Programming (GP): Principles of genetic programming, terminal sets, functional sets, differences between GA & GP, random population generation, solving differential equations using GP.

UNIT V

Applications of Optimization in Design and Manufacturing systems: Some typical applications like optimization of path synthesis of a four-bar mechanism, minimization of weight of a cantilever beam and general optimization model of a machining process.

Course Outcomes:

After completion of this course, the student will be able to explain the need of optimization of engineering systems

understand optimization of electrical and electronics engineering problems apply classical optimization techniques, linear programming, simplex algorithm,

• transportation problem apply unconstrained optimization and constrained non-linear programming anddynamic programming Formulate optimization problems.

TEXT BOOKS:

Optimal design – Jasbir Arora, Mc Graw Hill (International) Publishers
Optimization for Engineering Design – Kalyanmoy Deb, PHI Publishers
Engineering Optimization – S.S.Rao, New Age Publishers

REFERENCES:

1.Genetic algorithms in Search, Optimization, and Machine learning – D.E.Goldberg, Addison-Wesley Publishers
Genetic Programming- Koza
Multi objective Genetic algorithms - Kalyanmoy Deb, PHI Publishers

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – I ECE

III B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

Course Code	BASICS OF ELECTRONICS AND COMMUNICATION ENGINEERING	L	T	P	C
20A50405		3	0	0	3
	Semester	**V**			

Pre-requisite

Applied Physics

Course Objectives:

- To study the basic principle, construction and operation of semiconductor devices.
- To learn the real time applications of semiconductor devices.
- To introduce binary number systems, logic gates and digital logic circuits.
- To get an idea about the basic principles of communication systems and their applications.
- To learn the measurement of physical parameters using Sensors and Transducers.

Course Outcomes (CO): At the end of this course, the students will be able to

- Understand the basic principle, construction and operation of semiconductor devices.
- Learn the real time applications of semiconductor devices.
- Comprehend the binary number systems, logic gates and digital logic circuits.
- Understand the basic principles of communication systems and their applications.
- Measure the physical parameters using Sensors and Transducers.

UNIT - I

Introduction to Electronics Engineering: Overview, scope and objective of studying Electronics Engineering. Introduction to semiconductor devices: Bond structure of semiconductors, intrinsic and extrinsic semiconductors; Basic principle and operation of semiconductor devices – diode, bipolar junction transistor, field effect transistors; Introduction to VLSI.

UNIT - II

Applications of semiconductor devices: Basic concepts of rectifiers, voltage regulators, amplifiers and oscillators; Basic concepts of operational amplifier and their applications.

UNIT - III

Introduction to digital systems: Binary number system, Boolean algebra, Logic gates, adders, one-bit memory, flip-flops (SR, JK), shift registers, Asynchronous counter.

UNIT - IV

Introduction to Communication Systems: Elements of a communication system – transmitter and receiver; Signal types in communication; FDM and TDM; Processing of signals for transmission – basic concepts of amplitude and frequency modulation; Examples of telecommunication systems – telephone, radio, television, mobile communication and satellite communication.

UNIT - V

Sensors and Transducers - Active and passive transducers: Measurement of displacement (Resistance, capacitance, inductance; LVDT) Force (strain gauges) Pressure (piezoelectric transducers) Temperature (resistance thermometers, thermocouples and thermistors), Velocity, Acceleration, Vibration, pH measurement Signal Conditioning Circuits.

Textbooks:

1. Millman J, Halkias C.C and Jit S, “Electronic Devices and Circuits”, Tata McGraw-Hill, 2nd 2007 Edition.
2. Mano M.M., “Digital Design”, Prentice-Hall, 3rd Edition. 2002
3. A.K. Sawhney, “A course in Electrical and Electronics Measurements and Instrumentation”, DhanpatRai& Co. 3rd edition Delhi, 2010.
4. Kennedy G. and Davis B., “Electronic Communication Systems”, Tata McGraw-Hill, 4th 2008 Edition.

Reference Books:

1. Tomasi W., “Advanced Electronic Communication Systems”, Pearson/Prentice-Hall, 6th 2004 Edition.
2. Boylstead R.L. and Nashelsky L., “Electronic Devices and Circuit Theory”, Pearson, 10th 2009 Edition.

Online Learning Resources:

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – I CSE
III B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch
INTRODUCTION TO JAVA PROGRAMMING

Course Code:20A50505 Semester V(R20) L T P C : 3 0 0 3

Course Objectives:
- To understand object-oriented concepts and problem-solving techniques
- To obtain knowledge about the principles of inheritance and polymorphism
- To implement the concept of packages, interfaces, exception handling and concurrency mechanism.
- To design the GUIs using applets and swing controls.
- To understand the Java Database Connectivity Architecture

Course Outcomes:

CO6: Solve real-world problems using OOP techniques.
CO7: Apply code reusability through inheritance, packages and interfaces
CO8: Solve problems using java collection framework and I/O classes.
CO9: Develop applications by using parallel streams for better performance and develop applets for web applications.
CO10: Build GUIs and handle events generated by user interactions and Use the JDBC API to access the database.

UNIT – I: **Introduction**

Introduction to Object Oriented Programming, The History and Evolution of Java, Introduction to Classes, Objects, Methods, Constructors, this keyword, Garbage Collection, Data Types, Variables, Type Conversion and Casting, Arrays, Operators, Control Statements, Method Overloading, Constructor Overloading, Parameter Passing, Recursion, String Class and String handling methods.

UNIT – II: **Inheritance, Packages, Interfaces**

Inheritance: Basics, Using Super, Creating Multilevel hierarchy, Method overriding, Dynamic Method Dispatch, Using Abstract classes, Using final with inheritance, Object class,

Packages: Basics, Finding packages and CLASSPATH, Access Protection, Importing packages.

Interfaces: Definition, Implementing Interfaces, Extending Interfaces, Nested Interfaces, Applying Interfaces, Variables in Interfaces.

UNIT – III: **Exception handling, Stream based I/O**

Exception handling - Fundamentals, Exception types, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built-in exceptions, creating own exception subclasses.

Stream based I/O (java.io) – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and Writing Files, Random access file operations, The Console class, Serialization, Enumerations, Autoboxing, Generics.

UNIT – IV: **Multithreading, The Collections Framework**

Multithreading: The Java thread model, Creating threads, Thread priorities, Synchronizing threads, Interthread communication.

The Collections Framework (java.util): Collections overview, Collection Interfaces, The Collectionclasses- Array List, Linked List, Hash Set, Tree Set, Priority Queue, Array Deque. Hashtable, Properties, Stack, Vector, String Tokenizer, Bit Set, Date, Calendar, Random, Formatter, Scanner.

UNIT – V: **Applet, GUI Programming with Swings, Accessing Databases with JDBC**

Applet: Basics, Architecture, Applet Skeleton, requesting repainting, using the status window, passing parameters to applets

GUI Programming with Swings – The origin and design philosophy of swing, components and containers, layout managers, event handling, using a push button, jtextfield, jlabel and image icon, the swing buttons, jtext field, jscrollpane, jlist, jcombobox, trees, jtable, An overview of jmenubar, jmenu and jmenuitem, creating a main menu, show message dialog, show confirmdialog, show input dialog, show option dialog, jdialog, create a modeless dialog.

Accessing Databases with JDBC:

Types of Drivers, JDBC Architecture, JDBC classes and Interfaces, Basic steps in developing JDBC applications, Creating a new database and table with JDBC.

Textbooks:

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Java How to Program, 10th Edition, Paul Dietel, Harvey Dietel, Pearson Education.

Reference Books:

13. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.
14. Core Java Volume – 1 Fundamentals, Cay S. Horstmann, Pearson Education.
15. Java Programming for core and advanced learners, Sagayaraj, Dennis, KarthikandGajalakshmi, University Press
16. Introduction to Java programming, Y. Daniel Liang, Pearson Education

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – I Chemical
III B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

Course Code		L	T	P	C
20A50805	**ENERGY CONVERSION AND STORAGE DEVICES**	**3**	**0**	**0**	**3**

Pre-requisite

Course Objectives:

1. Understand the fundamentals of fossil energy sources, solar, biomass and electrochemical energy etc
2. Understand the basics of photosynthetic, photocatalytic and photoelectrochemical systems and devices for the efficient energy and fuels production.
3. Learn the principles and operations of electrochemical energy storage devices,

Course Outcomes (CO):

At the end of the course, the student will be able to:

CO1	Understand the need of energyconversion and the various methods of energy storage
CO2	Identify Winds energy as alternateform of energy and to know how itcan be tapped
CO3	Understand the nuclear and bio energy, its mechanism of production and its applications
CO4	Analyse chemical, electrochemical energy storage devices and interpret the conversion efficiencies
CO5	Explain bio gas generation and itsimpact on environment

Course Articulation Matrix

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												
CO6												

UNIT - I

Outline of the course. Introduction and scope of energy conversion. World Energy Production and Balance. Motivations for studying future energy systems (e.g. pollution, climate change, energy security).

UNIT - II

Fossil Energy: Overview of fossil fuel resources and energy contents. Cycle analysis (Rankine, Brayton, combined cycles, cogeneration)

Nuclear Energy: nuclear reaction and energy conversion physics (fission and fusion), nuclear power systems

UNIT - III

Solar-thermal energy: solar thermal radiation physics, Active and passive solar-thermal energy collection and conversion systems

Photoelectric energy: Photoelectric physics. Solar photovoltaic cell materials and technology

Wind Energy: Wind interaction with objects fluid dynamics. Wind harvesting devices and systems

UNIT - IV

Biomass and Waste to Energy: Potential and resources of biomass and waste energy. Thermal-chemical and bio-chemical conversion methods

Overview of Climate Control, CO_2 Sequestration and Energy Sustainability

UNIT - V

Basic of Electrochemical energy conversion and storage, Fundamentals of Fuel Cells, Basics of Fusion power, Energy Storage Technologies, Mechanical storage, Chemical storage, Electrical storage

Textbooks:

Energy Systems Engineering, F.M. Vanek, L.D Albright, and LargusAngenent, Second Edition, McGraw-Hill, Inc., 2012,

Reference Books:

- AngèleReinders, Pierre Verlinden, Wilfried van Sark, Alexandre Freundlich, Photovoltaic Solar Energy:From Fundamentals to Applications, JOHN WILEY.
- Alexander P. Kirk, Solar Photovoltaic Cells: Photons to Electricity, ELSEVIER
- Francesco Dalena, Angelo Basile, Claudio Rossi, Bioenergy Systems For The Future: Prospects ForBiofuels And Biohydrogen, 1st Edition, ELSEVIER
- Jean-Marie Tarascon, Patrice Simon, ELECTROCHEMICAL ENERGY STORAGE,
- Electrochemistry by Carl H. Hamann, Andrew Hamnett and Wolf Vielstich, Wiley VCH, 1998.
- Modern Electrochemistry 1. Volume 1 and 2, by J. O'M. Bockris and A. K. N. Reddy, Kluwer Academic,2000.
- Electrochemical Methods, by A. J. Bard and L. R. Faulkner, John Willey, 1980
- John Love and John A. Bryant, Biofuels and Bioenergy, John Wiley
- Anju Dahiya, Bioenergy: Biomass to Biofuels, Elsevier

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – I Mathematics
III B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

Course Code	**Optimization Methods**		**L**	**T**	**P**	**C**
20A55101	**B.Tech III Year (Common for all) Open elective course -1**		**0**	**3**	**0**	**3**
Pre-requisite	**--**	**Semester**	**I**			

Course Objectives:

This course enables the students to classify and formulate real-life problem for modeling as optimization problem, solving and applying for decision making.

Course Outcomes (CO): Student will be able to

- formulate a linear programming problem and solve it by various methods.
- give an optimal solution in assignment jobs, give transportation of items from sources to destinations.
- identify strategies in a game for optimal profit.
- implement project planning.

UNIT - I		8 Hrs

Introduction to operational research-Linear programming problems (LPP)-Graphical method-Simplex method-Big M Method-Dual simplex method.

UNIT - II		8 Hrs

Transportation problems- assignment problems-Game theory.

UNIT - III		9 Hrs

CPM and PERT –Network diagram-Events and activities-Project Planning-Reducing critical events and activities-Critical path calculations.

UNIT - IV		8 Hrs

Sequencing Problems-Replacement problems-Capital equipment- Discounting costs-Group replacement .

UNIT - V		9 Hrs

Inventory models-various costs- Deterministic inventory models-Economic lot size-Stochastic inventory models- Single period inventory models with shortage cost.

Textbooks:

1. Operations Research , S.D. Sharma.
2. Operations Research, An Introduction, Hamdy A. Taha, Pearson publishers.

3. Operations Research, Nita H Shah, Ravi M Gor, HardikSoni, PHI publishers
Reference Books:
1. Problems on Operations Research, Er. Premkumargupta, Dr.D.S. Hira, Chand publishers 2. Operations Research, CB Gupta, PK Dwivedi, Sunil kumaryadav
Online Learning Resources:
https://nptel.ac.in/content/storage2/courses/105108127/pdf/Module_1/M1L2slides.pdf https://slideplayer.com/slide/7790901/ https://www.ime.unicamp.br/~andreani/MS515/capitulo12.pdf

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – I Physics
III B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

Subject Code	Title of the Subject	L	T	P	C
20A55201	**MATERIALS CHARACTERIZATION TECHNIQUES**	3		-	3

COURSE OBJECTIVES	
1	To provide an exposure to different characterization techniques.
2	To explain the basic principles and analysis of different spectroscopic techniques.
3	To elucidate the basic principle of Scanning electron microscope along with its limitations and applications.
4	To identify the Resolving power and Magnification of Transmission electron microscope and its applications.
5	To educate the uses of advanced electric and magnetic instruments for characterization.
COURSE OUTCOMES	
At the end of the course the student will be able	
CO1	To explain the structural analysis by X-ray diffraction.
CO2	To understand the morphology of different materials using SEM and TEM.
CO3	To recognize basic principles of various spectroscopic techniques.
CO4	To apprehend the electric and magnetic properties of the materials.
CO5	To make out which technique has to be used to analyse a material

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

SYLLABUS

Credit: 3 **Hours of teaching: - 45 H**

UNIT-I **9H**

Structure analysis by Powder X-Ray Diffraction: Introduction, Bragg's law of diffraction, Intensity of Diffracted beams, Factors affecting Diffraction, Intensities, Structure of polycrystalline Aggregates, Determination of crystal structure,Crystallite size by Scherrer and Williamson-Hall (W-H) Methods, Small angle X-ray scattering (SAXS) (in brief).

UNIT-II **9H**

Microscopy technique -1 –Scanning Electron Microscopy (SEM)

Introduction, Principle, Construction and working principle of Scanning Electron Microscopy, Specimen preparation, Different types of modes used (SecondaryElectron and Backscatter Electron), Advantages, limitations and applications of SEM.

UNIT-III **9H**

Microscopy Technique -2 - Transmission Electron Microscopy (TEM): Construction and Working principle, Resolving power and Magnification, Bright and dark fields, Diffraction and image formation, Specimen preparation, Selected Area Diffraction, Applications of Transmission Electron Microscopy,Difference between SEM and TEM, Advantage and Limitations of Transmission Electron Microscopy.

UNIT-IV **9H**

Spectroscopy techniques – Principle, Experimental arrangement, Analysis and advantages of the spectroscopic techniques – (i) UV-Visible spectroscopy(ii) Raman Spectroscopy, (iii) Fourier Transform infrared (FTIR) spectroscopy, (iv) X-ray photoelectron spectroscopy (XPS).

UNIT-V **9H**

Electrical & Magnetic Characterization techniques: Electrical Properties analysis techniques (DC conductivity, AC conductivity) Activation Energy, Effect of Magnetic field on the electrical properties (Hall Effect). Magnetization measurement by induction method,Vibrating sample Magnetometer (VSM) and SQUID.

TEXT BOOKS:

1. Material Characterization: Introduction to Microscopic and Spectroscopic Methods –Yang Leng – John Wiley & Sons (Asia) Pvt. Ltd. 2008
2. Hand book of Materials Characterization -by **Sharma** S. K. - S**pringer**

REFERENCES:

1. Fundamentals of Molecular Spectroscopy – IV Ed. – Colin Neville BanwellandElaine M. McCash, Tata McGraw-Hill, 2008.
2. Elements of X-ray diffraction – Bernard Dennis Cullity& Stuart R Stocks, PrenticeHall, 2001 – Science
3. **Materials Characterization: Introduction to Microscopic and Spectroscopic Methods-Yang Leng- John Wiley & Sons**
4. Characterization of Materials 2nd Edition, 3 Volumes-Kaufmann E N -John Wiley(Bp)
5. Microstructural Characterization of Materials - David Brandon, Wayne D Kalpan,John Wiley & Sons Ltd., 2008.

NPTEL courses

https://nptel.ac.in/courses/115/103/115103030/
https://nptel.ac.in/content/syllabus_pdf/113106034.pdf
https://nptel.ac.in/noc/courses/noc19/SEM1/noc19-mm08/

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – I H & SS
III B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

Course Code	E-Business	L	T	P	C
20A55401		3	0	0	3
Pre-requisite					

Course Objectives:

1.	To provide knowledge on emerging concept on E-Business related aspect.
2.	To understand various electronic markets models which are trending in India
3.	To give detailed information about electronic payment systems net banking.
4.	To exact awareness on internet advertising, market research strategies and supply chain management.
5.	To understand about various internet protocols-security related concept.

Course Outcomes (CO):

1	They will be able to identify the priority of E-Commerce in the present globalised world.
2	Will be able to understand E-market-Models which are practicing by the organization
3.	Will be able to recognize various E-payment systems & importance of net banking.
4.	By knowing E-advertisement, market research strategies, they can identify the importance of customer role.
5.	By understanding about E-security, they can ensure better access control to secure the information
6	Develop a personal synthesis and approach towards E-Business

UNIT – I **Electronic Business**

Definition of Electronic Business - Functions of Electronic Commerce (EC) - Advantages of E-Commerce – E-Commerce and E-Business Internet Services Online Shopping-Commerce Opportunities for Industries.

LEARNING OUTCOMES:- After completion of this unit student will

- Understand the concept of E-Business
- Contrast and compare E-Commerce E-Business
- Analyze Advantages of E-Commerce
- Evaluate opportunities of E-commerce for industry

UNIT - II **Electronic Markets and Business Models**

E-Shops-E-Malls E-Groceries - Portals - Vertical Portals-Horizontal Portals - Advantages of Portals - Business Models-Business to Business(B2B)-Business to Customers(B2C)-Business to Government(B2G)-Auctions-B2B Portals in India

LEARNING OUTCOMES:- After completion of this unit student will

- Understand the concept of business models
- Contrast and compare Vertical portal and Horizontal portals
- Analyze Advantages of portals
- Explain the B2B,B2C and B2G model

UNIT - III **III Electronic Payment Systems**

Digital Payment Requirements-Designing E-payment System- Electronic Fund Transfer (EFT)-Electronic Data Interchange (EDT)-Credit Cards-Debit Cards-E-Cash-Electronic Cheques -Smart Cards-Net Banking-Digital Signature.

LEARNING OUTCOMES:- After completion of this unit student will

- Understand the Electronic payment system
- Contrast and compare EFT and EDT
- Analyze debit card and credit card
- Explain the on Digital signature

UNIT - IV **E-Security**

Internet Protocols - Security on the Internet –Network and Website Security – Firewalls – Encryption – Access Control – Secure Electronic transactions.

LEARNING OUTCOMES:- After completion of this unit student will

- Understand E-Security
- Contrast and compare security and network
- Analyze Encryption
- Evaluate electronic transitions

UNIT - V **E-Marketing**

Online Marketing – Advantages of Online Marketing – Internet Advertisement – Advertisement Methods – Conducting Online Online Market Research– Data mining and Marketing Research Marketing Strategy On the Web – E-Customer Relationship Management(e-CRM) –E- Supply Chain Management.(e-SCM) –New Trends in Supply

Chain Management.

LEARNING OUTCOMES:- After completion of this unit student will

- Understand the concept of online marketing
- Analyze advantages of online marketing
- Compare the e-CRM and e-SCM
- Explain the New trends in supply chain management

Textbooks:

1. **E-Commerce by C.S.V Murthy** Himalaya publication house, 2002.
2. **E-Commerce by** P.T.S Joseph, Fourth Edition, Prentice Hall of India 2011

Reference Books:

1. **E-Commerce: by** KamaleshKBajaj,DebjaniNa, Second Edition TataMcGrwHills 2005
2. **E-Commerce E-Management: by Dave Chaffey** – Second Edition, Pearson, 2012.
3. **E-Commerce Fundamentals and Application; by** Henry Chan, Raymond Lee,Tharm Wiley India 2007
4. **E-Commerce: by** S. Jaiswall Galgotia Publication Pvt Ltd 2003.

Online Learning Resources:

JNTUA College of Engineering (Autonomous), Ananthapuramu

Open Elective Course – I

III B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

DEPARTMENT OF CHEMISTRY

Subject Code	Title of the Subject	L	T	P	C
20A55301	**CHEMISTRY OF ENERGY MATERIALS**	2	1	-	3

COURSE OBJECTIVES	
1	To make the student understand basic electrochemical principles such as standard electrode potentials, emf and applications of electrochemical principles in the design of batteries.
2	To understand the basic concepts of processing and limitations of fossil fuels and Fuel cells & their applications.
3	To impart knowledge to the students about fundamental concepts of hydrogen storage in different materials and liquification method
4	Necessasity of harnessing alternate energy resources such as solar energy and its basic concepts.
5	To understand and apply the basics of calculations related to material and energy flow in the processes.

COURSE OUTCOMES	
CO1	Solve the problems based on electrode potential,Describe the Galvanic Cell Differentiate between Lead acid and Lithium ion batteries, Illustrate the electrical double layer
CO2	Describe the working Principle of Fuel cell,Explain the efficiency of the fuel cell Discuss about the Basic design of fuel cells,Classify the fuel cell
CO3	Differentiate Chemical and Physical methods of hydrogen storage,Discuss the metal organic frame work, Illustrate the carbon and metal oxide porous structures Describe the liquification methods
CO4	Apply the photo voltaic technology,Demonstrate about solar energy and prospects Illustrate the Solar cells,Discuss about concentrated solar power
CO5	Differentiate between Photo and Photo electrochemical Conversions,Illustrate the photochemical cells, Identify the applications of photochemical reactions, Interpret advantages of photoelectron catalytic conversion

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

SYLLABUS

UNIT-1: Electrochemical Systems: Galvanic cell, standard electrode potential, application of EMF, electrical double layer, dipole moments, polarization, Batteries-Lead-acid and Lithium ion batteries.-

UNIT-2: Fuel Cells: Fuel cell working principle, Classification of fuel cells, Polymer electrolyte membrane (PEM) fuel cells, Solid-oxide fuel cells (SOFC), Fuel cell efficiency, Basic design of fuel cell,

UNIT-3: Photo and Photo electrochemical Conversions: Photochemical cells and applications of photochemical reactions, specificity of photo electrochemical cell, advantage of photoelectron catalytic conversions.

UNIT-4: Solar Energy: Solar energy introduction and prospects, photo voltaic (PV) technology, concentrated solar power (CSP), Solar Fuels, Solar cells .

UNIT-5: Hydrogen Storage: Hydrogen Storage, Chemical and Physical methods of hydrogen storage, Hydrogen Storage in metal hydrides, metal organic frame works (MOF), Carbon structures, metal oxide porous structures, hydrogel storage by high pressure methods. Liquifaction method.

References :

1. Physical chemistry by Ira N. Levine
2. Essentials of Physical Chemistry, Bahl and Bahl and Tuli.
3. Inorganic Chemistry, Silver and Atkins
4. Fuel Cell Hand Book 7th Edition, by US Department of Energy (EG&G technical services and corporation)
5. Hand book of solar energy and applications by Arvind Tiwari and Shyam.
6. Solar energy fundamental, technology and systems by Klaus Jagar et.al.
7. Hydrogen storage by Levine Klebonoff

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – II Civil
III B.TECH – II SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

Course Code	Disaster Management	L	T	P	C
20A60105		3	0	0	3

Course Objectives:
1. To give knowledge types of disasters and stages in disaster rehabilitation process.
2. To make awareness on change in climates and their impacts on occurrence of environmental disasters.
3. To impart knowledge on Consideration of wind and water effects as per codal provisions to withstand disasters.
4. To familiarize the student with the Causes of earthquake and their effects and remedial methods to be adopted for buildings.
5. To illustrate the methodology in Planning and design considerations of various structures constructing in disaster prone areas.

Course Outcomes (CO):
1. About various types of disasters and stages in disaster rehabilitation process.
2. Impact of change in climates and their impacts on occurrence of environmental disasters.
3. Adopting suitable codal provisions to study the effect of wind and water effects on various structures constructed at disaster prone areas.
4. Causes of earthquake and their effects and remedial methods to be adopted for buildings.
5. Adopt suitable Planning and design considerations of various structures constructing in disaster prone areas.

UNIT - I

Brief introduction to different types of natural disaster, Occurrence of disaster in different climatic and geographical regions, hazard (earthquake and cyclone) map of the world and India, Regulations for disaster risk reduction, Post disaster recovery and rehabilitation (socioeconomic consequences)

UNIT - II

Climate change and its impact on tropical cyclone, Nature of cyclonic wind, velocities and pressure, Cyclone effects, Storm surge, Floods, Landslides. Behavior of structures in past cyclones and wind storms, case studies. Cyclonic retrofitting, strengthening of structures and adaptive sustainable reconstruction. Life–line structures such as temporary cyclone shelter.

UNIT - III

Basic wind engineering, aerodynamics of bluff bodies, vortex shedding and associated unsteadiness along and across wind forces. Lab: Wind tunnel testing, its salient features. Introduction to Computational fluid dynamics. General planning/design considerations under wind storms & cyclones; Wind effects on buildings, towers, glass panels etc, & wind resistant features in design. Codal Provisions, design wind speed, pressure coefficients; Coastal zoning regulation for construction & reconstruction phase in the coastal areas, innovative construction material & techniques, traditional construction techniques in coastal areas.

UNIT - IV

Causes of earthquake, plate tectonics, faults, seismic waves; magnitude, intensity, epicenter, energy release and ground motions. Earthquake effects – On ground, soil rupture, liquefaction, landslides. Performance of ground and building in past earthquakes: Behavior of various types of buildings, structures, and collapse patterns; Behavior of Non-structural elements like services, fixtures, mountings- case studies. Seismic retrofitting- Weakness in existing buildings, aging, concepts in repair, restoration and seismic strengthening.

UNIT - V

General Planning and design consideration; Building forms, horizontal and vertical eccentricities, mass and stiffness distribution, soft storey etc.; Seismic effects related to building configuration. Plan and vertical irregularities, redundancy and setbacks. Various Types and Construction details of: Foundations, soil stabilization, retaining walls, plinth fill, flooring, walls, openings, roofs, terraces, parapets, boundary walls, under-ground – overhead tanks, staircases and isolation of structures; innovative construction material and techniques; Local practices: traditional regional responses; Computational investigation techniques.

Textbooks:

1. Disaster Management by Rajib Shah, Universities Press, India, 2003
2. Disaster Management by R.B. Singh (Ed) Rawat Publication, New Delhi, 2000

Reference Books:

1. Natural disasters. By Abbott, L. P. (2013) 9th Ed. McGraw-Hill.
2. Earthquake Resistant Design of Structures. By Agarwal, P. and Shrikhande, M. (2009). New Delhi : PHI Learning.
3. Mapping Vulnerability: Disasters, Development and People. byBankoff, G., Frerks, G. and Hilhorst, D. (2004). London :Earthscan.
4. Improving Earthquakes and Cyclone Resistance of Structures:Guidelines for the Indian Subcontinent. TERI
5. Disaster Mitigation, preparedness, recovery and Response. By Sinha, P. C. (2006). New Delhi : SBS Publishers.
6. World Bank. (2009). Handbook for Reconstructingafter Natural Disasters.

Online Learning Resources:

JNTUA College of Engineering (Autonomous), Ananthapuramu

Open Elective Course – II EEE

III B.TECH – II SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

<table>
<tr><td>Course Code</td><td colspan="2" rowspan="2">RENEWABLE ENERGY SYSTEMS
(OE-II)</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>20A60205</td><td>3</td><td>0</td><td>0</td><td>3</td></tr>
<tr><td>Pre-requisite</td><td></td><td>Semester</td><td colspan="4">VI</td></tr>
<tr><td colspan="7"></td></tr>
<tr><td colspan="7">Course Objectives: To make the students learn about:</td></tr>
<tr><td colspan="7">• Various sources of Energy and the need of Renewable Energy Systems.
• The concepts of Solar Radiation, Wind energy and its applications.
• Operation of Solar thermal and solar PV systems
• The concept of geo thermal energy and its applications, biomass energy, the concept of Ocean energy and fuel cells.</td></tr>
<tr><td colspan="7">Course Outcomes (CO): At the end of the course the student will be able to:</td></tr>
<tr><td colspan="7">CO 1 Understand various alternate sources of energy for different suitable application requirements.
CO 2Analyze the concepts of solar energy generation strategies and wind energy system
CO 3 Design Solar and Wind energy systems.
CO 4 Apply the concepts of Geo Thermal Energy, Ocean Energy, Bio mass and Fuel Cells for generation of power.</td></tr>
<tr><td>UNIT - I</td><td colspan="2">SOLAR ENERGY</td><td colspan="4">Lecture Hrs: 10</td></tr>
<tr><td colspan="7">Solar radiation - beam and diffuse radiation, solar constant, earth sun angles, attenuation and measurement of solar radiation, local solar time, derived solar angles, sunrise, sunset and day length. flat plate collectors, concentrating collectors, storage of solar energy-thermal storage.</td></tr>
<tr><td>UNIT - II</td><td colspan="2">PV ENERGY SYSTEMS</td><td colspan="4">Lecture Hrs: 10</td></tr>
<tr><td colspan="7">Introduction, The PV effect in crystalline silicon basic principles, the film PV, Other PV technologies, Electrical characteristics of silicon PV cells and modules, PV systems for remote power, Grid connected PV systems.</td></tr>
<tr><td>UNIT - III</td><td colspan="2">WIND ENERGY</td><td colspan="4">Lecture Hrs: 10</td></tr>
<tr><td colspan="7">Principle of wind energy conversion; Basic components of wind energy conversion systems; wind mill components, various types and their constructional features; design considerations of horizontal and vertical axis wind machines: analysis of aerodynamic forces acting on wind mill blades and estimation of power output; wind data and site selection considerations.</td></tr>
<tr><td>UNIT - IV</td><td colspan="2">GEOTHERMAL ENERGY</td><td colspan="4">Lecture Hrs: 8</td></tr>
<tr><td colspan="7">Estimation and nature of geothermal energy, geothermal sources and resources like hydrothermal, geo-pressured hot dry rock, magma. Advantages, disadvantages and application of geothermal energy, prospects of geothermal energy in India.</td></tr>
<tr><td>UNIT - V</td><td colspan="2">MISCELLANEOUS ENERGY TECHNOLOGIES</td><td colspan="4">Lecture Hrs: 10</td></tr>
</table>

Ocean Energy: Tidal Energy-Principle of working, performance and limitations. Wave Energy-Principle of working, performance and limitations.
Bio mass Energy: Biomass conversion technologies, Biogas generation plants, Classification, advantages and disadvantages, constructional details, site selection, digester design consideration
Fuel cell: Principle of working of various types of fuel cells and their working, performance and limitations.

Text books:

1. Stephen Peake, "Renewable Energy Power for a Sustainable Future", Oxford International Edition, 2018.
2. G. D. Rai, "Non-Conventional Energy Sources", 4th Edition, Khanna Publishers, 2000.

Reference Books:

1. S. P. Sukhatme, "Solar Energy",3rd Edition, Tata Mc Graw Hill Education Pvt. Ltd, 2008.
2. B H Khan , " Non-Conventional Energy Resources", 2nd Edition, Tata Mc Graw Hill Education Pvt Ltd, 2011.
3. S. Hasan Saeed and D.K.Sharma,"Non-Conventional Energy Resources",3rd Edition, S.K.Kataria& Sons, 2012.
4. G. N. Tiwari and M.K.Ghosal, "Renewable Energy Resource: Basic Principles and Applications", Narosa Publishing House, 2004.

Online Learning Resources:

1. https://nptel.ac.in/courses/103103206
2. https://nptel.ac.in/courses/108108078

https://www.slideshare.net/fatimahAlkreem/e-businessppt-67935771
https://www.slideshare.net/VikramNani/e-commerce-business-models
https://www.slideshare.net/RiteshGoyal/electronic-payment-system
https://www.slideshare.net/WelingkarDLP/electronic-security
https://www.slideshare.net/Ankitha2404/emarketing-ppt

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – II Mechanical
III B.TECH – II SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

Subject Code	Title of the Subject	L	T	P	C
20A60305	**SOLAR ENERGY SYSTEMS**	3	0	0	3

Course objectives

Learning the fundamental principles of solar radiation and geographic distribution of solar radiation.

Study of various solar energy technologies with different types of concentrating collectors.

Comparative study of different solar cells with respect to properties and applications of solar cells in nano technology.

Understanding the basics of economics involves in the solar system.

Learning the concepts and designing aspects in thermal power. 6. Study of solar pond and solar stills and their applications.

UNIT – I
SOLAR RADIATION:

Sources of radiation –sun earth relationship, Solar Time and angles, day length, angle of incidence on tilted surface; Sun path diagram, Solar Radiation: Extraterrestrial Radiation; Effect of earth atmosphere; Estimation of solar radiation on horizontal and tilted surfaces. Geographic Distribution of solar radiation, Phyrellio, pyranometer, equation of time-estimation of average radiation falling on tilled.

UNIT-II
SOLAR ENERGY TECHNOLOGIES:

Performance analysis of a liquid Flat-plate collector, Total loss coefficient and heat losses: Top loss coefficient, Bottom loss coefficient, Side loss coefficient. Solar concentrating collectors, types of concentrating collectors, Parabolic Dish System, The central power tower system, The Parabolic Trough System, Tracking CPC and Solar Swing, Performance analysis of cylindrical parabolic collector, Compound parabolic concentrator (CPC).

UNIT-III
SOLAR CELLS:

Solar cell fundamentals, solar cell classification, solar cell, module, panel array construction, maximum power pint trackers(MPPT), solar PV applications, The Recent developments in Solar cells, Role of Nano-Technology in Solar cells.

UNIT – IV
ECONOMICS:

Discounted Cash Flow-light cycle, coasting of solar system, production function and optimization

UNIT – V

THERMAL POWER:

The power concepts- design aspects, thermo-chemical reactor.

SOLAR POND AND SOLAR STILLS:

Working Principle-Construction-operating difficulties and remedies, Agriculture and Domestic applications: Still, timber drying, crop drying, cooker.

Course Outcomes :

Illustrate the fundamental principles of solar radiation and geographic distribution of solar radiation.

Obtaining the performance analysis of liquid flat plate collector and cylindrical parabolic collector.

Developing solar cells in the field of nano technology.

Calculating the cash flow and costs involves in the solar energy systems.

Designing and developing of thermo chemical reactor with respect to thermal power.

<u>Reference Books:</u>

Solar Energy Thermal Process Diffice and Beckman

Solar Heating and Cooling by Kreith and Kreider

Solar Energy Utilization by G.D.Rai

Solar Energy Utilization by G.D.Rai , Khanna Publishers.

Renewable Energy Sources and Emerging Technologies- By D.P. Kothari, PHI Pub.,

Applied Solar Energy by Meinel and Meinel

Non-Conventional Energy Resources by B.H . Khan, Tata McGraw Hill

Energy Resources Utilization and Technologies ByAnjaneyulu, BS Pub.

JNTUA College of Engineering (Autonomous), Ananthapuramu

Open Elective Course – II ECE

III B.TECH – II SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

Course Code	BASICS OF INTEGRATED CIRCUITS	L	T	P	C
20A60405	APPLICATIONS	3	0	0	3

\Pre-requisite
Basics of Electronics and Communication Engineering

Course Objectives:

- To introduce the basic building blocks of linear & digital integrated circuits.
- To learn the linear and non - linear applications of operational amplifiers.
- To introduce the theory and applications of 555 and PLL.
- To learn the theory of ADC and DAC
- To understand different families of digital integrated circuits and their characteristics.

Course Outcomes (CO): At the end of this course, the students will be able to

- Understand the basic concepts of Op -AMPs, characteristics and specifications.
- Design circuits using operational amplifiers for various applications.
- Develop, apply and analyze circuits for advanced applications using Op-Amps, PLL, VCO and Analog multipliers.
- Understand different families of digital integrated circuits and their characteristics
- Design various and sequential circuits using digital ICs.

UNIT - I

Operational Amplifier: Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp, Modes of Operation - Inverting, Non-Inverting, Differential, Instrumentation Amplifier, AC Amplifier, Differentiators and Integrators, Comparators, Schmitt Trigger, Introduction to Voltage Regulators, Features of 723 Regulator, Three Terminal Voltage Regulators.

UNIT - II

Op-Amp, IC-555 & IC 565 Applications: Introduction to Active Filters, Characteristics of Band pass, Band reject and All Pass Filters, Analysis of 1st order LPF & HPF Butterworth Filters, Waveform Generators – Triangular, Sawtooth, Square Wave, IC555 Timer - Functional Diagram, Monostable and Astable Operations, Applications, IC565 PLL - Block Schematic, Description of Individual Blocks, Applications.

UNIT - III

Data Converters: Introduction, Basic DAC techniques, Different types of DACs-Weighted resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs - Parallel Comparator Type ADC, Counter Type ADC, Successive Approximation ADC and Dual Slope ADC, DAC and ADC Specifications.

UNIT - IV

Digital Integrated Circuits: Classification of Integrated Circuits, Comparison of Various Logic Families, CMOS Transmission Gate, IC interfacing- TTL Driving CMOS & CMOS Driving TTL

Combinational Logic ICs – Specifications and Applications of TTL-74XX & CMOS 40XX Series ICs - Code Converters, Decoders, Demultiplexers, LED & LCD Decoders with Drivers, Encoders, Priority Encoders, Multiplexers, Demultiplexers, Priority Generators/Checkers, Parallel Binary Adder/Subtractor, Magnitude Comparators.

UNIT - V

Sequential Logic ICs and Memories: Familiarity with commonly available 74XX & CMOS 40XX Series ICs – All Types of Flip-flops, Synchronous Counters, Decade Counters, Shift Registers. Memories - ROM Architecture, Types of ROMS & Applications, RAM Architecture, Static & Dynamic RAMs.

Textbooks:

1. Ramakanth A. Gayakwad, "Op-Amps & Linear ICs", PHI, 2003.
2. Floyd and Jain, "Digital Fundamentals", Pearson Education, 8th Edition, 2005.

Reference Books:

1. D. Roy Chowdhury, "Linear Integrated Circuits", New Age International (p) Ltd, Second Edition, 2003.
2. James M. Fiore, "Op Amps and Linear Integrated Circuits-Concepts and Applications", Cengage Learning/ Jaico, 2009.
3. K.Lal Kishore, "Operational Amplifiers with Linear Integrated Circuits", Pearson, 2009.
4. John. F. Wakerly, "Digital Design Principles and Practices", Pearson, Third Edition, 2005.

Online Learning Resources:

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – II CSE
III B.TECH – II SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

Introduction to Linux Programming

Course Code:20A60505 **L T P C : 3 0 0 3**

Course Objectives:

- To study the commands according to user requirements.
- To utilize Shell scripts to perform the given task.
- To enable writing own programs in UNIX.
- To know AWK programs.

Course Outcomes:

CO1: Develop text data processing applications using Unix commands and filters.
CO2: Design and develop text based user interface components
CO3: Understand user management, network management and backup utilities
CO4: Use the system calls for file management
CO5: Understands the Concept of Process Threads and File Structure.

UNIT-I: Introduction,Unix File System,Unix Commands

Operating System, History of UNIX, Overview and Features of Unix System,Structure of Unix System, Unix Environment. **Unix File System**: Introduction of Files, Organization of File Systems, Accessing File Systems, Structure of File Systems. **Unix Commands**: Basic Commands, Advanced Unix Commands: File Access Permissions, Pipe Operator, cut, paste, wc, sort, head, tail, diff, cmp, uniq, comm, time, Conversions between DOS and Unix, man.

UNIT-II: File management and Compression Techniques,Manipulating Processes and Signals

Managing and Compressing Files, Computer Devices, Disk related Commands, Compression and Uncompressing Files, Important Unix System Files, Shell Variables, Export of Local and Global Shell Variables.

Manipulating Processes and Signals: Process Basics, Processes States and Transitions, Zombie Process, Context switching, Threads, ps-status of Process.

UNIT-III: System calls

Introduction, File-related System calls (open, create, read, write, lseek), File-related System calls (close, mknod, link and unlink, access, and chown, chmod), Directory Handling System calls (mkdir, rmdir, chdir, opendir, readdir, telldir, closedir), Process related System calls (exec, fork, wait,exit).
Editors in Unix: introduction, Stream editor, Emacs Editor.

UNIT-IV: AWK Script,Burne Shell

AWK Command, print, printf, Displaying Content of Specified Patterns, Comparison Operators, Compound Expressions, Arithmetic Operators, Begin and end Sections, User-defined Variables, if else Statement, Built-in Variables, Changing Input Filed Separator, Functions, Loops, Getting Input from User, Search and Substitute Functions, Copying results into Another file.

Bourne Shell: Introduction, beginning Bourne Shell Scripting, Writing Shell Scripts, Command Line Parameters, read, for Loop, While Loop, if Statement, Bourne Shell Commands.

UNIT-V: InterprocessCommunicaation, Unix System Administration and Networking

Interprocess Communication, Synchronization, Filters.

Unix System Administration and Networking: Unix Booting Procedure,Mounting Unix File System, Unmounting Unix File System, Managing User Accounts, Networking Tools, mail Command, Distributed File System, Firewalls, Backup and Restore.

TEXT BOOKS

1. "UNIX and SHELL Programming", B.M. HARWANI, OXFORD UNIVERSITY PRESS.

REFERENCES

1. "UNIX and Linux System Administration Handbook", Evi Nemeth, Garth Snyder, Trent R. Hein and Ben Whaley, PHI

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – II Chemical

III B.TECH – II SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

Course Code	OE2. GREEN TECHNOLOGY	L	T	P	C
20A60805		3	0	0	3

Pre-requisite

Course Objectives:

Course Outcomes (CO):

At the end of the course, the student will be able to:

CO1	Understand the basic knowledge of environmental issues and estimate the risk
CO2	Evaluate the exposures
CO3	To discuss the type of wastes and emissions that drive the environmental impacts
CO4	Estimation of the environmental properties, persistence, ecosystem risk,
CO5	To present approaches and methodologies for evaluating and improving the environmental performance of chemical processes and chemical products.

Course Articulation Matrix

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

UNIT - I

An introduction to environmental issues: Role of chemical processes and chemical products, Global environmental issues, Air and water quality issues, Ecology.

Risk concept: Description of risk, Risk assessment concept, Dose-response, Exposure assessment.

UNIT - II

Evaluating exposures: Occupational exposures: recognition, evaluation, control, Exposure assessment for chemicals in the ambient environment, Designing safer chemicals.

Green chemistry:Green chemistry methodologies, Optimization based frameworks for the design of green chemical synthesis pathway.

UNIT - III

Evaluating environmental fate: Chemical and physical property estimation, estimating environmental persistence, estimating ecosystem risk, classifying environmental risk based on chemical structure.

UNIT - IV

Life-cycle concepts: Life-cycle assessment, Life-cycle impact assessment

UNIT - V

Material flows in chemical manufacturing, Assessing opportunities for waste exchanges and by-product synergies.

Textbooks:

SHONNARD, DALLEN, D. Green Engineering: Environmentally Conscious Design of Chemical Processes.

Reference Books:

Online Learning Resources:

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – II
III B.TECH – II SEMESTER (R20) (common to all branches) - 2020 Admitted Batch
DEPARTMENT OF MATHEMATICS

Course Code	Mathematical Modelling & Simulation (Common for CIVIL,MECH&CHEM)		L	T	P	C
20A65101			0	3	0	3
Pre-requisite		Semester	II			

Course Objectives:

This course focuses on what is needed to build simulation software environments, and not just building simulations using preexisting packages.

Course Outcomes (CO): Student will be able to

- understand basic Model Forms.
- understand basic Simulation Approaches.
- evaluate handling Stepped and Event-based Time in Simulations.
- distinguish Discrete versus Continuous Modeling.
- apply Numerical Techniques.
- calculate Sources and Propagation of Error.

UNIT - I		8 Hrs

Simulation Basics-Handling Stepped and Event-based Time in Simulations-Discrete versus Continuous Modelling-Numerical Techniques-Sources and Propagation of Error

UNIT - II		9 Hrs

Dynamical, Finite State, and Complex Model Simulations-Graph or Network Transitions Based Simulations-Actor Based Simulations-Mesh Based Simulations-Hybrid Simulations

UNIT - III		8 Hrs

Converting to Parallel and Distributed Simulations-Partitioning the Data-Partitioning the Algorithms-Handling Inter-partition Dependencies

UNIT - IV		8 Hrs

Probability and Statistics for Simulations and Analysis-Introduction to Queues and Random Noise-Random Variates Generation-Sensitivity Analysis

UNIT - V		9 Hrs

Simulations Results Analysis and Viewing Tools-Display Forms: Tables, Graphs, and Multidimensional Visualization-Terminals, X and MS Windows, and Web

Interfaces-Validation of Model Results.
Textbooks:
1. Mathematical modeling, JN Kapur, Newage publishers 2. Mathematical Modeling and Simulation: Introduction for Scientists and Engineers by Kai Velten, Wiley Publishers
Reference Books:
1. Introduction to Mathematical Modeling and Computer Simulations By Vladimir Mityushev,WojciechNawalaniecNataliaRylko Published by Chapman and Hall/CRC.
Online Learning Resources:
http://www.cse.chalmers.se/~dag/docs/matmodReport6.pdf https://www.slideshare.net/arupparia/introduction-to-mathematical-modelling-42588379 https://www.slideshare.net/mailrenuka/simulation-for-queuing-problems-using-random-numbers

JNTUA College of Engineering (Autonomous), Ananthapuramu

Open Elective Course – II

III B.TECH – II SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

DEPARTMENT OF MATHEMATICS

Course Code	**Wavelet transforms and its Applications (Common for EEE&ECE)**		**L**	**T**	**P**	**C**
20A65102			**0**	**3**	**0**	**3**
Pre-requisite	Fourier Series	**Semester**	**II**			

Course Objectives:

This course provides the students to understand Wavelet transforms and its applications.

Course Outcomes (CO): Student will be able to

- understand wavelets and wavelet expansion systems.
- illustrate the multi resolution analysis ad scaling functions.
- form fine scale to coarse scale analysis.
- find the lattices and lifting.
- perform numerical complexity of discrete wavelet transforms.
- find the frames and tight frames using Fourier series.

UNIT - I	Wavelets	9 Hrs

Wavelets and Wavelet Expansion Systems - Wavelet Expansion- Wavelet Transform- Wavelet System- More Specific Characteristics of Wavelet Systems - Haar Scaling Functions and Wavelets -effectiveness of Wavelet Analysis -The Discrete Wavelet Transform The Discrete-Time and Continuous Wavelet Transforms.

UNIT - II	A Multiresolution Formulation of Wavelet Systems	8 Hrs

Signal Spaces -The Scaling Function -Multiresolution Analysis - The Wavelet Functions - The Discrete Wavelet Transform- A Parseval's Theorem - Display of the Discrete Wavelet Transform and the Wavelet Expansion.

UNIT - III	Filter Banks and the Discrete Wavelet Transform	9 Hrs

Analysis - From Fine Scale to Coarse Scale- Filtering and Down-Sampling or Decimating -Synthesis - From Coarse Scale to Fine Scale -Filtering and Up-Sampling or Stretching - Input Coefficients - Lattices and Lifting - -Different Points of View.

UNIT - IV	Time-Frequency and Complexity	9 Hrs

Multiresolution versus Time-Frequency Analysis- Periodic versus Nonperiodic Discrete Wavelet Transforms -The Discrete Wavelet Transform versus the Discrete-

Time Wavelet Transform- Numerical Complexity of the Discrete Wavelet Transform.		
UNIT - V	Bases and Matrix Examples	8 Hrs
Bases, Orthogonal Bases, and Biorthogonal Bases -Matrix Examples - Fourier Series Example - Sine Expansion Example - Frames and Tight Frames - Matrix Examples -Sine Expansion as a Tight Frame Example.		
Textbooks:		
1. C. Sidney Burrus, Ramesh A. Gopinath, "Introduction to Wavelets and Wavelets Transforms",Prentice Hall, (1997). 2. James S. Walker, "A Primer on Wavelets and their Scientific Applications", CRC Press, (1999).		
Reference Books:		
1. Raghuveer Rao, "Wavelet Transforms", Pearson Education, Asia.		
Online Learning Resources:		
https://www.slideshare.net/RajEndiran1/introduction-to-wavelet-transform-51504915		

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – II
III B.TECH – II SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

DEPARTMENT OF MATHEMATICS

Course Code	Statistical Methods for Data Science		L	T	P	C
20A65103	CSE (Data Science)			3		3
Pre-requisite		Semester	II			

Course Objectives:

This course aims at providing knowledge on basic concepts of Statistics, Estimation and testing of hypotheses for large and small samples.

Course Outcomes (CO): Student will be able to

- Understand the basic concepts of Statistics
- Analyze data and draw conclusion about collection of data under study using Point estimation
- Analyze data and draw conclusion about collection of data under study using Interval estimation
- Analyzing the tests and types of errors for large samples
- Apply testing of hypothesis for small samples.

UNIT - I	Basic Concepts	9 Hrs

Population, sample, parameter and statistic; characteristics of a good estimator; Consistency – Invariance property of Consistent estimator, Sufficient condition for consistency; Unbiasedness; Sufficiency – Factorization Theorem – Minimal sufficiency; Efficiency – Most efficient estimator, likelihood equivalence, Uniformly minimum variance unbiased estimator,applications of Lehmann-Scheffe's Theorem, Rao - Blackwell Theorem and applications

UNIT - II	Point Estimation	8 Hrs

Point Estimation- Estimator, Estimate, Methods of point estimation – Maximum likelihood method (the asymptotic properties of ML estimators are not included), Large sample properties of ML estimator(without proof)- applications , Method of moments, method of least squares, method of minimum chi-square and modified minimum chi-square-Asymptotic Maximum Likelihood Estimation and applications.

UNIT - III	Interval Estimation	8 Hrs

Confidence limits and confidence coefficient; Duality between acceptance region of a test and a confidence interval; Construction of confidence intervals for population proportion (small and large samples) and between two population proportions(large samples); Confidence intervals for mean and variance of a normal population; Difference between the mean and ratio of two normal populations.

UNIT - IV	Testing of hypotheses	9 Hrs

Types of errors, power of a test, most powerful tests; Neyman-Pearson Fundamental Lemma and its applications; Notion of Uniformly most powerful tests; Likelihood Ratio

tests: Description and property of LR tests - Application to standard distributions.		
UNIT - V	**Small sample tests**	**9 Hrs**
Student's t-test, test for a population mean, equality of two population means, paired t-test, F-test for equality of two population variances,CRD,RBD,LSD; Chi-square test for goodness of fit and test for independence of attributes, $\chi 2$ test for testing variance of a normal distribution Sign test, Signed rank test, Median test, Mann-Whitney test, Run test and One sample Kolmogorov –Smirnov test ,Kruskal – Wallis H test(Description, properties and applications only).		
Textbooks:		
1. Manoj Kumar Srivastava and Namita Srivastava, Statistical Inference – Testing of Hypotheses, Prentice Hall of India, 2014. 2. Robert V Hogg, Elliot A Tannis and Dale L.Zimmerman, Probability and Statistical Inference,9th edition,Pearson publishers,2013.		
Reference Books:		
1. S.P.Gupta, Statistical Methods, 33rd Edition, Sultan Chand & Sons. 2. Miller and John E Freund, Probability and Statistics for Engineers, 5th Edition.		
Online Learning Resources:		
1. https://www.statstutor.ac.uk/resources/uploaded/1introduction3.pdf 2. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2996198/		

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – II
III B.TECH – II SEMESTER (R20) (common to all branches) - 2020 Admitted Batch
PHYSICS OF ELECTRONIC MATERIALS AND DEVICES

COURSE OBJECTIVES

1 To impart the fundamental knowledge on various materials, their properties and **Applications.**
2 To provide insight into various semiconducting materials and their properties.
3 To elucidate the characteristic behavior of various semiconductor devices.
4 To provide the basics of dielectric and piezoelectric materials and their properties.
5 To explain different categories of magnetic materials, mechanism and their advanced applications.

COURSE OUTCOMES

At the end of the course the student will be able
CO1 To understand the fundamentals of various materials.
CO2 To exploit the physics of semiconducting materials
CO3 To familiarize with the working principles of semiconductor-based devices.
CO4 To understand the behavior of dielectric and piezoelectric materials.
CO5 To make use of the magnetic materials for advanced applications.

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

SYLLABUS **Credit: 3 Hours of teaching: - 45 H**

UNIT-1 Fundamentals of Materials Science: 9H

Introduction, Phase rule, Phase Diagram, Elementary idea of Nucleation and Growth, Methods of crystal growth. Basic idea of point, line and planar defects.Concept of thin films, preparation of thin films, Deposition of thin film using sputtering methods (RF and glow discharge).

UNIT-2: Semiconductors: 9H

Introduction, charge carriers in semiconductors, effective mass, Diffusion and drift, Diffusion and recombination, Diffusion length. The Fermi level & Fermi-Dirac distribution, Electron and Hole in quantum well, Change of electron-hole concentration- Qualitative analysis, Temperature dependency of carrier concentration, Conductivity and mobility, Effects of temperature and doping on mobility, High field effects.

UNIT-3: Physics of Semiconductor Devices: 9H

Introduction, Band structure, PN junctions and their typical characteristics under equilibrium.and under bias, Construction and working principles of: Light emitting diodes, Heterojunctions, Transistors, FET and MOSFETs.

UNIT-4: Dielectric Materials and their Applications: 9H

Introduction, Dielectric properties, Electronic polarizability and susceptibility, Dielectric constant and frequency dependence of polarization, Dielectric strength and dielectric loss, Piezoelectric properties- Ferroelectricity-Applications.

UNIT-5: Magnetic Materials and their Applications: 9H
Introduction, Magnetism & various contributions to para and dia magnetism, Ferro and Ferri magnetism and ferrites, Concepts of Spin waves and Magnons, Anti-ferromagnetism, Domains and domain walls, Coercive force, Hysteresis, Nano-magnetism, Super-paramagnetism – Properties and applications.

Text Books

1. Principles of Electronic Materials and Devices-S.O. Kasap, McGraw-Hill Education (India) Pvt. Ltd.,3rd edition, 2007.
2. Electronic Components and Materials- Grover and Jamwal, DhanpatRai and Co.

Reference Books:

1. Solid State Electronic Devices -B.G. Streetman and S. Banerjee, PHI Learning,6th edition
2. Electronic Materials Science- Eugene A. Irene, , Wiley, 2005
3. An Introduction to Electronic Materials for Engineers-Wei Gao, Zhengwei Li, Nigel Sammes, World Scientific Publishing Co. Pvt. Ltd., , 2nd Edition,2011
4. A First Course In Material Science- by Raghvan, McGraw Hill Pub.
5. The Science and Engineering of materials- Donald R.Askeland,Chapman& Hall Pub.
6. Electrical Engineering Materials-by A.J. Dekker, PHI Pub

NPTEL courses links
https://nptel.ac.in/courses/113/106/113106062/
https://onlinecourses.nptel.ac.in/noc20_mm02/preview
https://nptel.ac.in/noc/courses/noc17/SEM1/noc17-mm07

JNTUA College of Engineering (Autonomous), Ananthapuramu

Open Elective Course – II H& SS

III B.TECH – II SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

Course Code	**Academic Writing and Public Speaking**		**L**	**T**	**P**	**C**
20A65501			**3**	**0**	**0**	**3**
Pre-requisite						

Course Objectives:

- ➢ To encourage all round development of the students by focusing on writing skills
- ➢ To make the students aware of non-verbal skills
- ➢ To develop analytical skills
- ➢ To deliver effective public speeches

Course Outcomes (CO):

By the end of the program students will be able to

- Define various elements of Academic Writing
- Understand how to paraphrase sources and avoid plagiarism
- Demonstrate the knowledge in writing a Research paper
- Analyse different types of essays
- Assess the speeches of others and know the positive strengths of speakers
- Build confidence in giving an impactful presentation to the audience

UNIT - I	Introduction to Academic Writing	Lecture Hrs

Introduction to Academic Writing – Essential Features of Academic Writing – Courtesy – Clarity – Conciseness – Correctness – Coherence – Completeness – Types – Descriptive, Analytical, Persuasive, Critical writing

UNIT - II	**Academic Journal Article**	Lecture Hrs

Art of condensation- summarizing and paraphrasing - Abstract Writing, writing Project Proposal, writing application for internship, Technical/Research/Journal Paper Writing – Conference Paper writing - Editing, Proof Reading - Plagiarism

UNIT - III	**Essay & Writing Reviews**	Lecture Hrs

Compare and Contrast – Argumentative Essay – Exploratory Essay – Features and Analysis of Sample Essays – Writing Book Report, Summarizing, Book/film Review-

UNIT - IV	Public Speaking	Lecture Hrs

Introduction, Nature, characteristics, significance of Public Speaking – Presentation – 4 Ps of Presentation – Stage Dynamics – Answering Strategies –Analysis of Impactful Speeches-Speeches for Academic events

UNIT - V	Public Speaking and Non-Verbal Delivery	Lecture Hrs

Body Language – Kinesics – Oculesics – Proxemics – Haptics – Paralanguage

Textbooks:

1. **Critical Thinking, Academic Writing and Presentation Skills: Mg University Edition Paperback – 1 January 2010 Pearson Education; First edition (1 January 2010)** 2. **A Course In Academic Writing Paperback – 1 January 2017Publisher : The Orient Blackswan; Second edition (1 January 2017)**
Reference Books: 1. **A Handbook For Academic Writing and Composition Paperback – 1 January 2014** by Nzanmongi Jasmine PattonPublisher : Pinnacle Learning; 1st edition (1 January 2014) 2. Critical Thinking, Academic Writing and Presentation Skills: Mg University Edition Paperback – 1 January 2010Publisher : Pearson Education; First edition (1 January 2010) by Marilyn Anderson (Author) 3. Effective Academic Writing Second Edition: 1: Student Book: The Paragraph Paperback – Student Edition, 9 June 2014 by Alice Savage (Author), MasoudShafiei (Author)Publisher : Oxford University Press; Student, Workbook edition (9 June 2014) 4. A Course In Academic Writing Paperback – 1 January 2017 by Renu Gupta (Author) Publisher : The Orient Blackswan; Second edition (1 January 2017)
Online Learning Resources:
1. https://youtu.be/NNhTIT81nH8 2. phttps://www.youtube.com/watch?v=478ccrWKY-A 3. https://www.youtube.com/watch?v=nzGo5ZC1gMw 4. https://www.youtube.com/watch?v=Qve0ZBmJMh4

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – II
III B.TECH – II SEMESTER (R20) (common to all branches) - 2020 Admitted Batch
DEPARTMENT OF CHEMISTRY

Subject Code	Title of the Subject	L	T	P	C
	CHEMISTRY OF POLYMERS AND ITS APPLICATIONS	2	1	-	3

COURSE OBJECTIVES	
1	To understand the basic principles of polymers
2	To synthesize the different polymeric materials and their characterization by various instrumental methods.
3	To impart knowledge to the students about fundamental concepts of Hydro gels of polymer networks, surface phenomenon by micelles
4	To enumerate the applications of polymers in engineering

COURSE OUTCOMES	
CO1	Classify the polymers, Explain polymerization mechanism, Differentiate addition, condensation polymerizations, Describe measurement of molecular weight of polymer
CO2	Differentiate Bulk, solution, Suspension and emulsion polymerization, Describe fibers and elastomers, Identify the thermosetting and thermo polymers, Characterize the properties of polymers by IR, NMR, XRD etc.
CO3	Describe the properties and applications of polymers, Interpret the properties of cellulose, lignin, starch, rosin, latex etc., Discuss the special plastics of PES, PAES, PEEK etc., Explain modified cellulosics
CO4	Identify types of polymer networks, Describe methods involve in hydrogel preparation, Explain applications of hydrogels in drug delivery, Demonstrate the advanced drug delivery systems and controlled release
CO5	Demonstrate electrical phenomena at interfaces including electrokinetics, miselles, reverse micelles etc., Explain photoelectron spectroscopy, Discuss ESCA and Auger spectroscopy to the study of surfaces, Differentiate micelles and reverse micelles

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

SYLLABUS

Unit – I: Polymers-Basics and Characterization :-

Basic concepts: monomers, repeating units, degree of polymerization, linear, branched and network polymers, classification of polymers, Polymerization: addition, condensation, co polymerization and coordination. Average molecular weight concepts: number, weight and viscosity average molecular weights, polydispersity and molecular weight distribution. Measurement of molecular weight: end group, viscosity, light scattering, osmotic and ultracentrifugation methods, analysis and testing of polymers.

Unit – II: Synthetic Polymers

Addition and condensation polymerization processes – Bulk, Solution, Suspension and Emulsion polymerization. Preparation and significance, classification of polymers based on physical properties, Thermoplastics, Thermosetting plastics, Fibers and elastomers, General Applications. Preparation of Polymers based on different types of monomers, Olefin polymers, Diene polymers, nylons, Urea - formaldehyde, phenol – formaldehyde. Melamine Epoxy and Ion exchange resins. Characterization of polymers by IR, NMR, XRD

Unit – III : Natural Polymers & Modified cellulosics

Natural Polymers: Chemical & Physical structure, properties, source, important chemical modifications, applications of polymers such as cellulose, lignin, starch, rosin, shellac, latexes, vegetable oils and gums, proteins. Modified cellulosics: Cellulose esters and ethers such as Ethyl cellulose, CMC, HPMC, cellulose acetals, Liquid crystalline polymers; specialty plastics- PES, PAES, PEEK, PEA.

Unit-IV: Hydrogels of Polymer networks and Drug delivery

Definitions of Hydrogel, polymer networks, Types of polymer networks, Methods involved in hydrogel preparation, Classification, Properties of hydrogels**,** Applications of hydrogels in drug delivery.

Introduction to drug systems including, drug development, regulation, absorption and disposition, routes of administration and dosage forms. Advanced drug delivery systems and controlled release.

Unit – V: Surface phenomena

Surface tension, adsorption on solids, electrical phenomena at interfaces including electrokinetics, micelles, reverse micelles, solubilization. Application of photoelectron spectroscopy, ESCA and

Auger spectroscopy to the study of surfaces.

References :

1. A Text book of Polymer science, Billmayer
2. Organic polymer Chemistry, K.J.Saunders, Chapman and Hall
3. Advanced Organic Chemistry, B.Miller, Prentice Hall
4. Polymer Chemistry – G.S.Mishra
5. Polymer Chemistry – Gowarikar
6. Physical Chemistry –Galston
7. Drug Delivery- Ashim K. Misra

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – III CIVIL
IV B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

Course Code	Building Technology for Engineers	L	T	P	C
20A70104		3	0	0	3

Course Objectives :

1. To make the student familiar with varioustypes of Buildings and its components
2. To teach the students about general requirements of building regarding safety and transportation
3. To impart knowledge on various special requirements of buildings regarding ventilation, insulation acoustics, etc,.
4. To make the student familiar with the concepts of various Prefabrication systems.
5. To Teach the students about various construction equipments used in building.

Course Outcomes:

By the end of this course the student will be able to

1. Classify various types of buildings and its components.
2. Understand the general requirements of building regarding safety and transportation.
3. Understand the Special requirements of buildings regarding ventilation, insulation acoustics, etc,.
4. Familiarize with the concepts of various Prefabrication systems.
5. Understand various construction equipments used in building.

UNIT-1

Building planning: Types of Buildings — components, definitions, economy and design, Principles and aspects of building planning, Definitions and importance of Grouping and circulation; Lighting and ventilation; Sustainability and Green Buildings.

UNIT-II

General requirements: Requirements for safety against fire, termite, damping, earthquakes, Vertical transportation in building — planning of vertical transportation, Stairs, different forms of stairs, Other modes of vertical transportation.

UNIT-III

Special Requirements: Air conditioning — process and classification of air conditioning, Dehumidification. Systems of air-conditioning, ventilation, functional requirements of ventilation. Thermal insulation. Acoustics, effect of noise, properties of noise and its measurements, Principles of acoustics of building. Sound insulation.

UNIT-IV

Prefabrication systems: Prefabricated walls, openings, cupboards, shelves etc., planning and modules and sizes of components in prefabrication. Plumbing services — water supply system, maintenance of building pipe line, Sanitary fittings, Design of building drainage.

UNIT-V

Construction Equipment: Introduction and Planning for construction Equipment, Earthmoving and Excavating equipment, Pile driving equipment, Lifting and Concreting Equipment.

Learning Resources:

Text Books:

1. Building Construction, Punmia B. C., Jain A.J., and Jain A.J., Laxmi Publication, 2016, Eleventh Edition.
2. The Text book for Building Construction, Arora S. P., and Bindra S. P., Dhanpat Rai Pubications, 2010.

Reference Books:

1. Building Construction, Varghese P.C., PHI Learning Pvt. Ltd., 2017, 2nd Edition.
2. Construction Planning, Equipment and Methods, Robert P., Clifford J. S., and Aviad S., McGrawHiII Education, 2010

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – III EEE
IV B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

Course Code	BATTERY MANAGEMENT SYSTEMS (OE-III)		L	T	P	C
20A70204			3	1	0	4
Pre-requisite	**Basic Electrical Engineering**	**Semester**	**VI**			

Course Objectives: To make the students learn about:

- Understand the role of battery management system and the requirements of BMS.
- Interpret the concept associated with battery charging / discharging process
- Analyze various parameters of battery and battery pack
- Design the model of battery pack

Course Outcomes (CO): After completion of this course, student will be able to

CO1: Understand and remember the basic concepts and terminologies of Cells and Batteries, charging, discharging methods, concept of cell balancing.
CO2: Analyze BMS functionality, various sensors used, control techniques, Sate of Charge estimation, cell total energy and cell total power.
CO3: Apply the equivalent circuits, physical models, empirical modelling of BMS.
CO4: Design of Battery management system considering various parameters and through simulation.

UNIT - I	INTRODUCTION	Lecture Hrs: 14

Introduction to Battery Management System, Cells & Batteries, Nominal voltage and capacity, C rate, Energy and power, Cells connected in series, Cells connected in parallel, Electrochemical and lithium-ion cells, Rechargeable cell, Charging and Discharging Process, Overcharge and Undercharge, Modes of Charging

UNIT - II	BATTERY MANAGEMENT SYSTEM	Lecture Hrs: 14

Introduction and BMS functionality, Battery pack topology, BMS Functionality, Voltage Sensing, Temperature Sensing, Current Sensing, BMS Functionality, High-voltage contactor control, Isolation sensing, Thermal control, Protection, Communication Interface, Range estimation, State-of charge estimation, Cell total energy and cell total power

UNIT - III	BATTERY STATE OF CHARGE AND STATE OF HEALTH ESTIMATION	Lecture Hrs: 12

Battery state of charge estimation (SOC), voltage-based methods to estimate SOC, Model-based state estimation, Battery Health Estimation, Lithium-ion aging: Negative electrode, Lithium ion aging: Positive electrode, Cell Balancing, Causes of imbalance, Circuits for balancing

UNIT - IV	MODELLING AND SIMULATION	Lecture Hrs: 12

Equivalent-circuit models (ECMs), Physics-based models (PBMs), Empirical modelling approach, Physics-based modelling approach, Simulating an electric vehicle, Vehicle range calculations, Simulating constant power and voltage, Simulating battery packs

UNIT - V	DESIGN OF BATTERY MANAGEMENT SYSTEMS	Lecture Hrs: 12

Design principles of battery BMS, Effect of distance, load, and force on battery life and BMS, energy balancing with multi-battery system

Textbooks:

1. Plett, Gregory L. Battery management systems, Volume I: Battery modelling. Artech House, 2015.
2. Plett, Gregory L. Battery management systems, Volume II: Equivalent-circuit methods. Artech House, 2015.

Reference Books:

1. Bergveld, H.J., Kruijt, W.S., Notten, P.H.L "Battery Management Systems -Design by Modelling" Philips Research Book Series 2002.
2. Davide Andrea," Battery Management Systems for Large Lithium-ion Battery Packs" Artech House, 2010
3. Pop, Valer, et al. Battery management systems: Accurate state-of-charge indication for battery-powered applications. Vol. 9. Springer Science & Business Media, 2008.
4. RuiXiong, "Battery management Algorithm for Electric Vehicles", China Machine Press, Springer,2020.
5. Bergveid, Krujit, Notten, " Battery Management Systems: Design by Modelling", Philips Research Book Series, Kluwer Academic Publishers.

Online Learning Resources:

1. https://www.coursera.org/learn/battery-management-systems

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – III
IV B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch
DEPARTMENT OF MECHANICAL ENGINEERING

Subject Code	Title of the Subject	L	T	P	C
20A70304	**MODERN MANUFACTURING METHODS**	3	0	0	3

Course Objectives:

To learn the importance and basics of unconventional machining.
To understand the rapid prototyping processes.
To have the knowledge of different micro machining methods
To understand the working principles of various Non-traditional machining methods.
To learn about Non-traditional forming processes.

UNIT-I

Need for Modern Manufacturing Methods: Non-traditional machining methods and rapid prototyping methods - their relevance for precision and lean manufacturing. Classification of non-traditional processes - their selection for processing of different materials and the range of applications.

Introduction to rapid prototyping - Classification of rapid prototyping methods - sterolithography, fused deposition methods - materials, principle of prototyping and various applications.

UNIT-II

Ultrasonic machining – Elements of the process, mechanics of material removal, process parameters, applications and limitations, Abrasive jet, Water jet and abrasive water jet machining: Basic mechanics of material removal, descriptive of equipment, process variables, applications and limitations.

UNIT-III

Electro –Chemical Processes: Fundamentals of electro chemical machining, electrochemical grinding, metal removal rate in ECM, Tooling, process variables, applications, economic aspects of ECM.

Chemical Machining: Fundamentals of chemical machining- Principle of material removal- maskants – etchants- process variables, advantages and applications.

UNIT-IV

Thermal Metal Removal Processes: Basic principle of spark erosion (EDM), Wire cut EDM, and Electric Discharge Grinding processes - Mechanics of machining, process parameters, selection of tool electrode and dielectric fluids, choice of parameters for improved surface finish and machining accuracy - Applications of different processes and their limitations.

Plasma Machining: Principle of material removal, description of process and equipment, process variables, scope of applications and the process limitations.

UNIT-V

Electron Beam Machining: Generation and control of electron beam for machining, theory of electron beam machining, comparison of thermal and non-thermal processes - process mechanics, parameters, applications and limitations.

Laser Beam Machining: Process description, Mechanism of material removal, process parameters, capabilities and limitations, features of machining, applications and limitations.

Course Outcomes:

At the end of this course the student should be able to understand

- Technical aspects of precision machining.
- Applications of rapid prototyping technologies.
- Tool selection for non traditional processes.
- Knowledge of economic aspects of Non traditional processes.
- Fabrication of microelectronic devices.

TEXT BOOKS:

- Manufacturing processes for engineering materials by SeropeKalpakjian and Steven R Schmid, 5edn, Pearson Pub.
- Advanced machining processes, VK Jain, Allied publishers.

REFERENCE:

- New Technology , Bhattacharya A, The Institution of Engineers, India 1984
- Manufacturing Technology, Kalpakzian, Pearson
- Modern Machining Process, Pandey P.C. and Shah H.S., TMH.

JNTUA College of Engineering (Autonomous), Ananthapuramu

Open Elective Course – III

IV B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

DEPARTMENT OF Electronic & Communication Engineering

Course Code	DIGITAL ELECTRONICS		L	T	P	C
20A70404			3	0	0	3
Pre-requisite		Semester	VII			

Basics of Electronics and Communication Engineering

Course Objectives:

- To learn simplification methods for minimizing Boolean functions and their realization using logic gates.
- To understand and design various combinational logic circuits like adders and code converters.
- To know the design of various combinational circuits useful to implement logic functions.
- To study the design of sequential logic circuits in synchronous and asynchronous modes.
- To introduce programmable logic devices.

Course Outcomes (CO): At the end of this course, the students will be able to

- Learn simplification methods for minimizing Boolean functions and their realization using logic gates.
- Understand and design various combinational logic circuits like adders and code converters.
- Know the design of various combinational circuits useful to implement logic functions.
- Gain knowledge on the design of sequential logic circuits in synchronous and asynchronous modes.
- Understand the operation and uses of programmable logic devices.

UNIT - I

Logic Simplification and Combinational Logic Design: Review of Boolean Algebra and De Morgan’s Theorem, SOP & POS forms, Canonical forms, Introduction to Logic Gates, Ex-OR, Ex-NOR operations, Minimization of Switching Functions: Karnaugh map method, Quine –McCluskey Tabular Minimization Method. Logic function realization: AND-OR, OR-AND and NAND/NOR realizations.

UNIT - II

Introduction to Combinational Design 1: Binary Adders, Subtractors and BCD adder, Code converters - Binary to Gray, Gray to Binary, BCD to excess3, BCD to Seven Segment display.

UNIT - III

Combinational Logic Design 2: Decoders (3 to 8, octal to decimal), Encoders, Priority Encoders, Multiplexers, Demultiplexers, Comparators, Implementations of Logic Functions using Decoders and Multiplexers.

UNIT - IV

Sequential Logic Design: Latches, Flipflops, S-R, D, T, JK and Master-Slave JK FF, Edge triggered FF, flipflop conversions, set up and hold times, Ripple and Synchronous counters, Shift registers.

UNIT - V

Programmable Logic Devices:ROM, Programmable Logic Devices (PLDs), Introduction to logic families and their comparisons.

Textbooks:

1. Digital Design, M. Morris Mano & Michel D. Ciletti, 5th Edition, Pearson Education, 1999.
2. Switching theory and Finite Automata Theory, ZviKohavi and Nirah K. Jha, 2nd Edition, Tata McGraw Hill, 2005.

Reference Books:

1. Fundamentals of Logic Design, Charles H Roth, Jr., 5th Edition, Brooks/coleCengage Learning, 2004.
2. Digital & State Machine Design, Comer, 3rd Edition, OXFORD.

Online Learning Resources:

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – III
IV B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch
DEPARTMENT OF Compute Science & Engineering
Cyber Security

Course Code:20A70504 **L T P C : 3 0 0 3**

Course Objectives:

- To introduce the concepts of Java.
- To Practice object-oriented programs and build java applications.
- To implement java programs for establishing interfaces.
- To implement sample programs for developing reusable software components.
- To establish database connectivity in java and implement GUI applications.

Course Outcomes:

CO6: Recognize the Java programming environment.
CO7: Select appropriate programming constructs to solve a problem.
CO8: Develop efficient programs using multithreading.
CO9: Design reliable programs using Java exception handling features.
CO10: Extend the programming functionality supported by Java.

UNIT-I: Cybercrime

Cybercrime and information security, Cybercriminals, Classifications of cybercrimes, Need for Cyberlaws in Indian context, Legal perspectives of cybercrime, Indian perspective of cybercrimes, Cybercrime and the Indian ITA 2000, Positive aspects and weak areas of ITA 2000, Amendments made in Indian ITA 2000 for admissibility of e- records, Amendments to the Indian IT Act, Global perspective on cybercrimes, Intellectual property in cyberspace, Ethical dimension of cybercrimes.

UNIT-II: Cyber Offenses

Cybercrime and information security, Cybercriminals, Classifications of cybercrimes, Need for Cyberlaws in Indian context, Legal perspectives of cybercrime, Indian perspective of cybercrimes, Cybercrime and the Indian ITA 2000, Positive aspects and weak areas of ITA 2000, Amendments made in Indian ITA 2000 for admissibility of e- records, Amendments to the Indian IT Act, Global perspective on cybercrimes, Intellectual property in cyberspace, Ethical dimension of cybercrimes.

UNIT-III: Cybercrime in Mobile and Wireless Devices

Proliferation of mobile and wireless devices, Trends in mobility, Credit card frauds in mobile and wireless computing era, Security challenges posed by mobile devices, Registry settings for mobile devices, Authentication service security, Attacks on mobile/cell phones, Security implications of mobile devices for organizations, Organizational measures for handling mobile devices related security issues.

UNIT-VI: Tools and Methods Used in Cybercrime

Proxy servers and anonymizers, Password cracking, Keyloggers and spywares, Virus and worms, Trojan horses and backdoors, Steganography, DoS and DDoS attacks, SQL Injection, Buffer Overflow, Attacks on wireless networks

UNIT-V: Cyber Forensics, Cybercrime in Real-World

Forensics of Computer and Handheld Devices: Cyber forensics, Cyber forensics and digital evidence, Forensics analysis of e-mail, Forensics and social networking sites, Forensics of handheld devices –

Smartphone forensics, EnCase, Device Seizure, MOBIL edit.
Cybercrime examples, mini-cases, online scams: Real-life examples - Official website of Maharashtra Government hacked, Indian banks lose millions of rupees, Game source code stolen; Mini-cases - Indian Case of online gambling, Indian case of intellectual property crime; Online scams - Cheque cashing scam, Charity scams.

References:

7. K. A. Navas, “Electronics Lab Manual”, Volume I, PHI, 5th Edition, 2015, ISBN:9788120351424
8. Cyril Prasanna Raj P., “CMOS digital circuit design manual”, Volume 1, MSEC E-publication, Edition 2016

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – III

IV B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

DEPARTMENT OF Chemical Engineering

Course Code	INDUSTRIAL POLLUTION CONTROL ENGINEERING	L	T	P	C
20A70804		3	0	0	3

Pre-requisite

Course Objectives:

Course Outcomes (CO):

At the end of the course, the student will be able to:

- CO1 Understand the different types of wastes generated in an industry, their effects on living and non-living things & environmental regulatory legislations and standards and climate changes.
- CO2 Quantify, analyse and treat wastewater
- CO3 Apply the different unit operations and unit processes involved in conversion of highly polluted water to potable standards
- CO4 Apply the operating principles, design calculations of particulate control devices.
- CO5 Estimate the different waste generated from the industries

Course Articulation Matrix

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												
CO6												

UNIT - I

Types of emissions from chemical industries and effects of environment, environment legislation, Type of pollution, sources of wastewater, Effluent guidelines and standards. Characterization of effluent streams, oxygen demands and their determination (BOD, COD, and TOC), Oxygen sag curve, BOD curve mathematical, controlling of BOD curve, self purification of running streams, sources and characteristics of pollutants in fertilizer, paper and pulp industry, petroleum and petroleum industry.

UNIT - II

General methods of control and removal of sulfur dioxide, oxides of nitrogen and organic vapors from gaseous effluent, treatment of liquid and gaseous effluent in fertilizer industry. Air pollution sampling and measurement: Types of pollutant and sampling and measurement,ambient air sampling: collection of gaseous air pollutants, collection of particulate air pollutants. Stack sampling: sampling system, particulate sampling, and gaseous sampling. Analysis of air pollutants: Sulphur dioxide, nitrogen oxides, carbon monoxide, oxidants and ozones, hydrocarbons, particulate matter

UNIT - III

Air pollution control methods and equipments: Source collection methods: raw material changes, process changes, and equipment modification. Cleaning of gaseous equipments particulate emission control: collection efficiency, control equipment like gravitational settling chambers, Cyclone separators, fabric filters, ESP and their constructional details and design aspects. Scrubbers: wet scrubbers, spray towers, centrifugal scrubbers, packed beds and plate columns, venturi scrubbers, their design aspects. Control of gaseous emissions: absorption by liquids, absorption equipments, adsorption by solids, equipment and the design aspects

UNIT - IV

Introduction to waste water treatment, biological treatment of wastewater, bacterial and bacterial growth curve, aerobic processes, suspended growth processes, activated aerated lagoons and stabilization ponds, attached growth processes, trickling filters, rotary drum filters, anaerobic processes.

UNIT - V

Methods of primary treatments: screening, sedimentation, flotation, neutralization, and methods of tertiary treatment. A brief study of carbon absorption, ion exchange, reverse osmosis, ultra-filtration, chlorination, ozonation, treatment and disposal. Hazardous waste management: nuclear wastes: health and environment effects, sources and disposal methods. Chemical wastes: health and environmental effects, treatment and disposal: treatment and disposal by industry, off site treatment and disposal, treatment practices in various countries. Biomedical wastes: types of wastes and their control.

Textbooks:

1. Environmental Pollution and Control Engineering, C. S. Rao – Wiley Eastern Limited, India, New Delhi, 1993.
2. Pollution Control in Process Industries, S.P. Mahajan, Tata McGraw-Hill, New Delhi, 1985.

Reference Books:

1. Wastewater Treatment, M. Narayana Rao and A.K.Datta, Oxford and IHB publ. New Delhi.

Online Learning Resources:

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – III
IV B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

DEPARTMENT OF MATHEMATICS

Course Code	**Numerical Methods for Engineers (Common for all Branches)**	**L**	**T**	**P**	**C**
20A75101		**0**	**3**	**0**	**3**
Pre-requisite	**---**				

Course Objectives:

This course aims at providing the student with the knowledge on various numerical methods for solving equations, interpolating the polynomials, evaluation of integral equations and solution of differential equations.

Course Outcomes (CO): Student will be able to

- apply numerical methods to solve algebraic and transcendental equations.
- understand fitting of several kinds of curves.
- derive interpolating polynomials using interpolation formulae.
- Solve differential and integral equations numerically.

UNIT - I	**Solution of Algebraic & Transcendental Equations:**	8 Hrs

Introduction-Bisection method-Iterative method-Regula falsi method-Newton Raphson method. System of Algebraic equations: Gauss Jordan method-Gauss Siedal method.

UNIT - II	**Curve Fitting**	8 Hrs

Principle of Least squares- Fitting of curves- Fitting of linear, quadratic and exponential curves.

UNIT - III	**Interpolation**	9 Hrs

Finite differences-Newton's forward and backward interpolation formulae – Lagrange's formulae. Gauss forward and backward formula, Stirling's formula, Bessel's formula

UNIT - IV	**Numerical Integration**	8 Hrs

Numerical Integration: Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule

UNIT - V	**Solution of Initial value problems to Ordinary differential equations**	9 Hrs

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Modified Euler's Method-Runge-Kutta Methods.

Textbooks:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Probability and Statistics for Engineers and Scientists, Ronald E. Walpole,PNIE.
3. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India

Reference Books:

1. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
2. Advanced Engineering Mathematics, by Alan Jeffrey, Elsevier.

Online Learning Resources:

https://slideplayer.com/slide/8588078/

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – III
IV B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

DEPARTMENT OF Physics

Subject Code	Title of the Subject	L	T	P	C
20A75201	**SMART MATERIALS AND DEVICES**	3		-	3

COURSE OBJECTIVES	
1	To provide exposure to smart materials and their engineering applications.
2	To impart knowledge on the basics and phenomenon behind the working of smart materials
3	To explain theproperties exhibited by smart materials
4	To educate various techniques used to synthesize and characterize smart materials
5	To identify the required smart material for distinct applications/devices
COURSE OUTCOMES	
At the end of the course the student will be able	
CO1	To recognize the need of smart materials
CO2	To understand the working principles of smart materials
CO3	To know different techniques used to synthesize and characterize smart materials
CO4	To exploit the properties of smart materials
CO5	To make use of smart materials for different applications

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

SYLLABUS

Credit: 3 **Hours of teaching: - 45 H**

UNITI : Introduction to Smart Materials: 9H

Historical account of the discovery and development of smart materials, Two phases: Austenite and Martensite, Temperature induced phase changes, Shape memory effect, Pseudoelasticity, One-way shape memory effect, Two-way shape memory effect.

UNIT II: Properties of Smart Materials: 9H

Physical principles of optical, Electrical, Dielectric, Piezoelectric, Ferroelectric, Pyroelectric and Magnetic properties of smart materials.

UNIT III: Synthesis of Smart materials: 9H

Solid state reaction technique, Chemical route: Chemical vapour deposition, Sol-gel technique, Hydrothermal method,Co-precipitaiton.Green synthesis, Mechanical alloying and Thin film deposition techniques: Chemical etching, Spray pyrolysis.

UNIT IV: Characterization Techniques: 9H

X-ray diffraction, Raman spectroscopy (RS), Fourier-transform infrared reflection (FTIR), UV-Visible spectroscopy, Scanning electron microscopy (SEM), Transmission electron microscopy, Atomic force microscopy (AFM) and Differential Scanning Calorimetry (DSC).

UNIT V:Smart Materials and Devices: 9H

Characteristics of shape memory alloys, Magnetostrictive, Optoelectronic, Piezoelectric, Metamaterials, Electro-rheological and Magneto-rheological materials and Composite materials.
Devices based on smart materials: Sensors & Actuators, MEMS and intelligent devices, Future scope of the smart materials.

Text Books:

1.Encyclopaediaof Smart Materials- Mel Schwartz, John Wiley & Sons, Inc.2002

2. Smart Materials and Structures - M. V. Gandhi and B.S. Thompson, Champman and Hall, 1992

Texts/References:

1. Smart Materials and Technologies- M. Addington and D. L. Schodek, , Elsevier, 2005.

2. Characterization and Application of smart Materials -R. Rai, Synthesis, , Nova Science, 2011.

3. Electroceramics: Materials, Properties, Applications -A.J. Moulson and J.M. Herbert, , 2nd Edn., John Wiley & Sons, 2003.

4. Piezoelectric Sensorics: Force, Strain, Pressure, Acceleration and Acoustic 1. Emission Sensors, Materials and Amplifiers,G.Gautschi, Springer, 2002.

5. Optical Metamaterials: Fundamentals and Applications-W. Cai and V. Shalaev, ,springer,2010.

6. Smart Materials and Structures - P. L Reece, New Research, Nova Science, 2007

NPTEL courses links

https://nptel.ac.in/courses/112/104/112104173/
https://nptel.ac.in/courses/112/104/112104251/
https://nptel.ac.in/content/storage2/courses/112104173/Mod_1_smart_mat_lec_1.pdf

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – III
IV B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch
DEPARTMENT OF H &SS

Course Code	**Employability Skills**		**L**	**T**	**P**	**C**
20A75501			**3**	**0**	**0**	**3**
Pre-requisite		**Semester-VII**				

Course Objectives:

- ➢ To encourage all round development of the students by focusing on productive skills
- ➢ To make the students aware of Goal setting and writing skills
- ➢ To enable them to know the importance of presentation skills in achieving desired goals.
- ➢ To help them develop organizational skills through group activities

To function effectively with heterogeneous teams

Course Outcomes (CO):

CO1: Define goals and try to achieve them
CO2: Understand the significance of self-management
CO3: Apply the knowledge of writing skills in preparing eye-catchy resumes
CO4: Analyse various forms of Presentation skills
CO5: Judge the group behaviour
CO6: Develop skills required for employability.

UNIT - I	Goal Setting and Self-Management	Lecture Hrs
Definition, importance, types of Goal Setting – SMART Goal Setting – Motivation – Intrinsic and Extrinsic Motivation – Self-Management - Knowing about self – SWOT Analysis		
UNIT - II	**Writing Skills**	**Lecture Hrs**
Definition, significance, types of writing skills – Resume writing, E-Mail writing, Cover Letters, - E-Mail Etiquettes		
UNIT - III	**Technical Presentation Skills**	**Lecture Hrs**
Nature, meaning & significance of Presentation Skills – Planning, Preparation, Presentation, Stage Dynamics – PPT & Poster Presentation		
UNIT - IV	**Group Presentation Skills**	**Lecture Hrs**
Body Language – Group Behaviour - Team Dynamics – Leadership Skills – Personality Manifestation- Group Discussion		
UNIT - V	**Job Cracking Skills**	**Lecture Hrs**
Nature, characteristics, importance & types of Interviews – Job Interviews – Skills for success - Answering Strategies – Mock Interviews		

Textbooks:

- 1. Soft Skills & Employability Skills (English, Paperback, SABINA PILLAI, AGNA FERNANDEZ)Publisher: Cambridge

2.Personality Development and Soft Skills (English, Paperback, MitraBarun K.)

Reference Books:
1. Learning How To Fly - Life Lessons for the Youth (English, Paperback, Kalam Abdul A. P. J.), Rupa& Co 2. Personality Development and Soft Skills - Preparing for Tomorrow 1 Edition (English, Paperback, Shikha Kapoor)Publisher: Dreamtech Press 3. Skills for Employability - Skills for Employability with 0 Disc (English, Paperback, Dr. M. Sen Gupta)Publisher: Innovative Publication
Online Learning Resources:
1. **https://youtu.be/gkLsn4ddmTs** 2. **https://youtu.be/2bf9K2rRWwo** 3. **https://youtu.be/FchfE3c2jzc** 4. **https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel_j2PUy0pwjVUgj7KlJ**

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – III
IV B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

DEPARTMENT OF Chemistry

Subject Code	Title of the Subject	L	T	P	C
20A75301	**GREEN CHEMISTRY AND CATALYSIS FOR SUSTAINABLE ENVIRONMENT**	2	1	-	3

COURSE OBJECTIVES	
1	Learn an interdisciplinary approach to the scientific and societal issues arising from industrial chemical production, including the facets of chemistry and environmental health sciences that can be integrated to promote green chemistry and the redesign of chemicals, industrial processes and products.
2	Understand the use of alternatives assessments that combine chemical, environmental health, regulatory, and business considerations to develop safer products.

COURSE OUTCOMES	
CO1	Apply the Green chemistry Principles for day to day life as well as synthesis, Describe the sustainable development and green chemistry, Explain economic and un-economic reactions, Demonstrate Polymer recycling.
CO2	Explain Heterogeneous catalyst and its applications in Chemical and Pharmaceutical Industries, Differentiate Homogeneous and Heterogeneous catalysis, Identify the importance of Bio and Photo Catalysis, Discuss Transition metal and Phase transfer Catalysis
CO3	Demonstrate Organic solvents and importance of solvent free systems, Discuss Super critical carbondioxide, Explain Super critical water and water as a reaction solvent, Interpret Ionic Liquids as Catalyst and Solvent
CO4	Describe importance of Biomass and Solar Power, Illustrate Sonochemistry and Green Chemistry, Apply Green Chemistry for Sustainable Development , Discuss the importance of Renewable resources
CO5	Discuss green Chemistry Principles for practicing Green nano synthesis, Illustrate Microwave Assisted Synthesis, Differentiate Hydrothermal and Reflux synthesis, Demonstrate Green Chemistry applications of Inorganic nanomaterials

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

CO1											
CO2											
CO3											
CO4											
CO5											

SYLLABUS

UNIT 1: PRINCIPLES AND CONCEPTS OF GREEN CHEMISTRY

Introduction, Green chemistry Principles, sustainable development and green chemistry, atom economy, atom economic: Rearrangement and addition reactions and un-economic reactions: Substitution, elimination and Wittig reactions, Reducing Toxicity. Waste - problems and Prevention: Design for degradation, Polymer recycling.

UNIT 2: CATALYSIS AND GREEN CHEMISTRY

Introduction to catalysis, Heterogeneous catalysts: Basics of Heterogeneous Catalysis, Zeolites and the Bulk Chemical Industry, Heterogeneous Catalysis in the Fine Chemical and Pharmaceutical Industries, Catalytic Converters, Homogeneous catalysis: Transition Metal Catalysts with Phosphine Ligands, Greener Lewis Acids, Asymmetric Catalysis, Heterogeneous and Homogenous catalysts, Phase transfer catalysis: Hazard Reduction, C–C Bond Formation, Oxidation Using Hydrogen Peroxide, Bio-catalysis and photo-catalysis with examples,

UNIT 3: ORGANIC SOLVENTS: ENVIRONMENTALLY BENIGN SOLUTIONS

Organic solvents and volatile organic compounds, solvent free systems, supercritical fluids: Super critical carbondioxide, super critical water and water as a reaction solvent: water based coatings, Ionic liquids as catalyst and solvent.

UNIT 4: EMERGING GREENER TECHNOLOGIES

Biomass as renewable resource, Energy: Fossil Fuels, Energy from Biomass, Solar Power, Other Forms of Renewable Energy, Fuel Cells, Chemicals from Renewable Feedstocks, Chemicals from Fatty Acids, Polymers from Renewable Resources, Some Other Chemicals from Natural Resources, Alternative Economies: The Syngas Economy, The Biorefinery, Design for energy efficiency, Industrial applications of alternative environmentally benign catalytic systems for carrying out the important reactions such as selective oxidation, reduction and C-C bond formations (specific reactions)

UNIT 5: ALTERNATIVE ENERGY SOURCES

Photo redox catalysis, single electron transfer reactions (SET), Advantages and Challenges Faced by Photochemical Processes, Examples of Photochemical Reactions, Chemistry Using Microwaves: Microwave Heating, Microwave-assisted Reactions, Sonochemistry: Sonochemistry and Green Chemistry, Electrochemical Synthesis: Examples of Electrochemical Synthesis.

Text Books :

1. M. Lancaster, Green Chemistry an introductory text, Royal Society of Chemistry, 2002.
2. Paul T. Anastas and John C. Warner, Green Chemistry Theory and Practice, 4th Edition,

Oxford University Press, USA

References :

1. Green Chemistry for Environmental Sustainability, First Edition, Sanjay K. Sharma and Ackmez Mudhoo, CRC Press, 2010.
2. Edited by Alvise Perosa and Maurizio Selva , Hand Book of Green chemistry Volume 8:

Green Nanoscience, wiley-VCH, 2013.

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – IV
IV B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

DEPARTMENT OF Civil Engineering

		L	T	P	C
20A70105	**Environmental Impact Assessment**	**3**	**0**	**0**	**3**

Course Objectives:
1. To impart knowledge on different concepts of Environmental Impact Assessment.
2. To teach procedures of risk assessment.
3. To teach the EIA methodologies and the criterion for selection of EIA methods.
4. To teach the procedures for environmental clearances and audit.
5. To know the impact quantification of various projects on the environment.

Course Outcomes (CO):
1. To prepare EMP, EIS, and EIA report.
2. To identify the risks and impacts of a project.
3. To choose an appropriate EIA methodology.
4. To evaluation the EIA report.
5. To Estimate the cost benefit ratio of a project.

UNIT - I

Concepts and methodologies of EIA :Initial environmental Examination, Elements of EIA, - Factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters- Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods and cost/benefit Analysis.

UNIT - II

Impact of Developmental Activities and Land Use :Introduction and Methodology for the assessment of soil and ground water, Delineation of study area, Identification of actives. Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures. E I A in surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment, Air pollution sources, Generalized approach for assessment of Air pollution Impact.

UNIT - III

Assessment of Impact on Vegetation, Wildlife and Risk Assessment :Introduction - Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation - Risk assessment and treatment of uncertainty-key stages in performing an Environmental Risk Assessment- Advantages of Environmental Risk Assessment

UNIT - IV Environmental audit

Introduction - Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, Audit protocol, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report.

UNIT - V Environmental Acts and Notifications

The Environmental protection Act, The water preservation Act, The Air (Prevention &Control of pollution Act), Wild life Act - Provisions in the EIA notification, procedure for environmental clearance, procedure for conducting environmental impact assessment report-Evaluation of EIA report. Environmental legislation objectives, evaluation of Audit data and preparation of Audit report. Post Audit activities, Concept of ISO and ISO 14000.

Textbooks:

1. Environmental Impact Assessment, by Canter Larry W., McGraw-Hill education Edi (1996)
2. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B. S. Publication, Hyderabad 2nd edition 2011

Reference Books:

1. Environmental Engineering, by Peavy, H. S, Rowe, D. R, Tchobanoglous, G.Mc-Graw Hill International Editions, New York 1985
2. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke, Prentice Hall Publishers
3. Environmental Science and Engineering, by Suresh K. Dhaneja, S.K., Katania& Sons Publication, New Delhi.
4. Environmental Pollution and Control, by H. S. Bhatia, Galgotia Publication (P) Ltd, Delhi.

Online Learning Resources:

https://nptel.ac.in/courses/124107160

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – IV
IV B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch
DEPARTMENT OF Electrical & Electronic & Engineering

Course Code	**IoT APPLICATIONS IN ELECTRICAL ENGINEERING (OE-IV)**		**L**	**T**	**P**	**C**
20A70205			**3**	**0**	**0**	**3**
Pre-requisite						

Course Objectives: To make the students learn about:

- Basics of Internet of Things and Micro Electro Mechanical Systems (MEMS) fundamentals in design and fabrication process.
- The concept of motion less and motion detectors in IoT applications.
- Applications of IoT in smart grid.
- The concept of Internet of Energy for various applications.

Course Outcomes (CO): After completing the course, the student should be able to do the following:

CO 1 Understand the concept of IoT in Electrical Engineering.
CO 2 Analyze various types of motionless sensors and various types of motion detectors
CO 3 Apply various applications of IoT in smart grid.
CO 4 Design future working environment with Energy internet.

UNIT - I	**SENSORS**	Lecture Hrs: 10

Definitions, Terminology, Classification, Temperature sensors, Thermoresistive, Resistance, temperature detectors, Silicon resistive thermistors, Semiconductor, Piezoelectric, Humidity and moisture sensors. Capacitive, Electrical conductivity, Thermal conductivity, time domain reflectometer, Pressure and Force sensors: Piezoresistive, Capacitive, force, strain and tactile sensors, Strain gauge, Piezoelectric

UNIT - II	**OCCUPANCY AND MOTION DETECTORS**	Lecture Hrs: 10

Capacitive occupancy, Inductive and magnetic, potentiometric - Position, displacement and level sensors, Potentiometric, Capacitive, Inductive, magnetic velocity and acceleration sensors, Capacitive, Piezoresistive, piezoelectric cables, Flow sensors, Electromagnetic, Acoustic sensors - Resistive microphones, Piezoelectric, Photo resistors

UNIT - III	**MEMS**	Lecture Hrs: 10

Basic concepts of MEMS design, Beam/diaphragm mechanics, electrostatic actuation and fabrication, Process design of MEMS based sensors and actuators, Touch sensor, Pressure sensor, RF MEMS switches, Electric and Magnetic field sensors

UNIT - IV	**IoT FOR SMART GRID**	Lecture Hrs: 8

Driving factors, Generation level, Transmission level, Distribution level, Applications, Metering and monitoring applications, Standardization and interoperability, Smart home

UNIT - V	**INTERNET of ENERGY (IoE)**	Lecture Hrs: 10

Concept of Internet of Energy, Evaluation of IoE concept, Vision and motivation of IoE, Architecture, Energy routines, information sensing and processing issues, Energy internet as smart grid .

Textbooks:
1. Jon S. Wilson, Sensor Technology Hand book, Newnes Publisher, 2004 2. Tai Ran Hsu, MEMS and Microsystems: Design and manufacture, 1st Edition, Mc Grawhill Education, 2017 3. ErsanKabalci and YasinKabalci, From Smart grid to Internet of Energy, 1st Edition, Academic Press, 2019
Reference Books:
1. Raj Kumar Buyya and Amir VahidDastjerdi, Internet of Things: Principles and Paradigms, Kindle Edition, Morgan Kaufmann Publisher, 2016 2. Yen Kheng Tan and Mark Wong, Energy Harvesting Systems for IoT Applications: Generation, Storage and Power Management, 1st Edition, CRC Press, 2019 3. RMD SundaramShriram, K. Vasudevan and Abhishek S. Nagarajan, Internet of Things, Wiley, 2019
Online Learning Resources:
1. https://onlinecourses.nptel.ac.in/noc22_cs96/preview 2. https://nptel.ac.in/courses/108108123 3. https://nptel.ac.in/courses/108108179

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – IV
IV B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

DEPARTMENT OF Mechanical Engineering

Subject Code	Title of the Subject	L	T	P	C
20A70305	**MATERIAL HANDLING EQUIPMENTS**	3	0	0	3

Course Objectives:

To understand how the knowledge of materials management can be an advantage to logistics and supply chain operations.

To sensitize the students on the materials management functions – Planning, Purchase, Controlling, Storing, Handling, Packaging, Shipping and Distributing, and Standardizing.

To realize the importance of materials both in product and service.

planning/ production and plant layouts, studying about strategies of material handling and equipments, and selection of site locations.

It also aims to explore the layout planning by computer applications following different algorithms.

UNIT-I

Overview of Material Handling: Principles of Material Handling, Principal groups of Material Handling equipment – General Characteristics and application of Material Handling Equipment, Modern trends in material handling.

UNIT-II

Lifting Equipments: Hoist- Components of Hoist – Load Handling attachments hooks, grabs and clamps – Grabbing attachments for bulk material – Wire ropes and chains.

UNIT-II

Lifting tackle pulleys for gain of force and speed: Tension in drop parts – Drums, Shears and sprockets – Arresting gear and brakes – Block brakes, Band brakes, thrust brakes – Safety and hand cranks. Principle operation of EOT, Gantry and jib cranes Hoisting Mechanisms, Travelling mechanisms, lifting mechanisms – Slewing Mechanisms – Elevators and lifts.

UNIT-IV

CONVEYORS: Types - description -applications of Belt conveyors, apron conveyors and escalators Pneumatic conveyors, Screw conveyors and vibratory conveyors

UNIT-V

ELEVATORS: Bucket elevators: Loading and bucket arrangements - Cage elevators - shaft way, guides, counter weights, hoisting machine, safety devices - Design of fork lift trucks.

Course Outcomes :

The students will be able to select appropriate location for establishing industrial plants by applying the concepts of location selection.

The students will be able to plan and design plant and production layouts through basic strategies and with computer applications.

The students will be able to identify and analyse the problems in the existing layout/ material handling system and shall be able to the optimize the layout/ material handling system

The students will be able to develop algorithms for new planning layouts for typical applications in the industries and Suggesting appropriate material handling strategies in the industries.

The students will be able to design of fork lift trucks.

REFERENCES

Rudenko, N., Materials handling equipment, ELnvee Publishers, 1970.

Spivakovsy, A.O. and Dyachkov, V.K., Conveying Machines, Volumes I and II, MIR Publishers, 1985.

Alexandrov, M., Materials Handling Equipments, MIR Publishers, 1981.

Boltzharol, A., Materials Handling Handbook, The Ronald Press Company, 1958.

P.S.G. Tech., “Design Data Book”, KalaikathirAchchagam, Coimbatore, 2003.

Lingaiah. K. and Narayana Iyengar, “Machine Design Data Hand Book”, Vol. 1 & 2, Suma Publishers, Bangalore, 1983

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – IV
IV B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

DEPARTMENT OF Electronics & Communication Engineering

Course Code 20A70405	PRINCIPLES OF DIGITAL SIGNAL PROCESSING	L	T	P	C
		3	0	0	3

Pre-requisite
Basics of Electronics and Communication Engineering

Course Objectives:
- To understand the frequency domain analysis of discrete time signals.
- To learn the properties of discrete Fourier series and Fourier transforms.
- To design &analyzeIIR digital filters from analog filters.
- To know various structures used in implementation of FIR digital filters.
- To grasp the importance and applications of Multirate Digital signal processing.

Course Outcomes (CO): At the end of this course, the students will be able to
- Articulate the frequency domain analysis of discrete time signals.
- Understand the properties of discrete Fourier series and Fourier transforms.
- Design &analyzeIIR digital filters from analog filters.
- Design various structures used in implementation of FIR digital filters.
- Summarize the importance and applications of Multirate Digital signal processing.

UNIT - I
Introduction to Digital Signal Processing: Discrete time signals & sequences, Classification of Discrete time systems, stability of LTI systems, LTI system Properties. Solution of Linear constant coefficient difference equations, frequency domain representation of discrete time signals and systems. Review of Z-transforms.

UNIT - II
Discrete Fourier Series and Fourier Transforms: Properties of discrete Fourier series, DFS representation of periodic sequences, Discrete Fourier transforms: Properties of DFT, linear filtering methods based on DFT, Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation in frequency FFT Algorithms, Inverse FFT.

UNIT - III
Design of IIR Digital Filters and Realizations: Analog filter approximations – Butter worth and Chebyshev, Design of IIR Digital filters from analog filters, Design Examples, Analog and Digital frequency transformations. Basic structures of IIR systems, Transposed forms.

UNIT - IV
Design of FIR Digital Filters and Realizations: Characteristics of FIR Digital Filters, frequency response. Design of FIR digital filters using window techniques and frequency sampling techniques, comparison of IIR & FIR filters, basic structures of FIR systems.
UNIT - V

DSP Applications: Introduction to programmable DSPs, Multirate signal processing: Decimation, Interpolation, Sampling rate conversion by a rational factor; Adaptive filters: Introduction, Basic principles of Forward Linear Predictive filter and applications such as system identification, echo cancellation, equalization of channels, and beam forming using block diagram representation study only.

Textbooks:

1. John G. Proakis and Dimitris G. Manolakis, "Digital Signal Processing, Principles, Algorithmsand Applications", Pearson Education, 2007.
2. A.V. Oppenheim and R.W. Schaffer, "Discrete Time Signal Processing", PHI.

Reference Books:

1. Andreas Antoniou, "Digital Signal Processing", TATA McGraw Hill, 2006
2. MH Hayes, "Digital Signal Processing", Schaum's Outline series, TATA Mc-Graw Hill, 2007.
3. Robert J. Schilling and Sandra L. Harris, "Fundamentals of Digital Signal Processing using MATLAB", Thomson, 2007.
4. B. Venkataramani and M. Bhaskar, "Digital Signal Processors – Architecture, Programming and Applications", TATA McGraw Hill, 2002.

Online Learning Resources:

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – IV
IV B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch
DEPARTMENT OF Computer Science & Engineering
Introduction to Database Management Systems

Course Code:20A70505 **L T P C : 3 0 0 3**

Course Objectives:

- To introduce the concept of Internet of Things.
- To Practice programs and build real time applications.
- Students will be explored to the interconnection and integration of the physical world.
- Students will gain practical experience in the development of Cloud-based IoT systems.
- To get knowledge on cloud platforms

Course Outcomes (CO):

CO4: Design reliable real time applications using microcontrollers and microprocessors .
CO5: Extend the programming functionality and design new modules.
CO6: Able to design & develop IOT Devices.

UNIT-I: Introduction

Introduction to database systems; Characteristics of databases, File system V/s Database system, Users of Database
system, approaches to building a database, data models, database management system, Data Independence, DBMS
system architecture, challenges in building a DBMS, various components of a DBMS
Introduction to database systems; Characteristics of databases, File system V/s Database system, Users of Database
system, approaches to building a database, data models, database management system, Data Independence, DBMS
system architecture, challenges in building a DBMS, various components of a DBMS
Introduction to database systems; Characteristics of databases, File system V/s Database system, Users of Database
system, approaches to building a database, data models, database management system, Data Independence, DBMSsystem architecture, challenges in building a DBMS, various components of a DBMS
Introduction to database systems; Characteristics of databases, File system V/s Database system, Users of Database
system, approaches to building a database, data models, database management system, Data Independence, DBMS
system architecture, challenges in building a DBMS, various components of a DBMS.
Introduction to database systems; Characteristics of databases, File system V/s Database system, Users of Database
system, approaches to building a database, data models, database management system, Data Independence,DBMS system architecture, challenges in building a DBMS, various components of a DBMS.
Introduction to database systems; Characteristics of databases, File system V/s Database system, Users of Database system, approaches to building a database, data models, database management system, Data Independence, DBMSsystem architecture, challenges in building a DBMS, various components of a DBMS.

Introduction to database systems, Characteristics of databases, File system V/s Database system, Users of Database system, approaches to building a database, data models, database management system, Data Independence, DBMS system architecture, challenges in building a DBMS, various components of a DBMS.

UNIT-II: E/R Model

Conceptual Data Modeling – motivation, entities, entity types, various types of attributes, relationships, relationship
types, Entity set types, Participation constraints, E/R diagram notation, Extended E/R Model, Examples

Conceptual Data Modeling – motivation, entities, entity types, various types of attributes, relationships, relationship
types, Entity set types, Participation constraints, E/R diagram notation, Extended E/R Model, Examples

Conceptual Data Modeling - motivation, entities, entity types, various types of attributes, relationships, relationship types, Entity set types, Participation constraints, E/R diagram notation, Extended E/R Model, Examples.

UNIT-III: Relational Data Model

Concepts of relations, schema-instance distinction, keys, referential integrity & foreign keys, converting the database specification in ER notation to the relational schema, Relational algebra operators: selection, projection, cross product, various types of joins, division, set operations, example queries, tuple relational calculus, domain relational calculus, Fundamentals of SQL.

UNIT-VI: Relational Database Design

Importance of a good schema design, problems encountered with bad schema designs, motivation for normal forms, dependency theory - functional dependencies, Armstrong's axioms for FD's, closure of a set of FD's, minimal covers, Normalization, Normal Forms - INF, 2NF, 3NF and BCNF, decompositions and desirable properties of them, multi valued dependencies and 4NF, join dependencies and 5NF, Concept of Denormalization.

UNIT-V: Transaction Processing,Data Storage & Indexing

Transaction processing and Error recovery-Concepts of transaction processing, ACID properties, concurrency control, Serializability, locking based protocols, Timestamp based protocols, recovery and logging methods.

Data Storage and Indexes - File organizations, primary, secondary index structures, various index structures - hasb based, dynamic hashing techniques, multi-level indexes, B and B-trees.

References:

9. K. A. Navas, “Electronics Lab Manual”, Volume I, PHI, 5th Edition, 2015, ISBN:9788120351424
10. Cyril Prasanna Raj P., “CMOS digital circuit design manual”, Volume 1, MSEC E-publication, Edition 2016

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DEPARTMENT OF Chemical Engineering

Course Code	**SOLID WASTE MANAGEMENT**	**L**	**T**	**P**	**C**
20A70805		**3**	**0**	**0**	**3**

Pre-requisite

Course Objectives:

- Material flow in society and generation of solid waste source
- Clarification of solid waste on characterization of the same
- Understand the sense of onsite handling storage and collection systems including transportation
- Understand processing technologies with mechanical volume reduction and thermal volume reduction corporate land filling, deep well injections.
- Learn to estimate material recovery energy recovery from a given waste data using case standing

Course Outcomes (CO):

At the end of the course, the student will be able to:

CO1	Identify sources and relationship between various functional elements of solid waste management and methods of storage and collection and transport of solid wastes.
CO2	Know the importance of transfer station and suggest suitable methods of solid waste disposal based on the composition of solid waste.
CO3	Suggest suitable methods for the management of plastic and E-wastes
CO4	Identify hazardous wastes and suggest suitable management techniques for radioactive wastes and Bio-medical wastes.
CO5	Adopt the suitable management method for a given industry

Course Articulation Matrix

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

UNIT - I

Introduction: Definition, characteristics and perspectives of solid waste. Types of solid waste. Physical and chemical characteristics. Variation of composition and characteristics. Municipal, industrial, special and hazardous wastes.

General aspects Overview of material flow in society. Reduction in raw material usage. Reduction in solid waste generation. Reuse and material recovery. General effects on health and environment. Legislations

UNIT - II

Engineered systems: Typical generation rates. Estimation and factors effecting generation rates. On site handling. Storage and processing. Collection systems and devices. Transfer and transport.

UNIT - III

Processing Techniques: Mechanical volume reduction. Thermal volume reduction. Component separation. Land filling and land forming. Deep well injection.

UNIT - IV

Material recovery: Mechanical size alteration. Electromagnetic separation. Drying and dewatering. Other material recovery systems. Recovery of biological conversion products. Recovery of thermal conversion products.

Energy recovery: Energy recovery systems and efficiency factors. Determination of output and efficiency. Details of energy recovery systems. Combustion incineration and heat recovery. Gasification and pyrolysis. Refuse derived fuels (RDF).

UNIT - V

Case studies: Major industries and management methods used in typical industries – Coal fired power stations, textile industry, oil refinery, distillery, sugar industry, and radioactive waste generation units.

Textbooks:

1. Howard S. Peavy, Environmental Engineering, McGraw Hill International Edition, 1986.
2. Dutta, Industrial Solid Water Management and Land Filling Practice, Narose Publishing House, 1999.

Reference Books:

1. Sastry C.A., Waste Treatment Plants, Narose Publishing House, 1995.
2. Lagrega, Hazardous Waste Management, McGraw Hill, 1994.

Online Learning Resources:

JNTUA College of Engineering (Autonomous), Ananthapuramu
Open Elective Course – IV
IV B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

DEPARTMENT OF MATHEMATICS

Course Code	Number theory and its Applications		L	T	P	C
20A75102			0	3	0	3
Pre-requisite	-----	Semester	I			
Course Objectives:						
This course enables the students to learn the concepts of number theory and its applications to information security.						
Course Outcomes (CO): Student will be able to						
• understand number theory and its properties. • understand principles on congruences • develop the knowledge to apply various applications • develop various encryption methods and its applications.						
UNIT - I	Integers, Greatest common divisors and prime Factorization		8 Hrs			
The well-ordering property-Divisibility-Representation of integers-Computer operations with integers-Prime numbers-Greatest common divisors-The Euclidean algorithm -The fundamental theorem of arithmetic-Factorization of integers and the Fermat numbers-Linear Diophantine equations						
UNIT - II	Congruences		8 Hrs			
Introduction to congruences -Linear congruences-The Chinese remainder theorem-Systems of linear congruences						
UNIT - III	Applications of Congruences		9 Hrs			
Divisibility tests-The perpetual calendar-Round-robin tournaments-Computer file storage and hashing functions. Wilson's theorem and Fermat's little theorem-Pseudo primes- Euler's theorem- Euler's p hi-function- The sum and number of divisors- Perfect numbers and Mersenne primes.						
UNIT - IV	Finite fields & Primality, factoring		8 Hrs			
Finite fields- quadratic residues and reciprocity-Pseudo primes-rho method-fermat factorization and factor bases.						

UNIT - V	**Cryptology**	9 Hrs
Basic terminology-complexity theorem-Character ciphers-Block ciphers-Exponentiation ciphers- Public-key cryptography-Discrete logarithm-Knapsack ciphers- RSA algorithm-Some applications to computer science.		
Textbooks:		
1. Elementary number theory and its applications, Kenneth H Rosen, AT & T Information systems & Bell laboratories. 2. A course in Number theory & Cryptography, Neal Koblitz, Springer.		
Reference Books:		
1. An Introduction To The Theory Of Numbers, Herbert S. Zuckerman, Hugh L. Montgomery, Ivan Niven, wiley publishers 2. Introduction to Analytic number theory-Tom M Apostol, springer **3.** Elementary number theory, VK Krishnan, Universities press		
Online Learning Resources:		
https://www.slideshare.net/ItishreeDash3/a-study-on-number-theory-and-its-applications		

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DEPARTMENT OF Physics

Subject Code	Title of the Subject	L	T	P	C
20A75202	**SENSORS AND ACTUATORS FOR ENGINEERING APPLICATIONS**	3		-	3

COURSE OBJECTIVES	
1	To provide exposure to various kinds of sensors and actuators and their engineering applications.
2	To impart knowledge on the basic laws and phenomenon behind the working of sensors and actuators
3	To explain the operating principles of various sensors and actuators
4	To educate the fabrication of sensors
5	To explain the required sensor and actuator for interdisciplinary application
COURSE OUTCOMES	
At the end of the course the student will be able	
CO1	To recognize the need of sensors and actuators
CO2	To understand working principles of various sensors and actuators
CO3	To identify different type of sensors and actuators used in real life applications
CO4	To exploit basics in common methods for converting a physical parameter into an electrical quantity
CO5	To make use of sensors and actuators for different applications

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

SYLLABUS

Credits: 3 **Hours of teaching:- 45 H**

UNIT – I: Introduction to Sensors and Actuators **9H**

Sensors: Types of sensors:temperature, pressure, strain, active and passive sensors, General characteristics of sensors (Principles only), Materials used and their fabrication process: Deposition:ChemicalVapor Deposition, Pattern: photolithography and Etching: Dry and WetEtching.

Actuators: Functional diagram of actuators, Types of actuators and their basic principle of working: Hydraulic, Pneumatic, Mechanical, Electrical, Magnetic, Electromagnetic, Piezo-electric and Piezo-resistive actuators, Applications of Actuators.

UNIT –II: Temperature and Mechanical Sensors 9H

Temperature Sensors: Types of temperature sensors and their basic principle of working: Thermo-resistive sensors: Thermistors, Resistance temperature sensors, Silicon resistive sensors, Thermo-electric sensors: Thermocouples, PN junction temperature sensors

Mechanical Sensors: Types of Mechanical sensors and their basic principle of working: Force sensors: Strain gauges, Tactile sensors, Pressure sensors: Semiconductor, Piezoresistive, capacitive, Variable Reluctance Sensor (VRP).

UNIT –III: Optical and Acoustic Sensors 9H

Optical Sensors: Basic principle and working of: Photodiodes, Phototransistors and Photo-resistors based sensors, Photomultipliers, Infrared sensors:thermal, Passive Infra Red, Fiber based sensors and Thermopiles

Acoustic Sensors: Principle and working of Ultrasonic sensors, Piezo-electric resonators, Microphones.

UNIT –IV: Magnetic, Electromagnetic Sensors and Actuators 9H

Motors as actuators (linear, rotational, stepping motors), magnetic valves, inductive sensors (LVDT, RVDT, and Proximity), Hall Effect sensors, Magneto-resistive sensors, Magneto-strictive sensors and actuators, Voice coil actuators (speakers and speaker-like actuators).

UNIT –V: Chemical and Radiation Sensors 9H

Chemical Sensors: Principle and working of Electro-chemical, Thermo-chemical, Gas, pH, Humidity and moisture sensors.

Radiation Sensors: Principle and working of Ionization detectors, Scintillation detectors, Geiger-Muller counters, Semiconductor radiation detectors and Microwave sensors (resonant, reflection, transmission)

Text Books:

1. Sensors and Actuators – Clarence W. de Silva, CRC Press, 2nd Edition, 2015
2. Sensors and Actuators, D.A.Hall and C.E.Millar, CRC Press, 1999

Reference Books:

1.Sensors and Transducers- D.Patranabhis, Prentice Hall of India (Pvt) Ltd. 2003
2. Measurement, Instrumentation, and Sensors Handbook-John G.Webster, CRC press 1999
3. Sensors – A Comprehensive Sensors- Henry Bolte, John Wiley.
4. Handbook of modern sensors, Springer, Stefan Johann Rupitsch.
5. Principles of Industrial Instrumentation By D. Patranabhis

NPTEL courses links

https://onlinecourses.nptel.ac.in/noc21_ee32/preview

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IV B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

DEPARTMENT OF H & SS

Subject Code	Title of the Subject	L	T	P	C
20A79102	English Literary Spectrum	3		0	3

COURSE OBJECTIVES	
1	To develop aesthetic sense to appreciate the beauty of life
2	To introduce to Elizabethan drama and be able to appreciate the nuances of humour
3	To familiarize with Victorian novel and industrialization
4	To expose to the historical significance of ideas of different periods
5	To give exposure to the vicissitudes of life through short stories

COURSE OUTCOMES	
CO1	Awareness to lead a life of quality than quantity
CO2	Able to understand humour and Elizabethan culture
CO3	Enable to appreciate human relations in this mechanized world
CO4	Tolerant and receptive to different ideas
CO5	Be imaginative and understanding of human aspirations

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

SYLLABUS

UNIT I: Poetry
1. Ode to a Grecian Urn- John Keats
2. To a Skylark- P.B.Shelley
3. Satan's Speech from Paradise Lost Book I- 140-170 lines- John Milton
4. My Last Duchess- Robert Browning

UNIT II: Drama
1. Twelfth Night- William Shakespeare

a) Elizabethan theatre
b) Shakespearean tragedy
c) Shakespearean Comedy
d) Themes of Shakespearean Dramas

UNIT III: Novel

1. Hard Times- Charles Dickens

a) Rise of the English Novel
b) Victorian Novel
c) Utilitarianism
d) Humanism

UNIT IV: Prose

1. Of Studies – Francis Bacon
2. On Seeing People Off- A.G.Gardiner
3. Sweetness and Light- Mathew Arnold
4. I too have a Dream- Martin Luther King Junior

UNIT V: Short Stories

1. The Last Leaf- O.Henry
2. Useless Beauty- Guy de Maupassant
3. After the Dance – Leo Tolstoy
4. The Selfish Giant- Oscar Wilde

Text Books:

The Oxford Book of English Verse by Christopher Ricks (Editor)
Twelfth Night (2010 edition): Oxford School Shakespeare (Oxford School Shakespeare Series)
Dickens Charles, Hard Times (Penguin Classics)
The Art of the Personal Essay: An Anthology from the Classical Era to the Present, Anchor Books Publication

References:

Legois and Cazamian, *A History of English Literature*

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IV B.TECH – I SEMESTER (R20) (common to all branches) - 2020 Admitted Batch

DEPARTMENT OF Chemistry

Subject Code	Title of the Subject	L	T	P	C
20A75302	**CHEMISTRY OF NANOMATERIALS AND APPLICATIONS**	2	1	-	3

COURSE OBJECTIVES	
1	To understand synthetic principles of Nanomaterials by various methods
2	And also characterisae the synthetic nanomaterials by various instrumental methods
3	To enumerate the applications of nanomaterials in engineering

COURSE OUTCOMES	
CO1	Classify the nanostructure materials, Describe scope of nano science and technology, Explain different synthetic methods of nano materials, Identify the synthetic methods of nanomaterial which is suitable for preparation of particular material
CO2	Describe the top down approach, Explain aerosol synthesis and plasma arc technique, Differentiate chemical vapour deposition method and electrodeposition method, Discuss about high energy ball milling.
CO3	Discuss different technique for characterization of nanomaterial, Explain electron microscopy techniques for characterization of nanomaterial, Describe BET method for surface area analysis, Apply different spectroscopic techniques for characterization
CO4	Explain synthesis and properties and applications of nanaomaterials, Discuss about fullerenes and carbon nanotubes, Differentiate nanomagnetic materials and thermoelectric materials, Describe liquid crystals
CO5	Illustrate applications of nanaomaterials, Discuss the magnetic applications of nanomaterials, list the applications of non-linear optical materials, Describe the applications fullerenes, carbon nanotubes

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

CO4												
CO5												

SYLLABUS

Unit – I

Basics and Characterization of Nanomaterials : Introduction**,** Scope of nanoscience and nanotecnology, nanoscience in nature, classification of nanostructured materials, importance of nano materials.

Unit – II

Synthesis of nanomaterials : Top-Down approach**,** Inert gas condensation, arc discharge method, aerosol synthesis, plasma arc technique, ion sputtering, laser ablation, laser pyrolysis, and chemical vapour deposition method, electrodeposition method, high energy ball milling method.

Synthetic Methods**:** Bottom-Up approach**:-** Sol-gel synthesis, microemulsions or reverse micelles, co-precipitation method, solvothermal synthesis, hydrothermal synthesis, microwave heating synthesis and sonochemical synthesis.

UNIT-III

Techniques for characterization: Diffraction technique, spectroscopy techniques, electron microscopy techniques for the characterization of nanomaterilas, BET method for surface area analysis, dynamic light scattering for particle size determination-

UNIT-IV

Studies of Nano-structured Materials: Synthesis, properties and applications of the following nanomaterials, fullerenes, carbon nanotubes, core-shell nanoparticles, nanoshells, self- assembled monolayers, and monolayer protected metal nanoparticles, nanocrystalline materials, magnetic nanoparticles and important properties in relation to nanomagnetic materials, thermoelectric materials, non-linear optical materials and liquid crystals.

UNIT-V

Engineering Applications of Nanomaterials : Applications of Nano Particle, nano rods of nano wires, Fullerenes, carbon nano tubes, Graphines nanoparticles and other applications of nonmaterials and uses.

TEXT BOOKS:

1. **NANO: The Essentials:** T Pradeep, MaGraw-Hill, 2007.
2. **Textbook of Nanoscience and nanotechnology:** B S Murty, P Shankar, Baldev Rai, BB Rath and James Murday, Univ. Press, 2012.

REFERENCE BOOKS:

1. Concepts of Nanochemistry; Ludovico Cademrtiri and Geoffrey A. Ozin & Geoffrey A. Ozin, Wiley-VCH, 2011.
2. **Nanostructures & Nanomaterials; Synthesis, Properties & Applications:** Guozhong Cao, Imperial College Press, 2007.
3. **Nanomaterials Chemistry**, C. N. R. Rao, Achim Muller, K.Cheetham, Wiley-VCH, 2007.