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

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering

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

<div align="center">UNIT –IV</div>

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

<div align="center">UNIT –V</div>

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**

B.Tech. I – I Sem. (C.S.E)

L	P	C
4	0	4

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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Department of Computer Science & Engineering

I B.Tech.-I Sem .

L	P	C
4	0	4

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		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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I B.Tech.-I Sem .

	L	P	C
	4	0	4

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.

I B.Tech.-I Sem .

L	P	C
4	0	4

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.

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering

I B.Tech.-I Sem .

	L	P	C
	0	4	2

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

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering

I B.Tech.-I Sem .

L	P	C
0	4	2

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

Department of Computer Science & Engineering

	L	P	C
I B.Tech.-I Sem .	0	4	2

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.

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering

I B.Tech.-II SEM

L	P	C
4	0	4

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.

I B.Tech.-II SEM

	L	P	C
	4	0	4

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.

I B.Tech.-II SEM
         L   P   C
         4   0   4

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.

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering

B.Tech. I – II Sem. (C.S.E)

L	P	C
4	0	4

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.

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering

I B.Tech.-II SEM

	L	P	C
	4	0	4

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

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering

I B.Tech.-II SEM

L	P	C
4	0	4

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.

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering

I B.Tech.-II SEM

	L	P	C
	0	4	2

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.

Department of Computer Science & Engineering

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.

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering

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.

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering

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	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
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 $\overline{X}$

- 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.

JNTUA College Of Engineering (Autonomous):: Ananthapuramu
Department of Computer Science & Engineering

B.Tech. II – I Sem. (C.S.E)

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- MultiDimensional 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.

JNTUA College Of Engineering (Autonomous):: Ananthapuramu
Department of Computer Science & Engineering

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
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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

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering

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

B.Tech. II – I Sem. (C.S.E)

L	P	C
0	4	2

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 and Deletion.

Week 10

1. Write a C++ Program to Implement Binary Search Tree Traverses using recursive and non 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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Department of Computer Science & Engineering

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 Machine 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

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering

B.Tech. II – II Sem. (C.S.E)

L	P	C
4	0	4

15A05401: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	
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

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering

B.Tech. II – II Sem. (C.S.E)

L	P	C
4	0	4

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

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering

B.Tech. II – II Sem. (C.S.E)

L	P	C
4	0	4

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 and meaning 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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Department of Computer Science & Engineering

B.Tech. II – II Sem. (C.S.E)

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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.

B.Tech. II – II Sem. (C.S.E)

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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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B.Tech. II – II Sem. (C.S.E)

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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.

B.Tech. II – II Sem. (C.S.E)   L   P   C

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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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Department of Computer Science & Engineering

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	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	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 equation $ax^2 + bx + c = 0$. 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 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.
   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
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 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 subtraction using JOptionPane 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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Department of Computer Science & Engineering

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.

B.Tech. III – I Sem. (C.S.E)

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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

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering

B.Tech. III – I Sem. (C.S.E)	L	P	C
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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.

JNTUA College Of Engineering (Autonomous):: Ananthapuramu
Department of Computer Science & Engineering

B.Tech. III – I Sem. (C.S.E)

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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.

JNTUA College Of Engineering (Autonomous):: Ananthapuramu
Department of Computer Science & Engineering

B.Tech. III – I Sem. (C.S.E)   **L   P   C**
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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

B.Tech. III – I Sem. (C.S.E)

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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.

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering

B.Tech. III – I Sem. (C.S.E)

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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:

- <u>Andrew Moore's Data Mining Tutorials</u> (See tutorials on Decision Trees and Cross Validation)

- <u>Decision Trees</u> (Source: Tan, MSU)
- <u>Tom Mitchell's book slides</u> (See slides on Concept Learning and Decision Trees)
- Weka resources:
    - <u>Introduction to Weka</u> (html version) (download <u>ppt</u> version)
    - <u>Download Weka</u>
    - <u>Weka Tutorial</u>
    - <u>ARFF format</u>
    - <u>Using Weka from command line</u>

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.

B.Tech. III – I Sem. (C.S.E)	**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 and without 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 addressing modes). ‖.

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.

B.Tech. III – II Sem. (C.S.E)

	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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B.Tech. III – II Sem. (C.S.E)

L	P	C
4	0	4

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.

B.Tech. III – II Sem. (C.S.E)

L	P	C
4	0	4

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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| B.Tech. III – II Sem. (C.S.E) | 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.

B.Tech. III – II Sem. (C.S.E)	**L**	**P**	**C**
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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

B.Tech. III – II Sem. (C.S.E)	**L**	**P**	**C**
	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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B.Tech. III – II Sem. (C.S.E)   **L   P   C**
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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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Department of Computer Science & Engineering

B.Tech. III – II Sem. (C.S.E)   L   P   C
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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.

B.Tech III- II Sem.

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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.

B.Tech III- II Sem.

L	P	C
4	0	4

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.

B.Tech III- II Sem.	L	P	C
	0	4	0

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.

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.

JNTUA College Of Engineering (Autonomous):: Ananthapuramu
Department of Computer Science & Engineering

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	Login : [_____]
ECE	Passwor[_____]
EEE	
CIVIL	[Submit] [Reset]

3) CATOLOGUE PAGE:
The catalogue page should contain the details of all the books available in the web site in a table.
The details should contain the following:

1. Snap shot of Cover 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	
		Book : AI Author : S.Russel Publication : Princeton hall	$ 63	
		Book : Java 2 Author : Watson Publication : BPB	$ 35.5	

	publications		
	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.

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

CSE ECE EEE CIVIL	**Book name** Java 2 XML bible	**Price** $35.5 $40.5	**Quantity** 2 1	**Amount** $70 $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.

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.

B.Tech. IV – I Sem. (C.S.E)   **L   P   C**
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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.

	L	P	C
B.Tech. IV – I Sem. (C.S.E)	**4**	**0**	**4**

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

B.Tech. IV – I Sem. (C.S.E)	L	P	C
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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

JNTUA College Of Engineering (Autonomous):: Ananthapuramu
Department of Computer Science & Engineering

B.Tech. IV – I Sem. (C.S.E)

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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.

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering
B.Tech. IV – I Sem. (C.S.E)   L   P   C
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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	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	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

B.Tech. IV– I Sem. (C.S.E)	L	P	C
	4	0	4

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/

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering

B.Tech. IV – I Sem. (C.S.E)

L	P	C
0	4	2

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/

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering

B.Tech. IV – I Sem. (C.S.E)
L	P	C
0	4	2

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

B.Tech. IV – II Sem. (C.S.E)   **L   P   C**
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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

Department of Computer Science & Engineering

B.Tech. IV – II Sem. (C.S.E)	L	P	C
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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

JNTUA College Of Engineering (Autonomous):: Ananthapuram
Department of Computer Science & Engineering

B.Tech. IV – II Sem. (C.S.E)

L	P	C
4	0	4

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.

JNTUA College Of Engineering (Autonomous):: Ananthapuramu
Department of Computer Science & Engineering

B.Tech. IV – II Sem. (C.S.E)

L	P	C
4	0	4

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.

JNTUA College Of Engineering (Autonomous):: Ananthapuramu

Department of Computer Science & Engineering

B.Tech. IV – II Sem. (C.S.E)

L	P	C
4	0	4

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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B.Tech. IV – II Sem. (C.S.E)

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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.

B.Tech. IV – II Sem. (C.S.E)

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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

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

B.Tech. IV – II Sem. (C.S.E)	L	P	C
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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)

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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.,

B.Tech. IV – II Sem. (C.S.E)	**L**	**P**	**C**
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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.

B.Tech. IV – II Sem. (C.S.E)

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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