VELS

INSTITUTE OF SCIENCE, TECHNOLOGY & ADVANCED STUDIES (VISTAS)

(DEEMED TO BE UNIVERSITY Estd. u/s 3 OF THE UGC ACT, 1956)

NAAC ACCREDITED

PALLAVARAM - CHENNAI - INDIA

School of Engineering

B. Tech IT Cloud & Mobile based Application Development

(in association with IBM)

Programme Outcome of B.E / B.Tech Programme:

PO 1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2. Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant

to the professional engineering practice.

PO 7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes of B. Tech IT Cloud & Mobile based Application Development

To enable the student to emerge as:

PSO 1. An expert in Software design, Coding, Testing and Documentation.

PSO 2. Efficient programmer using high level languages such as C, C++, JAVA, .NET, PERL, PYTHON, etc.

PSO 3. Expert in mobile application development and Cloud Technology.

PSO 4. Specialist in the functions of various modules of different types of operating systems

PSO 5. System/Network Administrator with deep knowledge in Network design & analysis, Network security and Software defined networks

PSO 6. Specialist in Enterprise Application Development using IBM Rational tools and IBM worklight.

PSO 7. Data Scientist with deep knowledge in Data structure, Database and Data mining, Big Data analytics and Data Visualization.

PSO 8. Specialist in Virtualization techniques and Internet of Things.

Members in Board of Studies (BOS)

EXTERNAL MEMBERS		
SL.NO.	**Name & Designation**	**Name of the Organization& Address**
1	Dr.N.Bhalaji, Associate Professor, IT	Department of Information Technology SSN College of Engineering, Chennai.
2	Mr. Madhusudhana Rao R D, Regional Manager – Career Education	Software Group – India / South Asia IBM India Pvt Ltd.
3	Mr.Vinoth, Software Engineer	Iopex Technologies, Chennai.
INTERNAL MEMBERS		
1	Dr. P.Swaminathan Dean - Engineering	School of Engineering Vels University, Chennai.
2	Mrs.K.Kalaivani, HOD / CSE	Department of Computer Science and Engineering, Vels University, Chennai.
3	Dr.S.Arun, Associate Professor, CSE	Department of Computer Science and Engineering, Vels University, Chennai.
4	Dr.R.Anandan, Assistant Professor, CSE	Department of Computer Science and Engineering, Vels University, Chennai.
5	Mr.C.Swaraj Paul, Assistant Professor, CSE	Department of Computer Science and Engineering, Vels University, Chennai.

B. Tech - IT (CLOUD & MOBILE BASED APPLICATION DEVELOPMENT) CURRICULUM

Total Number of Credits : 195

Category	Code	Course	Hour / Week			
			Lecture	Tutorial	Practical	Credits
SEMESTER 1						
AECC	15GBE201	Technical English	3	0	0	3
Core	15GBE001	Mathematics I	3	1	0	3
Core	15GBE002	Engineering Physics	3	1	0	3
Core	15ECS011	Software Foundation and Programming 1	3	1	0	3
Core	15GBE004	Engineering Graphics	2	0	3	4
Core	15GBE005	Engineering Practices Laboratory	0	0	3	2
Core	15GBE006	Engineering Physics Laboratory	0	0	3	2
Core	15ECS012	Computer Practices Laboratory	0	0	3	2
			14	**3**	**12**	**22**
SEMESTER 2						
AECC	15GBE202	Communication Skills	3	0	0	3
Core	15GBE008	Mathematics II	3	1	0	3
Core	15GBE009	Engineering Chemistry	3	1	0	3
Core	15ECS021	Software Foundation and Programming 2	3	0	0	3
Core	15ECS022	Electric Circuits and Electronic Devices	3	0	0	3
Core	15GBE011	Engineering Chemistry Laboratory	0	0	3	2
AECC	15GBE203	Language Laboratory	0	0	3	2
Core	15ECS023	Object Oriented Programming Laboratory	0	0	3	2
			15	**2**	**9**	**21**

B. Tech - IT (CLOUD & MOBILE BASED APPLICATIONS) CURRICULUM

Category	Code	Course	Hour / Week			Credits
			Lecture	Tutorial	Practical	
SEMESTER 3						
AECC	15GBE204	Environmental Science and Engineering	3	0	0	3
Core	15GBE012	Mathematics III	3	1	0	3
Core	15ECS031	Data Structures	3	1	0	3
DSE	15_____	Discipline Specific Elective I	3	0	0	3
DSE	15_____	Discipline Specific Elective II	3	0	0	3
GE	15_____	Generic Elective I	3	0	0	3
SEC	15_____	Skill Enhancement Elective I	2	0	0	2
Core	15ECS032	Data Structures Laboratory	0	0	3	2
Core	15ECS033	Microprocessor and Microcontrollers Laboratory	0	0	3	2
			20	**2**	**6**	**24**
SEMESTER 4						
Core	15GBE013	Probability and Queuing Theory	3	1	0	3
Core	15ECS041	Database Management Systems	3	1	0	3
Core	15ECS042	Operating Systems	3	0	0	3
DSE	15_____	Discipline Specific Elective III	3	0	0	3
DSE	15_____	Discipline Specific Elective IV	3	0	0	3
GE	15_____	Generic Elective II	3	0	0	3
SEC	15_____	Skill Enhancement Elective II	2	0	0	2
Core	15ECS043	Database Management Laboratory	0	0	3	2
Core	15ECS044	Operating Systems Laboratory	0	0	3	2
Core	15ECS045	Basic Life Skills	1	0	1	2
Core	15ECS046	Information Management Basics using IBM DB2	1	0	0	1
			22	**2**	**7**	**27**

B. Tech - IT (CLOUD & MOBILE BASED APPLICATION DEVELOPMENT) CURRICULUM

Category	Code	Course	Hour / Week			
			Lecture	Tutorial	Practical	Credits
SEMESTER 5						
Core	15GBE017	Discrete Mathematics	3	1	0	3
Core	15ECS051	Computer Networks	3	1	0	3
Core	15ECS052	Software Engineering	3	0	0	3
DSE	15_____	Discipline Specific Elective V	3	0	0	3
DSE	15_____	Discipline Specific Elective VI	3	0	0	3
GE	15_____	Generic Elective III	3	0	0	3
SEC	15_____	Skill Enhancement Elective III	2	0	0	2
Core	15ECS053	Computer Networks Laboratory	0	0	3	2
Core	15ECS054	Java Programming Laboratory	0	0	3	2
Core	15ECS055	Introduction to R Software	2	0	0	2
Core	15ECS056	Requirement Management For Enterprise Application Development	1	0	0	1
			23	**2**	**6**	**27**
SEMESTER 6						
Core	15ECS061	Internet Programming	3	0	0	3
Core	15ECS062	Object Oriented Analysis and Design	3	0	0	3
Core	15ECS063	Information Retrieval	3	1	0	3
DSE	15_____	Discipline Specific Elective VII	3	0	0	3
DSE	15_____	Discipline Specific Elective VIII	3	0	0	3
GE	15_____	Generic Elective IV	3	0	0	3
SEC	15_____	Skill Enhancement Elective IV	2	0	0	2
Core	15ECS064	Object Oriented Analysis and Design Laboratory	0	0	3	2
Core	15ECS065	Internet Programming Laboratory	0	0	3	2
Core	15ECS066	Inplant Training	0	0	0	2

			20	**1**	**6**	**26**

B. Tech - IT (CLOUD & MOBILE BASED APPLICATION DEVELOPMENT) CURRICULUM

Category	Code	Course	Hour / Week Lecture	Tutorial	Practical	Credits
SEMESTER 7						
Core	15ECS071	Computer Graphics	3	0	0	3
Core	15ECS072	Software Testing	3	0	0	3
Core	15ECS073	.Net Environment	3	0	0	3
DSE	15_____	Discipline Specific Elective IX	3	0	0	3
DSE	15_____	Discipline Specific Elective X	3	0	0	3
GE	15_____	Generic Elective V	3	0	0	3
SEC	15_____	Skill Enhancement Elective V	2	0	0	2
Core	15ECS074	Computer Graphics Laboratory	0	0	3	2
Core	15ECS075	Open Source & .NET Laboratory	0	0	3	2
Core	15ECS076	Mini Project & Seminar	0	0	3	2
			20	**0**	**9**	**26**

SEMESTER 8						
DSE	15_____	Discipline Specific Elective XI	3	0	0	3
DSE	15_____	Discipline Specific Elective XII	3	0	0	3
GE	15_____	Generic Elective VI	3	0	0	3
Core	15ECS081	Project Work	0	0	20	12
Core	15ECS082	Industry Session On Advanced Features of Cloud & Mobile Based Applications	1	0	0	1
			10	**0**	**20**	**22**

List of Discipline Specific Elective Courses

15ECS101	Social Network Analysis
15ECS102	Design and Analysis of Algorithms
15ECS103	Microprocessors and Microcontrollers
15ECS104	Multi-core Programming
15ECS105	System Software
15ECS106	Computer Organization and Architecture
15ECS107	Artificial Intelligence
15ECS108	Programming Paradigms
15ECS109	Cryptography and Network Security
15ECS110	Theory of Computation
15ECS111	Soft Computing
15ECS112	Advanced Operating Systems
15ECS113	UNIX Internals
15ECS114	User Interface Design
15ECS115	Distributed Systems
15ECS116	Grid Computing
15ECS117	Cloud Computing
15ECS118	Mobile & Pervasive Computing
15ECS119	Data Warehousing and Data Mining
15ECS120	Digital Image Processing
15ECS121	Java to Business Application
15ECS122	TCP/IP Design and Implementation
15ECS123	Software Project Management
15ECS124	Software Quality Assurance
15ECS125	Information Security
15ECS126	E- Commerce
15ECS127	Essentials of Object Oriented Programming using Java
15ECS128	Foundation Course in Enterprise Application Development using IBM Rational Tools
15ECS129	Foundation course in Cloud Computing
15ECS130	Enterprise Mobile Application Development using IBM Worklight
15ECS131	Development of IoT Based Applications
15ECS132	Fundamentals of Enterprise Apps Development for Cloud Deployment
15ECS133	Cyber Forensics

List of Generic Elective Courses

15___151	Analog and Digital Communication
15___152	Control Systems
15___153	Digital Signal Processing
15___154	High Speed Networks
15___155	Robotics
15___156	Embedded Systems
15___157	Principles of Management & Professional Ethics
15___158	Fundamentals of Nano science
15___159	Intellectual Property Rights
15___160	Indian Constitution and Society
15___161	Engineering Economics
15___162	Operation Research
15___163	Total Quality Management
15___164	Digital Principles and System Design

List of Skill Enhancement Elective Courses

15GPD251	Personality Development I
15GPD252	Personality Development II
15GPD253	Personality Development III
15GPD254	Personality Development IV
15NSS255	NSS - I
15NSS256	NSS - II
15NSS257	NSS - III
15NSS258	NSS - IV
15NSS259	NSS - V
15NSS260	NSS – VI

Syllabus

Core Courses

15GBE201 TECHNICAL ENGLISH 3 0 0 3

Course Objective:

- To develop listening skills for academic and professional purposes.
- To acquire the ability to speak effectively in English in real life situations.
- To inculcate reading habit and to develop effective reading skills.
- To improve their active and passive vocabulary.
- To write letters and reports effectively in formal and business situations.

UNIT I INTRODUCTION TO BASIC GRAMMAR AND VOCABULARY 9

General Vocabulary – Changing words from one form to another, Nouns- Compound nouns,Pronouns - Relative pronouns, Demonstrative pronouns, Adjectives - Comparative adjectives, Verbs- Modal verbs, Linking verbs, Adverbs, Word Links – Connectives, Sequence words, Introducing oneself, Interactive grammar exercises.

UNIT II BASIC SKILL – LISTENING AND INTERPRETATION 9

Listening Skills - Note Making and Note-Taking, Transformation of Sentences – Positive, Comparative, Superlative, Affirmative, Negative, Interrogative and Assertive, Formation of Questions. Information Transfer - Chart – Flow chart, Bar chart, Pie chart. Pair works, SAM sessions.

UNIT III BASIC SKILL-WRITING SKILL AND STRUCTURES 9

Creative thinking and speaking, Tenses – Present Tense – simple present, present continuous, present perfect, present perfect continuous, Past Tense - simple past, past continuous, past perfect, past perfect continuous, Future Tense -simple future, future continuous, future perfect, future perfect continuous, Autobiographical writing, JAM session.

UNIT IV BASIC SKILL: READING SKILL AND WRITING SKILL 9

Reading Skills- Skimming and Scanning, Comprehension Passage Paragraph Writing – Descriptive paragraph, Argumentative paragraph, Persuasive paragraph, Demonstrative paragraph, Compare and contrast, Conversations.

UNIT V BASIC SKILL: SPEAKING SKILL AND VOCABULARY 9

Vocabulary, Prefixes and Suffixes, Cause and Effect relationship, Clauses and Phrases, Super-ordinates and Hyponyms, Expressing Causal Relation, Article, Prepositions, Preposition phrases, Speaking about the future plans, Reading comprehensions, Situational dialogues.

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Improve the language proficiency of a technical under-graduate in English with emphasis on LSRW skills.

CO 2. Develop listening skills for academic and professional purposes.

CO 3. Acquire the ability to speak effectively in English in real life situations.

CO 4. Provide learning environment to practice listening, speaking, reading and writing skills.

CO 5. Assist the students to carry on the tasks and activities through guided instructions and materials.

CO 6. Inculcate reading habit and to develop effective reading skills.

CO 7. Improve their active and passive vocabulary.

CO 8. Effectively integrate English language learning with employability skills and training.

CO 9. Provide hands-on experience through case-studies, mini-projects, group and individual presentations.

CO 10. Write letters and reports effectively in formal and business situations.

CO 11. Expose the students to a variety of self-instructional modes of language learning.

CO 12. Develop learner autonomy.

TEXT BOOKS:

1. Department of English, Anna University, Mindscapes, 'English for Technologists and Engineers', Orient Longman Pvt. Ltd, Chennai: 2012.
2. Department of Humanities and Social Sciences, Anna University, 'English for Engineers and Technologists' Combined Edition (Volumes 1 and 2), Chennai: Orient Longman Pvt. Ltd., 2006.

REFERENCE BOOKS:

1. N. Lakshmana Peruma, lTechnical English-I , Second Edition, Hitech Publishing company PVT. Ltd,2009.
2. Sumant. S, 'Technical English', Second Edition, McGraw-Hill Education (India) Pvt.Ltd., 2008.
3. T.M. Farhathullah, "Communication Skills for Technical Students", Orient Blackswan Private Limited., 2008

15GBE001 MATHEMATICS I 3 1 0 3

Course Objective: To develop the skills in the areas of Matrices, Three dimensional Analytical Geometry, Differential calculus, Functions of several Variables and Multiple Integrals. To serve as a pre-requisite mathematics course for post graduate courses, specialized studies and research.

UNIT I MATRICES 12

Characteristic equation – Eigenvalues and eigenvectors of a real matrix – Properties – Cayley-Hamilton theorem (excluding proof) – Orthogonal transformation of a symmetric matrix to diagonal form – Quadratic form – Reduction of quadratic form to canonical form by orthogonal transformation.

UNIT II THREE DIMENSIONAL ANALYTICAL GEOMETRY 12

Equation of a sphere – Plane section of a sphere – Tangent Plane – Equation of a cone – Right circular cone – Equation of a cylinder – Right circular cylinder.

UNIT III DIFFERENTIAL CALCULUS 12

Curvature in Cartesian co-ordinates – Centre and radius of curvature – Circle of curvature – Evolutes – Envelopes – Evolute as envelope of normals.

UNIT IV FUNCTIONS OF SEVERAL VARIABLES 12

Partial derivatives – Euler's theorem for homogenous functions – Total derivatives – Differentiation of implicit functions – Jacobians – Taylor's expansion – Maxima and Minima – Method of Lagrange's multipliers.

UNIT V MULTIPLE INTEGRALS 12

Double integration – Cartesian and polar coordinates – Change of order of integration – Change of variables between Cartesian and polar coordinates – Triple integrals – Area as double integral

TOTAL: 60h

Course Outcome:

After successful completion of the Mathematics – I course, the student will be able to

CO 1. Able to solve the 1st order differential equations in different fields.

CO 2. Identify and solve a 2nd and higher order differential equations and perform simple applications in Engineering.

CO 3. Calculate grad, divergence, curl; a line, surface and volume integral.

CO 4. To find work done, area, and volume.

CO 5. Apply the vector integral theorems to evaluate multiple integrals. Find the maxima and minima of two variable functions under different constraints.

CO 6. Solve the single and multiple integrals and calculate the moment of inertia.

CO 7. Develop the skills in the areas of Matrices to calculate the three dimensional analytical geometry.

CO 8. Know about the Functions of several Variables and Multiple Integrals.

CO 9. Serve as a pre-requisite mathematics course for post graduate courses.

CO 10. Specialized for studies and research.

CO 11. Orthogonal transformation of a symmetric matrix to diagonal form.

TEXT BOOKS:

1. Grewal. B.S, “Higher Engineering Mathematics”, Khanna Publications ,Delhi, 43rd Edition, 2013.
2. Ramana B.V, “Higher Engineering Mathematics”, Tata McGraw Hill Publishing Company, New Delhi,6th reprint, 2008.

REFERENCE BOOKS:

1. Glyn James, “Advanced Modern Engineering Mathematics”,Pearson Education ,3rd Edition, 2012.
2. Jain R.K and Iyengar S.R.K, “Advanced Engineering Mathematics”, Narosa Publishing House,4th Edition,2014

15GBE002 ENGINEERING PHYSICS 3 1 0 3

Course Objective: To learn the basics of Ultrasonics, Lasers, Fibre optics and applications, Quantum physics and crystal physics etc., and to apply these fundamental principles to solve practical problems related to materials used for engineering applications.

UNIT I ULTRASONICS 12

Introduction – Production – magnetostriction effect – magnetostriction generator – piezoelectric effect – piezoelectric generator – Detection of ultrasonic waves– properties – Cavitations – Velocity measurement – acoustic grating – Industrial applications – drilling, welding, soldering and cleaning –Non Destructive Testing – pulse echo system through transmission and reflection modes – A, B and C scan displays- SONAR – Medical applications – Sonograms.

UNIT II LASERS 12

Introduction – Principle of Spontaneous emission and stimulated emission – Population inversion, pumping - Einstein's A and B coefficients – derivation – Types of lasers – He-Ne, CO_2 , Nd-YAG, Semiconductor lasers homojunction and heterojunction (Qualitative) - Industrial Applications – Lasers in welding, heat treatment, cutting – Medical applications – Holography (construction and reconstruction).

UNIT III FIBRE OPTICS AND APPLICATIONS 12

Principle and propagation of light in optical fibres – Numerical aperture and Acceptance angle – Types of optical fibres (material, refractive index, mode) – fibre manufacturing (Double crucible technique) – Splicing, Loss in optical fibre – attenuation, dispersion, bending – Fibre optical communication system (Block diagram) – Light sources – Detectors –PIN Photo diode- Fibre optic sensors – temperature and displacement – Endoscope.

UNIT IV QUANTUM PHYSICS 12

Black body radiation – Planck's radiation law (derivation) – Deduction of Wien's displacement law and Rayleigh – Jeans Law from Planck's theory – Compton effect – Theory and experimental verification – Matter waves – Schrödinger's wave equation – Time independent and time dependent equations – Physical significance of wave function – Particle in a one dimensional box – Electron microscope - Scanning electron microscope – Transmission electron microscope.

UNIT V CRYSTAL PHYSICS 12

Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – d spacing in cubic lattice – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC and HCP structures – NaCl, ZnS, diamond and graphite structures – Polymorphism and allotropy – Crystal defects – point, line and surface defects – Burger vector.

TOTAL: 60 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Apply the fundamental principles to solve practical problems related to materials used for engineering applications.

CO 2. Formulate general mechanics parameters and distinguish between central and non-central forces.

CO 3. Learn the basics of Ultrasonic.

CO 4. Understanding about the Fiber optics.

CO 5. Explain types of waves and interference of light

CO 6. Derive thermodynamic parameters and apply fundamental laws to solve thermodynamic problems

CO 7. Differentiate between the terms atomic number, atomic mass, isotopes etc and apply various rules such as rule, octet rules and Bohr's energy levels.

CO 8. Know about various applications of Lasers.

CO 9. Basic information in Quantum physics and crystal physics etc.,

CO 10. Categorize between various environmental pollutants, study harmful effects of pollutants, elaborate the concepts such as global warming, BOD, COD, ozone depletion and acid rain.

TEXT BOOKS:

1. Gaur, R. K. and Gupta, S.C., 'Engineering Physics' Dhanpat Rai Publications, New Delhi 2013.
2. Avadhanulu, M.N. and Kshirsagar, P.G., 'A Text book of Engineering Physics', S.Chand and Company, Ltd., New Delhi, 2013.

REFERENCE BOOKS:

1. Frank J.Faly, "Foundations of Engineering Acoustics", Elsevier Academic press, 2005.
2. Williams T.Silfrast, "Laser Fundamentals", Cambridge University press, 2004.
3. John Gowar, "Optical communication systems", Prentice Hall publications, 1993.
4. Murugesan R and Sivaprasath K, Modern Physics, S. Chand Ltd., 2008.

15ECS011 SOFTWARE FOUNDATION AND PROGRAMMING 1 3 1 0 3

Course Objective:

- This course provides conceptual and foundational knowledge of the Fundamentals of technologies in the context of software and programming.
- The contents of this course will ensure a student's interest in the subject is well founded and sows a seed for a conceptual understanding of History of Computing, including programming and the Open Source concepts.
- The course includes enough hands on exercises for the students to be glued on to it.

UNIT I INTRODUCTION TO OPEN SOURCE PARADIGM 12

Brief History of Computing - Art and Science of Programming - Open Standards, Open Source, and IBM - What is an Open Standard - Open Standards Model - Industries needing standards - The Impact of Standards - Open Source Software - Open Source - Open Source Technology - The OPEN Proposition

UNIT II INTRODUCTION TO LINUX 12

What is Linux - Background of Linux - Why is Linux so popular - What can you do with Linux - Linux Distributions - Linux Technology Center - Future of Linux.

UNIT III INTRODUCTION TO EMERGING AREAS OF TECHNOLOGY 12

Cloud Computing – Pros and Cons of Cloud computing – Case study - Business Analytics – Need for Analytics - Mobile Apps Development – Social Business - Information Security.

UNIT IV INDUSTRY USAGE OF COMPUTER PROGRAMMING 12

Industry Session on C Programming - Background of C, Getting Started with C, Constructs, Loops & Arrays, Functions, Pointers, User Defined Types, Binary I/O With Structures..

UNIT V FILE HANDLING 12

File Handling in C – Stream File – Text File functions – Binary File functions – File System functions – Command Line Parameters – File Handling Programs.

TOTAL : 60h

Course Outcome:

At the end of this course, the student will be able to

CO 1. Understand the need of Open Source Standards and its impact in industries
CO 2. Work in Linux platform
CO 3. Describe the advantages and limitations of Linux.
CO 4. Analyze the pros and cons of Cloud Computing.
CO 5. Find the need for analytics and information security
CO 6. Understand the emerging areas of technology like cloud, data analytics and mobile app development
CO 7. Write programming code for various applications using C language

CO 8. Identify the industry usage of Computer Programming

CO 9. Implement various file operations in C

TEXT BOOK:

1. IBM Career Education IBM CE – Software Foundation and Programming 1, IBM Student Course Material,

15GBE004 ENGINEERING GRAPHICS 2 0 3 4

Course Objective:

- To develop the graphic skills for communication of concepts, ideas and design of Engineering products.
- To expose them to existing national standards related to technical drawings.

UNIT I PLANE CURVES AND FREE HAND SKETCHING 12

Curves used in engineering practices: Conics – Construction of ellipse, Parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of squad and circle – Drawing of tangents and normal to the above curves. Free hand sketching: Representation of Three Dimensional objects – General principles of orthographic projection – Need for importance of multiple views and their placement – First angle projection – layout views – Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES 12

Projection of points and straight lines located in the first quadrant – Determination of true lengths and true inclinations – Projection of polygonal surface and circular lamina inclined to both reference planes.

UNIT III PROJECTION OF SOLIDS 12

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.

UNIT IV SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES 12

Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other – Obtaining true shape of section. Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinders and cones – Development of lateral surfaces of solids with cylindrical cutouts, perpendicular to the axis.

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS 12

Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones. Perspective projection of prisms, pyramids and cylinders by visual ray method.

Special points applicable to University Examinations on Engineering Graphics:

1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.

Whenever the total number of candidates in a college exceeds 150, the University Examination in that college will be conducted in two sessions (FN and AN on the same day) for 50 percent of student (approx) at a time.

Total: 60h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the theory of projection.

CO 2. Able to know and understand the conventions and the methods of engineering drawing.

CO 3. Improve their visualization skills so that they can apply these skills in developing new products.

CO 4. Able to prepare simple layout of factory buildings.

CO 5. Impart and inculcate proper understanding of the theory of projection.

CO 6. Improve the visualization skills.

CO 7. Enable the students with various concepts like dimensioning, conventions and standards related to working drawings in order to become professionally efficient.

CO 8. Impart the knowledge on understanding and drawing of simple residential/office buildings.

CO 9. Ability to produce engineered drawings will improve.

CO 10. Ability to convert sketches into engineered drawings will increase.

TEXT BOOK:

1. N.D. Bhatt, “Engineering Drawing” Charotar Publishing House, 46th Edition, (2003).

REFERENCES:

1. K. V. Natrajan, “A text book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai (2006).
2. M.S. Kumar, “Engineering Graphics”, D.D. Publications, (2007).
3. K. Venugopal & V. Prabhu Raja, “Engineering Graphics”, New Age International (P) Limited (2008).
4. M.B. Shah and B.C. Rana, “Engineering Drawing”, Pearson Education (2005).
5. K. R. Gopalakrishnana, “Engineering Drawing” (Vol.I&II), Subhas Publications (1998).
6. Dhananjay A.Jolhe, “Engineering Drawing with an introduction to AutoCAD” Tata McGraw Hill Publishing Company Limited (2008).

   Basant Agarwal and Agarwal C.M., “Engineering Drawing”, Tata McGraw Hill Publishing Company Limited, New Delhi, (2008).

15GBE005 ENGINEERING PRACTICES LAB 0 0 3 2

GROUP A – Mechanical And Civil Engineering Practices

MECHANICAL ENGINEERING PRACTICES

Course Objective:

- To study bench fitting drawings for making male and female fittings as per the given dimensions and tolerances.
- To study Arc welding drawings for making common weld joints as per the given dimensions.
- To study sheet metal development drawings for making common metal parts/components as per the given dimensions.

List of Experiments

1. To make square, hexagonal, V joint in bench fitting as per the given dimensions and Tolerances.
2. To make single V, butt, lap and T fillet joint by arc welding with the back hand and fore hand welding techniques as per the given dimensions.
3. To make simple Cubical blocks, Rectangular trays in sheet metal with the jigs as per the given dimensions.

CIVIL ENGINEERING PRACTICES

Course Objective :

1. To study wood working drawings for making common wooden joints as per the given dimensions.
2. To study pipe line drawings for making common water supply in the domestic, plant applications as per the given dimensions.

List of Experiments

1. To make simple T, cross lap, mortise- tenon joints by wooden blocks as per the given dimensions.
2. To make simple water line pipe connections in PVC pipes with single tap, double taps for same and different diameters with valves as per the given dimensions.

GROUP B – Electrical and Electronics Engineering Practices

ELECTRICAL ENGINEERING PRACTICES

Course Objective:

1. To read electrical drawings for making Residential and industrial wiring as per the given provisions.
2. To read electrical circuit drawings for measuring electrical quantities, energy for the given electrical circuit.

List Of Experiments:

1. To measure energy by using single phase energy meter.
2. To measure electrical quantities like voltage, current, power, power factor in RLC Circuit..
3. To make fluorescent lamp, stair case and residential wiring.

ELECTRONICS ENGINEERING PRACTICES

Course Objective:

1. To understand the colour coding of the Resistors.
2. To measure AC Signal parameters by the CRO.
3. To measure ripple factors of HWR, FWR.
4. To solder and de-solder the components in the PCB.

List of Experiments:

1. To measure Peak-peak, rms, period, frequency using CRO.
2. To solder components devices and circuits by using general purpose PCB.

SUGGESTED ACTIVITIES

1. To attempt application oriented mini projects with the skills obtained for all the practices.
2. To make picture charts for all the practices.

MANUALS

1. Engineering practices lab manual – S.Madhavan / S.Achudhan (United Global Publishers).
2. Engineering practices lab manual – V. Ramesh Babu (VRB Publishers).

Total: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Able to make various joints in the given object with the available work material.

CO 2. Able to know how much time a joint will take for the assessment of time.

CO 3. Familiar with different types of woods used and tools used in wood Working technology.

CO 4. Familiar with different types of tools used in sheet metal working.

CO 5. Developments of sheet metal jobs from GI sheets, knowledge of basic concepts of soldering.

CO 6. Familiar with different types of tools used in forging technology.

CO 7. Knowledge of different types of furnaces like coal fired, electrical furnaces etc.

CO 8. Familiar with different types of tools used in fitting technology.

CO 9. Provide exposure to the students with hands-on experience on various fields.

CO 10. Basic Engineering Practices in Civil, Mechanical, Electrical and Electronics Engineering.

15GBE006 ENGINEERING PHYSICS LABORATORY 0 0 3 2

Course Objective: To learn the basic properties of various materials, to learn about the dispersive power of prism using Spectrometer, to determine the viscosity of liquid and to determine the wavelength of various sources.

List of Experiments :

1. Determination of Young's modulus of the material – Non uniform bending.
2. Determination of Band Gap of a semiconductor material.
3. Determination of specific resistance of a given coil of wire – Carey Foster Bridge.
4. Determination of viscosity of liquid – Poiseuille's method.
5. Spectrometer – Dispersive power of a prism.
6. Determination of Young's modulus of the material – Uniform bending.
7. Torsional Pendulum – Determination of Rigidity modulus.
8. Ultrasonic Interferometer – Velocity of ultrasonic waves and compressibility of liquids.
9. Spectrometer – Grating – Wavelength of mercury spectrum.
10. Determination of wavelength of LASER and particle size using Grating.
11. Determine the wavelength of given source using the newton's ring experiment
12. Find the thickness of the given thin wire using air wedge method

Total: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Ability to Design and Conduct experiments as well as to Analyze and Interpret Data.

CO 2. Ability to Identify, Formulate, and Solve Engineering Problems.

CO 3. Ability to use Techniques and Skills associated with Modern Engineering Tools such as Lasers and Fiber Optics.

CO 4. Provide Pre Requisite Hands on Experience for Engineering Laboratories.

CO 5. Study and understand the basic physics concepts and study the young's modulus of the uniform and non uniform bending of the materials.

CO 6. Develop skills to impart practical knowledge in real time solution.

CO 7. Understand principle, concept, working and application of new technology and comparison of results with theoretical calculations.

CO 8. Design new instruments with practical knowledge.

CO 9. Gain knowledge of new concept in the solution of practical oriented problems and

CO 10. To understand more deep knowledge about the solution to theoretical problems.

CO 11. Understand measurement technology, usage of new instruments and real time applications in engineering studies.

REFERENCES:

1. Frank J.Faly, “Foundations of Engineering Accoustics”, Elsevier Academic press, 2005.
2. Williams T.Silfrast, “Laser Fundamentals”, Cambridge University press, 2004.
3. John Gowar, “Optical communication systems”, Prentice Hall publications, 1993.
4. Murugesan R and Sivaprasath K, Modern Physics, S. Chand Ltd., 2008.

15GBE007 COMPUTER PRACTICES LABORATORY 0 0 3 2

Course Objective: To create Lab Programs in Word, Spreadsheet, Powerpoint, C Programs and HTML.

List of Experiments:

A) WORD PROCESSING

1. Document creation, Text manipulation with Scientific notations.
2. Table creation, Table formatting and Conversion.
3. Mail merge and Letter preparation.
4. Drawing - flow Chart.

B) SPREAD SHEET

1. Chart - Line, XY, Bar and Pie.
2. Formula - formula editor.
3. Spread sheet - inclusion of object, Picture and graphics, protecting the document and sheet.
4. Sorting and Import / Export features.

C) POWERPOINT

1. Any presentation of minimum five slides.

D) SIMPLE C PROGRAMMING *

1. Data types, Expression Evaluation, Condition Statements.
2. Arrays.
3. Structures and Unions.
4. Functions and Pointers.
5. File Operations.

- For programming exercises Flow chart and pseudocode are essential

E) HTML PROGRAMMING*

1. Create a webpage to embed an image in that page using HTML tags
2. HTML program for Table creation.

Total: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Create and manipulate various operations in word document using MS-Office.

CO 2. Design and perform various operations in tables.

CO 3. Generate letters using Mail-Merge.

CO 4. Implement various editing and formatting operations in spread sheet.

CO 5. Create power point presentation slides.

CO 6. Develop programs using various control instructions and operator precedence in C Programming.

CO 7. Implement string manipulations, arrays and functions for various applications in C.

CO 8. Analyze the use of structures, unions and pointers in C.

CO 9. Handle various file operations in C.

CO 10. Design web pages using HTML Tags.

15GBE202 COMMUNICATION SKILLS 3 0 0 3

Course objective:

1. To develop listening skills for academic and professional purposes.
2. To acquire the ability to speak effectively in English in real life situations.
3. To inculcate reading habit and to develop effective reading skills.
4. To improve their active and passive vocabulary.
5. To write letters and reports effectively in formal and business situations.

UNIT I TECHNICAL VOCABULARY 9

Technical Vocabulary, Punctuation, Numerical Expressions, Expanding Acronyms and Abbreviations, Concord, 'If' clauses, Infinitives. Homonyms, Homographs and Homophones, Telephone conversations, Reading Comprehensions, Making of an advertisement.

UNIT II BASIC SKILL:READING AND SPEAKING SKILLS 9

Reading and interpretation, , Intensive reading,. Writing reviews on books and films, Descriptions, Process description, Summarizing, Instructions, Oral presentations. Debate.

UNIT III BASIC SKILL: TECHNICAL WRITING SKILL 9

Letters – formal, informal, Cover Letter and CV , Synonyms and Antonyms, Indefinite Adjectives, Non-verbal communication, Interactive sessions. Role Plays, Critical reading, Listening and Note taking.

UNIT IV BASIC SKILL: LISTENING AND SPEAKING SKILLS 9

Active and Passive Voice, Impersonal Passive, Essay Writing, Comprehension Passage, Editing, Correction of errors, Direct and Indirect, Conversations , Dialogue writing, Discourse Markers. Group activities.

UNIT V TECHNICAL WRITING AND COMMUNICATION 9

Reports – Types, structure, data collection, content, form, Definitions, extended definition, Recommendations, Memos, Checklists. Group Discussions, Listening and comprehending the conversations.

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Formulate and practice effective reading strategy to enhance technical communication.

CO 2. Get assess strengths in writing skills and set goals for future growth

CO 3. Practice and perceive the full repertoire of listening strategies by using authentic listening tasks.

CO 4. Create learning situations to develop speaking skills based on sound educational and communication theories.

CO 5. Discover an understanding of the process of oral communication and originate knowledgeable audience-centered speaking.

CO 6. Formulate a significant training ground for the development of student's abilities in public speaking.

CO 7. Create multiple opportunities for students to practice and share their reading skill development

CO 8. Improve critical thinking and analytical skills

CO 9. Develop a milestone for leadership and group participation through communication skills

CO 10. Speak in group discussion without any fear.

TEXT BOOKS:

1. Department of English, Anna University, Mindscapes, 'English for Technologists and Engineers', Orient Longman Pvt. Ltd, Chennai: 2012.
2. Department of Humanities and Social Sciences, Anna University, ''English for Engineers and Technologists'' Combined Edition (Volumes 1 and 2), Chennai: Orient Longman Pvt. Ltd., 2006.
3. M.Ashraf Rizvi, "Effective Technical Communication",Tata mcGraw-Hill Publishing Company Limited, New Delhi.2009.

REFERENCE BOOKS:

1. Sumant. S, 'Technical English', Second Edition, McGraw-Hill Education (India) Pvt. Ltd., 2008.
2. Dr. M. Hariprasad," Communicative English "Third Edition, Neelkamal Publications, PVT. LTD.,2007.
3. Sangeeta Sharma , Binod Mishra, 'Communication Skills for Engineers and Scientists, PHI Learning Private Limited., New Delhi, 2009.

15GBE008 MATHEMATICS II 3 1 0 3

Course Objective:

- To acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
- To learn the concepts of vector calculus needed for problems in all engineering disciplines.
- To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow the of electric current.
- To understand the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

UNIT I ORDINARY DIFFERENTIAL EQUATIONS 12

Higher order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy's and Legendre's linear equations – Simultaneous first order linear equations with constant coefficients.

UNIT II VECTOR CALCULUS 12

Gradient Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration – Green's theorem in a plane, Gauss divergence theorem and stoke's theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelopipeds.

UNIT III ANALYTIC FUNCTIONS 12

Functions of a complex variable – Analytic functions – Necessary conditions, Cauchy – Riemann equation and Sufficient conditions (excluding proofs) – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping : w= z+c, cz, 1/z, and bilinear transformation.

UNIT IV COMPLEX INTEGRATION 12

Complex integration – Statement and applications of Cauchy's integral theorem and Cauchy's integral formula – Taylor and Laurent expansions – Singular points – Residues – Residue theorem – Application of residue theorem to evaluate real integrals – Unit circle and semi-circular contour(excluding poles on boundaries).

UNIT V LAPLACE TRANSFORM 12

Laplace transform – Conditions for existence – Transform of elementary functions – Basic properties – Transform of derivatives and integrals – Transform of unit step function and impulse functions – Transform of periodic functions. Definition of Inverse Laplace transform as contour integral – Convolution theorem (excluding proof) – Initial and Final value theorems – Solution of linear ODE of second order with constant coefficients using Laplace transformation techniques.

TOTAL : 60h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Evaluate double integral and triple integral to compute area, volume for two dimensional and three dimensional solid structure.

CO 2. Know the gradient, divergence and curl, related theorems useful for engineering applications.

CO 3. Test the analyticity and to construct the analytic function and transform complex functions from one plane to another plane graphically.

CO 4. Evaluate real and complex integrals over suitable closed paths or contours.

CO 5. Know the Applications of Laplace transform and its properties & to solve certain linear differential equations using Laplace transform technique

CO 6. Understand double and triple integrations and enable them to find area and volume using multiple integrals.

CO 7. Know the basics of vector calculus comprising gradient, divergence and curl and line, surface and volume integrals.

CO 8. Understand analytic functions of complex variables and conformal mappings.

CO 9. Know the basics of residues, complex integration and contour integration.

CO 10. Understand Laplace transform and use it to represent system dynamic models and evaluate their time responses.

TEXT BOOKS:

1. Grewal. B.S, “Higher Engineering Mathematics”, Khanna Publications ,Delhi,43rd Edition, 2013.
2. Ramana B.V, “Higher Engineering Mathematics”, Tata McGraw Hill Publishing Company, New Delhi,6th reprint, 2008.

REFERENCE BOOKS:

1. Erwin Kreyszig, “Advanced Engineering Mathematics”, Wiley India, 9th Edition, 2011.
2. Glyn James, “Advanced Modern Engineering Mathematics”,Pearson Education ,3rd Edition, 2012.
3. Jain R.K and Iyengar S.R.K, “Advanced Engineering Mathematics”, Narosa Publishing House,4th Edition,2014

15GBE009 ENGINEERING CHEMISTRY 3 1 0 3

Course Objective: To learn the basics of chemistrty and application of water technology, principles of electrochemistry, nuclear chemistry, nano chemistry, engineering materials, polymer and composites, corrosion and storage devices etc., and to apply these fundamental principles to solve practical problems related to materials used for engineering applications.

UNIT I WATER TECHNOLOGY 12

Characteristics – alkalinity – types of alkalinity and determination – hardness – types of estimation by EDTA method (problem) – Domestic water treatment – disinfection methods (Chlorination, ozonation. UV treatment) – Boiler feed water – requirements – disadvantages of using hard water in boilers – internal conditioning (phosphate, calgon and carbonate conditioning methods) – external conditioning – de mineralization process – desalination and reverse osmosis.

UNIT II ELECTROCHEMISTRY, NUCLEAR CHEMISTRY AND NANO CHEMISTRY 12

Introduction -Electrochemical cells – reversible and irreversible cells – EMF – measurement of emf – Single electrode potential – Nernst equation (problem) – reference electrodes – Standard Hydrogen electrode – Calomel electrode – Ion selective electrode – glass electrode and measurement of pH Nuclear energy – fission and fusion reactions and light water nuclear reactor for power generator (block diagram only) – Breeder reactor. Nanomaterials – introduction to nanochemistry – carbon nanotubes and their applications.

UNIT III ENGINEERING MATERIALS 12

Refractories – classification – acidic, basic and neutral refractories – properties (refractoriness, refractoriness under load, dimensional stability, porosity, thermal spalling) – manufacture of alumina, magnesite and zirconia bricks and their applications. Abrasives – natural and synthetic abrasives – quartz, corundum, emery, garnet, diamond, silicon carbide and boron carbide. Lubricants – mechanism of lubrications – properties – viscosity index – flash and fire points, cloud and pour points – oiliness – solid lubricants – graphite and molybdenum di sulphide.

UNIT IV POLYMERS AND COMPOSITES 12

Polymers – definition – polymerization – types – addition and condensation polymerization –free radical polymerization and mechanism – Plastics, classification – preparation, properties and uses of PVC, Teflon, polycarbonate, polyurethane, nylon-6,6, PET – Rubber – vulcanization of rubber. Synthetic rubbers. Composites – definition, types, polymer matrix composites – FRP only - Conducting polymers, semiconducting polymers, molecular switches—examples, mechanism and applications.

UNIT V CORROSION, CORROSION CONTROL AND STORAGE DEVICES 12

Chemical corrosion – Pilling – Bedworth rule – electrochemical corrosion – different types – galvanic corrosion – differential aeration corrosion – factors influencing corrosion – corrosion control – sacrificial anode and impressed cathodic current methods – corrosion inhibitors – protective coatings – paints – constituents and functions – metallic coatings – electroplating (Au) and electroless (Ni) plating. Solar energy conversion – solar cells – wind energy – fuel cells –hydrogen – oxygen fuel cell – Batteries – alkaline batteries – lead – acid batteries – nickel – cadmium batteries and lithium batteries.

TOTAL: 60 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Know about characteristics of water and estimation of hardness using EDTA Titration

CO 2. Determine alkalinity and its types of alkalinity using neutralisation reaction

CO 3. Explain different types of Nuclear reactions, stability of Nucleus and Nuclear forces

CO 4. Distinguish between Daniel cell, Voltaic cell, batteries etc.

CO 5. Define refractories, abrasives, lubricants and its classifications.

CO 6. Define polymers, Classifications of polymers and its synthetic applications.

CO 7. Distinguish between Chemical and Electrochemical Corrosion and method of prevention

CO 8. Gain knowledge about different sources of energy and types of batteries

CO 9. Understand the method of synthesis and different types of Nano tubes and its application

TEXT BOOKS:

1. B.Sivasankar "Engineering Chemistry" Tata McGraw-Hill Pub.Co.Ltd, New Delhi 2008.
2. B.K.Sharma "Engineering Chemistry" Krishna Prakasan Media (P) Ltd., Meerut 2001.
3. Puri and Sharma "A text book of Physical chemistry ", Chand and Co., New Delhi

REFERENCE BOOKS:

1. Jain P.C. and Monica Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company (P) Ltd., New Delhi, 2010
2. Dara S.S, Umare S.S, "Engineering Chemistry", S. Chand & Company Ltd., New Delhi 2010

15ECS021 SOFTWARE FOUNDATION AND PROGRAMMING 2 3 1 0 3

Course Objective:

- This course provides conceptual and practical knowledge of the Fundamentals of technologies in the context of building enterprise web based applications.
- The contents of this course will ensure that a student interest in the subject is well founded and sows a seed for a conceptual understanding of software and computing practices of current generation.
- This course provides knowledge on open source software PHP, XML, Eclipse.
- This course also provides the understanding on data analytics, and concepts of Hadoop.

UNIT I INTRODUCTION TO OPEN SOURCE PARADIGM 12

PHP - Key Driver of LAMP Stack - Getting started with PHP – Unified ODBC – PHP Data objects – PHP deployment platform – Zend core : Features and benefits - Zend and IBM – Ruby – Rails.

UNIT II INFORMATION MANAGEMENT : OVERVIEW 12

Information as a Service – IBM Information Management Software - Order Fulfillment System – Example Case - Open Source: Derby – Cloudscape - DB2 9 pureXML Technology - DB2 Express-C - DB2 Data Server Editions - Information Integration Business Drivers.

UNIT III INTRODUCTION TO XML AND RELATED TECHNOLOGIES: OVERVIEW 12

Issues in information exchange - What is XML? - Exercise: XML basics - Document type definitions (DTDs) - Exercise: Working with DTDs - XML namespaces - Exercise: XML namespaces - XML schema, part 1 - Exercise: Generating XML schemas - XML schema, part 2 - Exercise: XML schemas – Xpath - Exercise: XPath (and quiz) - XSL transformation: part 1 - Exercise: XSLT part 1 - simple XSL transforms - XSL transformation: part 2 - Exercise: XSLT part 2 - simple XSL transforms.

UNIT IV INTRODUCTION TO INTEGRATED DEVELOPMENT ENVIRONMENT – ECLIPSE 12

What is Eclipse - Eclipse Architecture - Eclipse Platform Architecture - Eclipse Plug-in Architecture - Eclipse Case Studies - Eclipse Terms and Concepts.

UNIT V EMERGING TECHNOLOGIES 12

Big Data Analytics – Concepts of Hadoop & related techniques - Cloud Based Applications Development : Introduction to IBM Bluemix - Enterprise Mobility & Mobile based Apps Development : Introduction to IBM Worklight.

TOTAL : 60h

Course Outcome:

At the end of this course, the student will be able to

CO 1. Write simple code in open source paradigm like PHP, Ruby, Rails

CO 2. Understand the features and benefits of open source software

CO 3. Gain knowledge on IBM Information Management Software

CO 4. Understand XML and related technologies

CO 5. Discuss Issues in information exchange.

CO 6. Demonstrate XML schema

CO 7. Describe Eclipse Architecture, Terms and Concepts

CO 8. Identify and analyze Big Data applications

CO 9. Find the need of mobility and Cloud Based Applications Development.

TEXT BOOK:

1. IBM Career Education IBM CE – Software Foundation and Programming 2(with C++), IBM Student Course Material.

15ECS022 ELECTRIC CIRCUITS AND ELECTRONIC DEVICES 3 0 0 3

Course Objective:

- To understand the different types of electronic devices
- To design different types of electronic circuits such as amplifier, oscillators.
- To analyze different types of configurations and applications of transistor

UNIT I CIRCUIT ANALYSIS TECHNIQUES 9

Kirchhoff's current and voltage laws – series and parallel connection of independent sources – R, L and C – Network Theorems – Thevenin, Superposition, Norton, Maximum power transfer theorems and duality – Star –delta conversion.

UNIT II TRANSIENT RESONANCE IN RLC CIRCUITS 9

Basic RC, RL and RLC circuits and their responses to pulse and sinusoidal inputs – frequency response – Parallel and series resonances – Q factor – single tuned and double tuned circuits.

UNIT III SEMICONDUCTOR DIODES 9

Review of intrinsic and extrinsic semiconductors – Theory of PN junction diode – Energy band structure –current equation – space charge and diffusion capacitances – effect of temperature and breakdown mechanism – Zener diode and its characteristics.

UNIT IV TRANSISTORS 9

Principle of operation of PNP and NPN transistors – study of CE, CB and CC configurations and comparison of their characteristics – operation and characteristics of N-Channel and P-Channel JFET – drain current equation – MOSFET – operation and characteristics Enhancement and depletion types comparison of BJT with MOSFET.

UNIT V SPECIAL SEMICONDUCTOR DEVICES (Qualitative Treatment only) 9

Tunnel diodes – SCR characteristics and two transistor equivalent model – UJT – Diac and Triac – Photodiode, Phototransistor, Photoconductive and Photovoltaic cells – LED, LCD.

TOTAL: 45 h

Course Outcome:

At the end of this course, the student will be able to

CO 1. State Kirchhoff's voltage and current law

CO 2. Describe the principle, limitations and applications of Network theorems

CO 3. Understand the transient resonance and power factor of RLC circuit

CO 4. Draw the phasor diagram for R, L and C Circuits

CO 5. Find the differences between intrinsic and extrinsic semiconductor diodes

CO 6. Understand the VI characteristics and applications of Zener diode

CO 7. Compare depletion and enhancement MOSFET

CO 8. Draw the symbol of n channel and p channel JFET

CO 9. Describe the characteristic of UJT and identify the negative resistance region

CO 10. Compare LED and LCD

TEXT BOOKS:

1. Joseph A. Edminister, Mahmood, Nahri, “Electric Circuits” – Shaumseries, Tata McGraw Hill, 2001.
2. S. Salivahanan, N. Suresh kumar and A. Vallavanraj, “Electronic Devices and Circuits”,Tata McGraw Hill, 2nd Edition, 2011.

REFERENCE BOOKS:

1. Robert T. Paynter, “Introducing Electronics Devices and Circuits”, Pearson Education, 7th Education, 2006.
2. William H. Hayt, J.V. Jack, E. Kemmebly and steven M. Durbin, “Engineering Circuit Analysis”,Tata McGraw Hill, 6th Edition, 2002.
3. J. Millman and Halkias, SatyebrantaJit, “Electronic Devices and Circuits”,Tata McGraw Hill, 2nd Edition, 2008.
4. David A. Bell, “Electronic Devices and Circuits”, Oxford University Press, 5th Edition, 2008.

15GBE011 ENGINEERING CHEMISTRY LABORATORY 0 0 3 2

Course Objective:

- To acquire practical skills in the determination of water quality parameters through volumetric analysis.
- To determine the molecular weight of a polymer by viscometry.

List Of Experiments:

1. Determination of the total, permanent and temporary hardness of the given water sample by EDTA method. A standard hard water and EDTA solutions are provided.
2. Determination of the type and amount of alkalinity present in the given water sample. A standard solution of sodium hydroxide of strength 0.1N is given.
3. Estimation of the amount of chloride present in the water sample by Argentometric analysis. A standard solution of strength 0.01N and sodium chloride solutions are provided
4. Determination of degree of polymerization and molecular weight of given polymer solution by Ostwald viscometer method.
5. Estimation of copper in brass by EDTA method.
6. Determination of the amount of strong acid (HCl) present in 1 litre of the given mixture of acid solution by conductometric titration using standard NaOH of normality 0.2N.
7. Determination of the amount of weak acid (CH_3COOH) present in 1 litre of the given mixture of acid solution by conductometric titration using standard NaOH of normality 0.2N.
8. Determination of the amount of strong acid and weak acid (HCl and CH_3COOH) present in 1 litre of the given mixture of acid solution by conductometric titration using standard NaOH of normality 0.2N.
9. Determination of the amount of barium chloride present in 1 litre of the given solution by conductometric titration using standard solution of sodium sulphate of normality 0.2N.
10. Estimatation of the amount of ferrous ion present in the whole of the given solution by potentiometric titration. A standard solution of potassium dichromate of strength 0.1N is provided.
11. Estimation of the amount of Ag^+ ion present in the whole of the given solution by potentiometric titration. A standard solution of sodium chloride of strength 0.1N is provided
12. Determination of the strength of the given hydrochloric acid by pH-metry with 0.2N sodium hydroxide solution.

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Estimate different types of hardness of water using complexometric titrations of given water sample

CO 2. Determine the amount of alkalinity of the given water sample using standard NaOH

CO 3. Find out the amount of chloride ion present in the given solution using argentometric method

CO 4. Calculate the molecular weight of unknown polymer solution using viscosity method

CO 5. Determine the amount of strong acid present in the given mixture of acid solution using conductometric titrations

CO 6. Estimate the amount of strong and weak acid present in the mixture solution using conductometric titrations

CO 7. Estimate the amount of barium chloride present in the given solutions using conductometric titrations

CO 8. Estimate the amount of ferrous ion present in the given solution using conductometric titrations

CO 9. Determine the strength of the given acid by using PH-metry titrations

REFERENCES:

1. B.Sivasankar “Engineering Chemistry” Tata McGraw-Hill Pub.Co.Ltd, New Delhi 2008.
2. B.K.Sharma “Engineering Chemistry” Krishna Prakasan Media (P) Ltd., Meerut 2001.
3. Puri and Sharma “A text book of Physical chemistry “, Chand and Co., New Delhi.

15GBE203 LANGUAGE LABORATORY 0 0 3 2

Course Objective:

- To gain effective speaking and listening skills in communication.
- To develop the soft skills and interpersonal skills to excel in their job.
- To enhance the performance of students at Placement Interviews, Group Discussions and other recruitment exercises.

A. ENGLISH LANGUAGE LAB (18 Periods)

I. PC based session (Weightage 40%) 24 periods

1. LISTENING COMPREHENSION: (6)

Listening and typing – Listening and sequencing of sentences – Filling in the blanks - Listening and answering questions.

2. READING COMPREHENSION: (6)

Filling in the blanks - Close exercises – Vocabulary building - Reading and answering questions.

3. SPEAKING: (6)

Phonetics: Intonation – Ear training - Correct Pronunciation – Sound recognition exercises – Common Errors in English. Conversations: Face to Face Conversation – Telephone conversation – Role play activities (Students take on roles and engage in conversation)

B. DISCUSSION OF AUDIO-VISUAL MATERIALS (6 PERIODS)

(Samples are available to learn and practice)

1. RESUME / REPORT PREPARATION / LETTER WRITING (1)

Structuring the resume / report - Letter writing / Email Communication - Samples.

2. PRESENTATION SKILLS: (1)

Elements of effective presentation – Structure of presentation – Presentation tools – Voice Modulation – Audience analysis - Body language – Video samples

3. SOFT SKILLS: (2)

Time management – Articulateness – Assertiveness – Psychometrics – Innovation and Creativity - Stress Management & Poise - Video Samples

4. GROUP DISCUSSION: (1)

Why is GD part of selection process ? - Structure of GD – Moderator – led and other GDs - Strategies in GD – Team work - Body Language - Mock GD –Video samples

5. INTERVIEW SKILLS: (1)

Kinds of interviews – Required Key Skills – Corporate culture – Mock interviews- Video samples.

1. Resume / Report Preparation / Letter writing: Students prepare their own resume and report. (2)
2. Presentation Skills: Students make presentations on given topics. (8)
3. Group Discussion: Students participate in group discussions. (6)
4. Interview Skills: Students participate in Mock Interviews (8)

II. Practice Session (Weightage – 60%) 24 periods

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Improve the listening capability

CO 2. Enhance writing capability will be enhanced through practice.

CO 3. Improve the reading capability.

CO 4. Use strong vocabulary and fluently like foreigners.

CO 5. Prepare their own resume in professional way.

CO 6. Understand about Structure of presentation and the tools available in the power point presentation.

CO 7. Make presentations on given topics or their own topic of interest,

CO 8. Participate in group discussion without any hesitation.

CO 9. Attend mock interviews to remove the fear factors.

TEXT BOOKS:

1. Anderson, P.V, **Technical Communication**, Thomson Wadsworth, Sixth Edition, New Delhi, 2007.

2. Prakash, P, **Verbal and Non-Verbal Reasoning**, Macmillan India Ltd., Second Edition, New Delhi, 2004.

REFERENCES:

1. John Seely, **The Oxford Guide to Writing and Speaking**, Oxford University Press, New Delhi, 2004.

2. Evans, D, **Decisionmaker**, Cambridge University Press, 1997.

3. Thorpe, E, and Thorpe, S, **Objective English**, Pearson Education, Second Edition, New Delhi, 2007.

4. Turton, N.D and Heaton, J.B, **Dictionary of Common Errors**, Addison Wesley

15ECS023 OBJECT ORIENTED PROGRAMMING LAB 0 0 3 2

Course Objective:

- To learn the object oriented way of solving problems.
- To practice the use of C++ classes and class libraries,
- To develop C++ programs using OOPS concepts for various applications

List of Experiments:

1. Create student details using class with constructor and destructor.
2. Program to calculate income tax using default arguments.
3. Program to implement payroll system using single inheritance.
4. Implementation of employee's details using static data members.
5. Program to add two private data members using friend functions.
6. Program to create user defined manipulators.
7. Program to manipulate complex numbers using operator overloading and type conversions.
8. Overload the new and delete operators to provide custom dynamic allocation of memory.
9. Develop with suitable hierarchy, classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism and RTTI.
10. Program to develop a template for linked list class and its methods.
11. Design a stack class with necessary exception handling
12. Program for file handling using sequential access and random access.

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the basic concepts of Object Oriented programming and its advantages

CO 2. Use constructors and destructors

CO 3. Find solutions for problems using operator and function overloading

CO 4. Develop C++ code to change from one data type to other

CO 5. Implement dynamic memory allocation, inheritance and polymorphism

CO 6. Write code for exception handlers and pure virtual functions

CO 7. Understand and execute dynamic memory allocation

CO 8. Handle file operations and object serialization

CO 9. Write code to perform string manipulations

CO 10. Formulate new solutions for real time problems using object oriented programming concepts

15GBE204 ENVIRONMENTAL SCIENCE AND ENGINEERING 3 0 0 3

Course Objective

At the end of this course the student is expected to understand what constitutes the environment, what are precious resources in the environment, how to conserve these resources, what is the role of a human being in maintaining a clean environment and useful environment for the future generations and how to maintain ecological balance and preserve bio-diversity. The role of government and non – governmental organization in environmental management.

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 9

Definition – Scope and importance – Need for public awareness – Concepts of an Ecosystem – Structure and Function of an Ecosystem –Producers, Consumers and Decomposers – Energy Flow in the Ecosystem – Ecological Succession – Food Chains, Food Webs and Ecological Pyramids – Introduction, Types, Characteristic Features, Structure and Function of the (A) Forest Ecosystem (B) Grassland Ecosystem (C) Desert Ecosystem (D) Aquatic Ecosystems (Ponds, Streams, Lakes, Rivers, Oceans, Estuaries) – Introduction to Biodiversity – Definition: Genetic, Species and Ecosystem Diversity – Biogeographical 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-Spots 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.Field Study of Common Plants, Insects and Birds.Field study of simple ecosystems - pond, river, hill slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION 9

Definition – Causes, 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 municipal solid Wastes – Role of an Individual in Prevention of Pollution – Pollution Case Studies – disaster Management - Floods, Earthquake, Cyclone and Landslides.Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III NATURAL RESOURCES 9

Forest resources -Use and over – Exploitation – Deforestation – Case studies – Timber extraction –Mining – Dams and their 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:- Growing Energy Needs, Renewable and Non Renewable Energy Sources, Use of Alternate Energy Sources, Case Studies – Land Resources - Land as a Resource, Land Degradation, Man Induced Landslides, Soil Erosion and Desertification – Role of an Individual in Conservation of Natural Resources – Equitable use of Resources for Sustainable Lifestyles.Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 9

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 Role of non – governmental organization - 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 Production Act – Air (Prevention and Control of Pollution) Act – Water (Prevention and Control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act –enforcement machinery involved in environmental Legislation – Central and state pollution control boards - Public Awareness.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT 9

Population Growth, Variation among Nations – Population Explosion Family Welfare Programme – 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.

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the nature and facts about environment.

CO 2. Find and implement scientific, technological, economic solutions to environmental problems.

CO 3. Know about the interrelationship between living organisms and environment.

CO 4. Understand the integrated themes and biodiversity, natural resources, pollution control and waste management.

CO 5. Analyze the importance of environment by assessing its impact on the human world.

CO 6. Study the dynamic processes and understand the features of the earth's interior and surface.

CO 7. Know the role of an individual in Conservation of Natural Resources.

CO 8. Know about the various social issues.

CO 9. Understand the role of government in solving the environmental problems.

CO 10. Know about Population Growth and variation among Nations

TEXT BOOKS:

1. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education (2004).
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw- Hill,NewDelhi, (2006).

REFERENCES BOOKS:

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT LTD, New Delhi, 2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press (2005)

15GBE012 MATHEMATICS III 3 1 0 3

Course Objective: To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems.To understand the mathematical principles on Fourier series and transforms, partial differential equations and Z transform would provide them the ability to formulate and solve some of the physical problems of engineering.

UNIT I FOURIER SERIES 12

Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series – Half range cosine series – Complex form of Fourier Series – Parseval's identity – Harmonic Analysis.

UNIT II FOURIER TRANSFORMS 12

Fourier integral theorem (without proof) – Fourier transform pair – Fourier Sine and Cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity.

UNIT III PARTIAL DIFFERENTIAL EQUATIONS 12

Formation of partial differential equations - singular integrals- Solutions of standard types of first order partial differential equations – Lagrange's linear equation - Linear partial differential equations of second and higher order with constant coefficients of both homogeneous and non- homogeneous types.

UNIT IV APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS 12

Classification PDE-Method of separation of variables - Solutions of one dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two-dimensional heat equation (excluding Insulated edges).

UNIT V Z -TRANSFORMS AND DIFFERENCE EQUATIONS 12

Z-transform - Elementary properties – Inverse Z-transform(using partial fraction and residues) – Convolution theorem - Formation of difference equations – Solution of difference equations using Z- transform.

TOTAL: 60h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Develop Fourier series for different types of functions.

CO 2. Define and determine Fourier transform of a system function.

CO 3. Perform Fourier series and analysis to analyze waveforms used in electronics engineering.

CO 4. Formulate numerical solution for algebraic, transcendental and simultaneous linear equations.

CO 5. Reduce equations to standard first order Partial Differential Equation (PDE) and solve the same.

CO 6. Derive and solve the wave, heat equation and boundary value problems using Partial Differential Equation (PDE)

CO 7. Understand the applications of Partial Differential Equations in engineering.

CO 8. Know the elementary properties of Z-Transform and solve difference equations using the same.

TEXT BOOKS:

1. Grewal. B.S, “Higher Engineering Mathematics”, Khanna Publications ,Delhi,43rd Edition, 2013.
2. Ramana B.V, “Higher Engineering Mathematics”, Tata McGraw Hill Publishing Company, New Delhi, 6th reprint,2008.

REFERENCE BOOKS:

1. Bali.N.P. and Manish Goyal ‘A Textbook of Engineering Mathematics’, Laxmi Publications, 9th edition,2011.
2. Erwin Kreyszig, “Advanced Engineering Mathematics”, Wiley India, 9th Edition, 2011.
3. Glyn James, “Advanced Modern Engineering Mathematics”, Pearson Education ,3rd Edition, 2012.
4. Sivaramakrishna Das.P & Vijayakumari.C ,A Text book of Engineering Mathematics-III (Transforms & Partial Differential equations), Pearson Eduaction Limited ,5th Edition ,2013.

15ECS031 DATA STRUCTURES 3 1 0 3

Course Objective:

- To understand the basic concepts of data structures.
- To study the various abstract data types and their applications.
- To design and implement different types of searching and sorting algorithms.
- To analyze graphical representation and apply algorithms of path finding.

Unit I Linear Structures 12

Abstract Data Types (ADT) – List ADT – Array based implementation – Linked list implementation – Cursor-based linked lists – Singly Linked List - Doubly linked lists : Operations – Circular linked list : Singly and Doubly – Applications of lists – Stack ADT : Operations – Queue ADT : Operations – Circular queue implementation – Applications of stacks and queues.

Unit II Tree Structures 12

Tree ADT: Introduction -– Tree Representation - Binary Tree Traversals and their implementations – Conversion of Left child right sibling data structures for general trees – Binary Tree ADT: Basics – Expression trees and their implementations – Applications of trees – Binary search Tree ADT: Operations: Insert and Delete – Threaded Binary Trees.

Unit III Balanced Trees and Sorting 12

AVL Trees: Balance factor, Single and Double rotations – Splay Trees: Rotation – B Tree: Operations: Insert and Delete - Binary heaps: Min and Max heaps – Applications of binary heaps – Sorting: Internal and External – Insertion sort : STL Implementation of Insertion sort – Quick sorting – Merge sorting : Analysis of Merge sort – Heap sort : Analysis of heap sort – Radix sorting.

Unit IV Hashing and Set 12

Hashing: Hashing Functions, Collision Resolution Techniques - Open addressing: Linear Probing and Quadratic Probing – Separate chaining - Rehashing – extendible hashing –Set :Definitions and Concepts - Disjoint Set ADT – Dynamic equivalence problem – Smart union algorithms : union by size and union by height – Path compression – Applications of Set.

Unit V Graphs 12

Definitions – Topological sort and their implementation – Graph Traversal: Depth-first traversal and Breadth-first traversal – Shortest-path algorithms: Single source and All Pairs Shortest path algorithms – Dijkstras algorithms – Minimum spanning tree – Prim's and Kruskal's algorithms –– Biconnectivity – Euler circuits – applications of graphs.

TOTAL: 60h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Acquire knowledge on different Abstract data types and their implementation

CO 2. Perform various operations such as insertion, deletion, searching, traversing on various data structures.

CO 3. Understand the functional routine of singly and doubly linked list

CO 4. Discuss, differentiate and implement various sorting and searching algorithms

CO 5. Be familiar with different types of Collision Resolution Techniques in hashing

CO 6. Understand the concept of union by size, union by height and path compression in smart union algorithm.

CO 7. Elaborte on direct file organization and the procedure to retrieve a record from a direct file using the key

CO 8. Perform various graph traversals

CO 9. Understand ADT operation for Prim's and Kruskal's algorithms.

CO 10. Understand problems such as Euler circuits, Biconnectivity and exhibit various applications of data structures.

TEXT BOOKS:

1. M. A. Weiss, "Data Structures and Algorithm Analysis in C", Second Edition , Pearson Education, 2005.
2. A. V. Aho, J. E. Hop croft, and J. D. Ullman, "Data Structures and Algorithms", Pearson Education, First Edition Reprint 2003.

REFERENCE BOOK:

1. R. F. Gilberg, B. A. Forouzan, "Data Structures", Second Edition, Thomson India Edition, 2005

15ECS032 DATA STRUCTURES LAB 0 0 3 2

Course Objective:

- To create and operate on various data structures like Stack, Queue and Linked List.
- To implement the Binary Tree concepts and various tree traversals.
- To implement various Sorting and Searching Techniques for various applications

List of Experiments:

1. Implementation of Linked List using Abstract Data Types(ADT).
2. Insert an element at any position using singly linked list.
3. Insert and delete an element at any position in doubly linked list.
4. Represent a polynomial as a linked list and write functions for polynomial addition.
5. Implement Stack ADT using Linked list with the basic operations as Create(), Is Empty(), Push(), Pop(), IsFull() with appropriate prototype to a functions.
6. Implement Queue ADT using Linked list with the basic functions of Create(), IsEmpty(), Insert(), Delete() and IsFull() with suitable prototype to a functions.
7. Implement stack and use it to convert infix to postfix expression
8. Insert and delete operation using binary search tree.
9. Write a program for Binary Search Tree to implement following operations:
   i. Insertion ii. Deletion - Delete node with only child, Delete node with both children
10. Implement the application for 'Evaluating Postfix Expressions' using linked list implementations of Stack ADT.
11. Implementation of hash techniques using open addressing.
12. Implementation of Prim's algorithm to find MST of an undirected graph.

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Gain skills to design and analyze simple linear and non linear data structures .

CO 2. Strengthen the ability to identify and apply the suitable data structure for the given real world problem

CO 3. Acquire knowledge in practical applications of linked list.

CO 4. Perform insertion, deletion and modification in singly and doubly linked list

CO 5. Write and execute code to perform manipulations in stack using arrays and linked list

CO 6. Demonstrate Queue in array for which all insertions and deletions are made at both end using various operations.

CO 7. Generate and manipulate Binary Search Tree

CO 8. Write program to avoid collision using open addressing hashing techniques

CO 9. Find shortest path in an undirected graph using Prim's algorithm.

15ECS033 MICROPROCESSORS AND MICROCONTROLLERS LAB 0 0 3 2

Course Objective:

- To introduce ALP concepts and features
- To write ALP for arithmetic and logical operations in 8086 and 8051
- To differentiate Serial and Parallel Interface
- To interface different I/Os with Microprocessors

List of Experiments:

1. Study of 8085 and 8086 Microprocessor
2. Programming with 8085 – 8-bit / 16-bit multiplication/division using repeated addition/subtraction
3. Programming with 8085-code conversion, decimal arithmetic, bit manipulations.
4. Programming with 8085-matrix multiplication, floating point operations
5. Programming with 8086 – String manipulation, search, find and replace, copy operations, sorting. (PC Required)
6. Using BIOS/DOS calls: Keyboard control, display, files manipulation. (PC Required)
7. Using BIOS/DOS calls: Disk operations. (PC Required)
8. Study of Microcontrollers
9. Interfacing with 8085/8086 – 8255, 8253
10. Interfacing with 8085/8086 – 8279, 8251
11. 8051 Microcontroller based experiments – Simple assembly language programs (cross assembler required).
12. 8051 Microcontroller based experiments – Simple control applications (cross assembler required).

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Be familiar with the assembly level programming of 8085 and 8086 microprocessors

CO 2. Perform various arithmetic operations, searching and sorting using 8086 microprocessors

CO 3. Write assembly language programs for various code conversions like binary to decimal, hexa demical, BCD and vice versa.

CO 4. Understand and execute various string manipulation operations using 8086 microprocessor.

CO 5. Interface Microprocessor with various peripheral devices and program the same for various applications

CO 6. Analyze Serial and Parallel Communication between two microprocessor kits

CO 7. Write a program to interface a microprocessor and microcontroller

CO 8. Understand the basic programming concepts of 8051 Microcontroller and perform different arithmetic, logical and bit manipulation operations

CO 9. Install a communication link between 8051 Microcontroller kit and PC

15GBE013 PROBABILITY AND QUEUING THEORY 3 1 0 3

Course Objective: The Probabilistic models are employed in countless applications in all areas of science and engineering. Queuing theory provides models for a number of situations that arise in real life. The course aims at providing necessary mathematical support and confidence to tackle real life problems.

UNIT I RANDOM VARIABLES 12

Discrete and continuous random variables – Moments - Moment generating functions and their properties. Binomial, Poisson, Geometric, Negative-binomial, Uniform, Exponential, Gamma and Weibull distributions .

UNIT II TWO DIMENSIONAL RANDOM VARIABLES 12

Joint distributions - Marginal and conditional distributions – Covariance - Correlation and regression - Transformation of random variables - Central limit theorem.

UNIT III MARKOV PROCESSES AND MARKOV CHAINS 12

Classification - Stationary process - Markov process - Markov chains - Transition probabilities - Limiting distributions- Poisson process.

UNIT IV QUEUEING THEORY 12

Markovian queues – Birth and Death Queuing models- Steady state results: Single and multiple server queuing models- Little's Formula - queues with finite waiting rooms- Finite source models.

UNIT V NON-MARKOVIAN QUEUES AND QUEUE NETWORKS 12

M/G/1 queue- Pollaczek- Khintchine formula, series queues- open and closed networks.

TOTAL: 60h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the fundamental concepts in probability and queuing models and apply these techniques in networks, image processing etc.

CO 2. Acquire skills in analyzing queuing models.

CO 3. Characterize probability models using probability mass (density) functions & cumulative distribution functions.

CO 4. Understand the terminology & nomenclature appropriate queuing theory.

CO 5. Demonstrate the knowledge and understand the various queuing models.

CO 6. Formulate concrete problems using queuing theoretical approaches.

CO 7. Gain fundamental knowledge of the probability concepts.

CO 8. Acquire skills in analyzing queuing models.

CO 9. Understand and characterize phenomenon, which evolve with respect to time in a probabilistic manner.

CO 10. Provide the required mathematical support in real life problems and develop probabilistic models which can be used in several areas of science and engineering.

TEXT BOOKS:

1. Ibe O.C., “Fundamentals of Applied Probability and Random Processes”, Elsevier,1st Indian Reprint, 2007. (For units 1, 2 and 3).

2. Gross. D. and. Harris C.M, “Fundamentals of Queuing Theory”, Wiley Student edition, 2004 (For units 4 and 5).

REFERENCE BOOKS:

1. A.O. Allen, “Probability, “Statistics and Queuing Theory with Computer Applications”, Elsevier, 2nd edition, 2005.
2. Sivaramakrishna Das. P and Vijayakumari. C,”Probability & Queueing Theory” , Pearson Eduaction Asia . 6th Edition ,2013.
3. K.S. Trivedi, “Probability and Statistics with Reliability, Queuing and Computer Science Applications”, John Wiley and Sons, 2nd edition, 2002.

15ECS041 DATABASE MANAGEMENT SYSTEMS 3 1 0 3

Course Objective: To help the learner to understand the concepts, techniques, security features, how data is stored in the system, Query Languages used and different types of Statements used in the Query Processing in Database Management Systems.

UNIT - I INTRODUCTION 12

Database system application-Purpose of database system-View of data-Database language-Relational database-Data storage and queuing-Transaction management-Database architecture-Database users and administrators-History of database system

UNIT- II INTRODUTION TO SQL 12

SQL Data Definition and its types – Specifying Constraints in SQL – Basic Retrieval Queries in SQL – INSERT,UPDATE ,DELETE Statements in SQL – Aggregate Functions in SQL – GROUPING : The GROUP BY and HAVING Clause – JOIN Expressions - VIEWS - TRANSACTIONS - SUBQUERIES

UNIT- III DATABASE DESIGN & PROGRAMMING TECHNIQUES 12

Functional Dependencies – First, Second, Third Normal Forms, Dependency Preservation – Boyce / Codd Normal Form – Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form – Entity relationship Model –Entity relationship Diagram and Examples

UNIT- IV TRANSACTION MANAGEMENT AND DATABASE SECURITY 12

Transaction - Simple Transaction Model – Serializability - Lock based protocols-Time stamp based protocol-Deadlock handling - Two Phase Commit – Introduction to Database Security Issues – Access Control Based on Granting and Revoking Privileges – Challenges of Database Security

UNIT- V DATA STORAGE AND QUERYING 12

Overview of Physical storage Media - Magnetic disks - RAID - Tertiary storage - File organization-Organization of records in files - B^+ - tree index files - B-tree Index files - Static Hashing - Dynamic Hashing -Overview of query processing-CASE STUDY-ORACLE

TOTAL: 60h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the fundamentals of database management system

CO 2. Acquire knowledge on Relational database, Data storage and queuing, Transaction management and Database architecture.

CO 3. Discuss the topic SQL Data Definition and its types.

CO 4. Write SQL queries using aggregate Functions such as Grouping, Join expressions, Views, Transactions and Subqueries.

CO 5. Analyze database design & programming techniques.

CO 6. Draw an Entity Relationship diagram for any application.

CO 7. Do transaction management and understand and implement database security.

CO 8. Understand the issues and challenges in Database security

CO 9. Explain the effective ways of data storage and querying.

CO 10. Discuss and differentiate Static and Dynamic Hashing.

TEXT BOOKS:

1. Abraham Silberschatz, Henry F.korthS.Sudharshan, ”Database system concepts” fifth edition,tata mcgraw hill, 2006.
2. Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, FourthEdition , Pearson / Addision wesley, 2007.

REFERENCE BOOKS:

1. Raghu Ramakrishnan, “Database Management Systems”, Third Edition, McGraw Hill, 2003.
2. S.K.Singh, “Database Systems Concepts, Design and Applications”, First Edition, Pearson Education, 2006.

15ECS042 OPERATING SYSTEMS 3 0 0 3

Course Objective: To understand the features of operating system and its role in managing various system resources. To learn the Structure and functions of OS, Process scheduling, Deadlocks, Device management, Memory management and File systems

UNIT I PROCESSES AND THREADS 9

Introduction to operating systems – review of computer organization – operating system structures – system calls – system programs – system structure – virtual machines. Processes: Process concept – Process scheduling – Operations on processes – Cooperating processes – Interprocess communication – Communication in client-server systems. Threads: Multi-threading models – Threading issues.

UNIT II PROCESS SCHEDULING AND SYNCHRONIZATION 9

CPU Scheduling: Scheduling criteria – Scheduling algorithms – Multiple-processor scheduling – Real time scheduling – Algorithm Evaluation. Process Synchronization: The critical-section problem – Synchronization hardware – Semaphores – Classic problems of synchronization – critical regions – Monitors. Deadlock: System model – Deadlock characterization – Methods for handling deadlocks – Deadlock prevention – Deadlock avoidance – Deadlock detection – Recovery from deadlock**.**

UNIT III STORAGE MANAGEMENT 9

Memory Management: Background – Swapping – Contiguous memory allocation –Paging – Segmentation – Segmentation with paging. Virtual Memory: Background –Demand paging – Process creation – Page replacement – Allocation of frames –Thrashing.

UNIT IV FILE SYSTEMS 9

File-System Interface: File concept – Access methods – Directory structure – Filesystem mounting – Protection. File-System Implementation : Directory implementation –Allocation methods – Free-space management – efficiency and performance – recovery– log-structured file systems.

UNIT V I/O SYSTEMS 9

I/O Systems – I/O Hardware – Application I/O interface – kernel I/O subsystem –streams – performance. Mass-storage Structure: Disk scheduling – Disk management –Swap-space management – RAID – disk attachment – stable storage – tertiary storage.

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the concept of operating system structures, system calls, system programs, system structure and virtual machines

CO 2. Explain Interprocess communication, Communication in client-server systems and Threads

CO 3. Discuss the CPU Scheduling algorithms

CO 4. Acquire knowledge on Classic problems of synchronization, critical regions, Monitors and Deadlock

CO 5. Be Familiar with the concept of Memory Management, Swapping, Contiguous memory allocation and Paging

CO 6. Explain Page replacement, Allocation of frames and Thrashing in storage management

CO 7. Know how to interface, mount and protect File-System Interface

CO 8. Discuss Allocation methods, Free-space management and log-structured file systems

CO 9. Gain knowledge on I/O Systems, I/O Hardware, Application I/O interface, kernel I/O subsystem and streams

CO 10. Be well versed in Disk scheduling and RAID

TEXT BOOKS:

1. Silberschatz, Galvin, and Gagne, “Operating System Concepts”, Sixth Edition, Wiley India Pvt Ltd, 2003.
2. Andrew S. Tanenbaum, “Modern Operating Systems”, Second Edition, Pearson Education, 2004.

REFERENCE BOOKS:

1. Andrew S. Tanenbaum, “Modern Operating Systems”, Second Edition, Pearson Education, 2004.
2. Gary Nutt, “Operating Systems”, Third Edition, Pearson Education, 2004.
3. Harvey M. Deital, “Operating Systems”, Third Edition, Pearson Education, 2004.

15ECS043 DATABASE MANAGEMENT LAB 0 0 3 2

Course Objective: To understand the various database management system concepts by working on databases.

List of Experiments:

1. DDL and DML Commands.
2. Join Queries.
3. Views and Set operations.
4. Built in functions.
5. Nested Queries
6. Triggers.
7. Aggregate Functions.
8. Roles and Privileges.
9. Cursors.
10. PL/SQL programs
11. PL/SQL cursor programs
12. Front end tools – Mini Project

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the concept of DDL and DML Commands

CO 2. Write Join Queries, Views and Set operators.

CO 3. Use Built in functions to manipulate the database

CO 4. Write Nested Queries

CO 5. Develop programs using Triggers and Aggregate Functions.

CO 6. Be familiar with the Roles and Privileges.

CO 7. Handle Cursors.

CO 8. Write PL/SQL programs.

CO 9. Write and execute PL/SQL cursor programs

CO 10. Design and develop Mini Project.

15ECS044 Operating Systems Lab 0 0 3 2

Course Objective: To practice various system calls and concepts of process management, memory management techniques.

List of Experiments:

1. Study of Linux commands.
2. Writing programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir
3. Writing programs using the I/O system calls of UNIX operating system (open, read, write, etc)
4. Writing C programs to simulate UNIX commands like ls, grep, etc.
5. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions).
6. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions)
7. Developing Application using Inter Process communication (using shared memory, pipes or message queues)
8. Implementation of Producer – Consumer problem using semaphores (using UNIX system calls).
9. Implementation of Deadlock avoidance using Banker's algorithm.
10. Implementation of some memory management schemes – I
11. Implementation of some memory management schemes – II
12. Implementation of any file allocation technique (Linked, Indexed or Contiguous)

Example for exercises 10 & 11 :

Free space is maintained as a linked list of nodes with each node having the starting byte address and the ending byte address of a free block. Each memory request consists of the process-id and the amount of storage space required in bytes. Allocated memory space is again maintained as a linked list of nodes with each node having the process-id, starting byte address and the ending byte address of the allocated space. When a process finishes (taken as input) the appropriate node from the allocated list should be deleted and this free disk space should be added to the free space list. [Care should be taken to merge contiguous free blocks into one single block. This results in deleting more than one node from the free space list and changing the start and end address in the appropriate node]. For allocation use first fit, worst fit and best fit.

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the concept of Linux commands.

CO 2. Write programs using the system calls of UNIX operating system.

CO 3. Write programs using the I/O system calls.

CO 4. Display/print the Gantt chart for FCFS, SJF, Priority and Round robin.

CO 5. Develop Application using Inter Process communication.

CO 6. Demonstrate Producer – Consumer problem using semaphores.

CO 7. Handle Deadlock avoidance using Banker's algorithm.

CO 8. Discuss memory management schemes – I.

CO 9. Know about memory management schemes – II.

CO 10. Demonstrate file allocation technique.

15ECS045 BASIC LIFE SKILLS 1 0 1 2

Course Objective : Providing value education to improve the students' character - understanding of principled life and physical health - maintaining youthfulness - measures and methods in five aspects of life

UNIT I PHYSICAL HEALTH 6

Manavalakalai (SKY) Yoga: Introduction - Education as a means for youth empowerment - Greatness of Education - Yoga for youth Empowerment.Simplified Physical Exercises: Hand, Leg, Breathing, Eye exercises - Kapalabathi, Makarasana Part I, Makarasana Part II, Body Massage, Acu pressure, Relaxation exercises - Benefits.Yogasanas: Pranamasana - Hastha Uttanasana - Pada Hasthasana – Aswa Sanjalana Asana - Thuvipatha asva Sanjalana asana - Astanga Namaskara - Bhujangasana - Atha Muktha Savasana - Aswa Sanjalana Asana - Pada Hasthasana - Hastha Uttanasana - Pranamasana.Pranayama : Naddi suddi - Clearance Practice - Benefits.

UNIT II LIFE FORCE 6

Reasons for Diseases - Natural reasons (Genetic / imprints, Planetary Position, Natural calamities and climatic changes) - Unnatural reasons (Food habits, Thoughts, Deeds)Philosophy of Kaya kalpa - Physical body - Sexual vital fluid - Life force - Bio-Magnetism – Mind .Maintaining youthfulness : Postponing old age - Transformation of food into seven components - Importance of sexual vital fluid – Measure and method in five aspects of life - Controlling undue Passion. Kayakalpa practice - Aswini Mudra - Ojas breath - Benefits of Kaya Kalpa.

UNIT III: MENTAL HEALTH 6

Mental Frequencies - Beta, Apha, Theta and Delta wave - Agna Meditation explanation - benefits. Shanthi Meditation explanation - Benefits Thuriya Meditation explanation - Benefits Benefits of Blessing - Self blessing (Auto suggestion) - Family blessing - Blessing the others - World blessing - Divine protection

UNIT IV VALUES 6

Human Values: Self control - Self confidence - Honesty Contentment - Humility – Modesty Tolerance - Adjustment - Sacrifice – Forgiveness Purity (Body, Dress, Environment) - Physical purity - Mental purity - Spiritual purity Social Values: Non violence – Service Patriotism – Equality Respect for parents and elders - care and protection - Respect for teacher Punctuality - Time Management

UNIT V MORALITY 6

Importance of Introspection - I - Mine (Ego, Possessiveness). Six Evil Temperaments - Greed - Anger - Miserliness - Immoral sexual passion - Inferiority and superiority Complex – Vengeance. Maneuvering of Six Temperaments - Contentment - Tolerance - Charity - Chastity - Equality - Pardon (Forgiveness).Five essential Qualities acquired through Meditation: Perspicacity - Magnanimity - Receptivity - Adaptability – Creativity. Improved Memory Power - Success in the Examination.

Total: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Acquire knowledge about the interconnections between body, breathe, mind and emotions in the context of maintaining resilience and well-being

CO 2. Utilize skills developed through participation in manavalakalai (SKY) yoga to help maintain lifelong health and fitness

CO 3. Demonstrate foundational standing, sitting, balance postures with proper alignment.

CO 4. Maintain youthfulness through kalpa practice

CO 5. Explore relaxation techniques to observe thoughts and to manage emotions and stress.

CO 6. Apply the principles of yoga in a personal way outside of yoga practice

CO 7. Apply effective breathing techniques to their yoga practice

CO 8. Demonstrate an understanding of anatomy and physiology as it applies to the intentionsl integration of breath, posture and movement within the practice of yoga

CO 9. Identify asanas specific to their desired health benefits and create a yoga practice to use for an healthy mind

CO 10. Achieve a greater sense of awareness, wisdom, introspection and a deeper sense of relaxation through meditation.

REFERENCE BOOKS:

1. Vethathiri Maharishi, 16th Edi.2013, Yoga for Modern Age, Vethathiri Publications, Erode.
2. Vethathiri Maharishi, 2014, Simplified Physical Exercises, Vethathiri Publications, Erode.
3. Vethathiri Maharishi, 3rd Edi.2014, Kayakalpam, Vethathiri Publications, Erode.
4. Rev.Dr.G.U.pope, 2016, Thirukkural, Giri Trading Agency,
5. Vethathiri Maharishi, 1994, Mind, Vethathiri Publications, Erode.
6. Chandrasekaran.K, 1999, Sound Health through yoga, Sedapati, Tamilnadu, Premkalyan Publications.
7. Iyengar, B.K.S. 2008, Light on Yoga, Noida, UP India, Harber Collins Publishing India Ltd.,.

15GBE017 DISCRETE MATHEMATICS 3 1 0 3

Course Objective: To know the concepts of Mathematical maturity and ability to deal with abstraction and to introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.

UNIT I LOGIC AND PROOFS 12

Propositional Logic – Propositional equivalences-Predicates and quantifiers-Nested Quantifiers-Rules of inference-introduction to Proofs-Proof Methods and strategy

UNIT II COMBINATORICS 12

Mathematical inductions-Strong induction and well ordering-.The basics of counting-The pigeonhole principle – Permutations and combinations-Recurrence relations-Solving Linear recurrence relations-generating functions-inclusion and exclusion and applications.

UNIT III GRAPHS 12

Graphs and graph models-Graph terminology and special types of graphs-Representing graphs and graph isomorphism -connectivity-Euler and Hamilton paths

UNIT IV ALGEBRAIC STRUCTURES 12

Algebraic systems-Semi groups and monoids-Groups-Subgroups and homomorphisms- Cosets and Lagrange's theorem- Ring & Fields (Definitions and examples)

UNIT V LATTICES AND BOOLEAN ALGEBRA 12

Partial ordering-Posets-Lattices as Posets- Properties of lattices-Lattices as Algebraic systems –Sub lattices –direct product and Homomorphism-Some Special lattices-Boolean Algebra

TOTAL: 60h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the notion of mathematical thinking, mathematical proofs, and algorithmic thinking, and be able to apply them in problem solving Proficiently construct logical arguments and rigorous proofs

CO 2. Solve problems using recurrence relations and recursion to analyze algorithms and programs such as finding Fibonacci numbers, the Ackerman function and Tower of Hanoi problems

CO 3. Calculate numbers of possible outcomes of elementary combinatorial processes such as permutations and combinations.

CO 4. Calculate probabilities and discrete distributions for simple combinatorial processes; calculate expectations.

CO 5. Understand the graphs and graph models

CO 6. Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction, for example, scheduling.

CO 7. Determine the domain and range of a discrete or non-discrete function, graph functions, identify one-to-one functions, perform the composition of functions, find and/or graph the inverse of a function, and apply the properties of functions to application problems.

CO 8. Be exposed to concepts and properties of algebraic structures such assemi groups, monoids and groups, rings and fields.

CO 9. Evaluate Boolean functions and simplify expression using the properties of Boolean algebra;

CO 10. Apply Boolean algebra to circuits and gating networks.

CO 11. Understand Basic concepts of sets, logic functions and graph theory

TEXT BOOKS:

1. Kenneth H.Rosen, “Discrete Mathematics and its Applications”, Tata McGraw-Hill Publications, New Delhi, 7th edition,2011.
2. Trembly J.P and Manohar R, “Discrete Mathematical Structures with Applications to Computer Science”, Tata McGraw–Hill Pub. Co. Ltd, New Delhi, 30th Re-print, 2011.
   (For units 4 & 5 , Sections 2-3.8 & 2-3.9,3-1,3-2 & 3-5, 4-1 & 4-2)

REFERENCE BOOKS:

1. Ralph. P. Grimaldi, “Discrete and Combinatorial Mathematics: An Applied Introduction”, Fourth Edition, Pearson Education Asia, Delhi, 2007.
2. Thomas Koshy, ”Discrete Mathematics with Applications”, Elsevier Publications, (2006).

15ECS051 COMPUTER NETWORKS 3 1 0 3

Course Objective:

- To understand the concepts of data communications and to study the functions of different layers.
- To introduce IEEE standards employed in computer networking and to familiarize with different protocols and network components.
- To help the leaner to design, calculate, and apply subnet masks and addresses to fulfill networking requirements.
- To analyze the features and operations of various application layer protocols such as Http, DNS, and SMTP.

UNIT I PHYSICAL LAYER AND MEDIA 12

Components – Direction of Data flow – networks – Components and Categories – types of Connections – Topologies –Protocols and Standards – ISO / OSI model – Transmission Media – Guided Media -Coaxial Cable – Fiber Optics – Unguided Media – Wireless- Switching- Digital Transmission –Analog Transmission- Line Coding – Dial up Modems

UNIT II DATA LINK LAYER 12

Error Detection and Correction – Introduction-Parity Checking– LRC – CRC – Check Sum-Hamming code – Framing - Flow Control and Error control - Stop and Wait – go back-N ARQ – selective repeat ARQ- Sliding window – HDLC – Multiple Access – Random Access –Channelization-Wired LAN - Ethernet IEEE 802.3 - IEEE 802.4 –Token Ring-FDDI – IEEE802.11.

UNIT III NETWORK LAYER 12

Logical Addressing-IPV4 Addresses - IPV6 Addresses-Inter Networking – Address Mapping – ARP, RARP,DHCP, ICMP- Delivery-Forwarding-Unicast Routing protocols- Intra Domain Routing-Inter domain Routing- Distance Vector Routing – Link State Routing – Path Routing – Multicast Routing Protocol- Subnetting – Congestion avoidance in network layer.

UNIT IV TRANSPORT LAYER 12

Duties of transport layer –Process to Process Delivery-Client Vs Server Paradigm - Multiplexing – DeMultiplexing – Sockets – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Flow Control – Error Control – Congestion Control – Open loop congestion control - closed loop congestion control - Quality of services (QOS)-Techniques to improve up QoS.

UNIT V APPLICATION LAYER 12

Domain Name Space (DNS) – Name Space- Domain Name Space –Distribution of Name Space –DNS in the Internet-DDNS – Electronic Mail- SMTP – POP – IMAP - FTP – HTTP - WWW – Cryptography-Symmetric Key Cryptography – Asymmetric Key Cryptography- Network Security –Security Services- Digital Signatures- IPsec-PGP.

TOTAL: 60h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the concept of physical layer and transmission media.

CO 2. Illustrate the network standards of ISO / OSI model.

CO 3. Discuss Error Detection and Correction in data link layer

CO 4. Describe IEEE 802.4, Token Ring, FDDI and IEEE802.11.

CO 5. Understand the functionalities of Network layer.

CO 6. Be well versed in various Routing protocols and Subnetting.

CO 7. Analyze Duties of transport layer and qualities to improve Quality of Service

CO 8. Discuss Flow Control , Error Control and Congestion Control

CO 9. Acquire knowledge on Domain Name Space (DNS), protocols such as SMTP, POP, IMAP, FTP, HTTP and WWW

CO 10. Be familiar with the concept of Cryptography and network security.

TEXT BOOK:

Behrouz A. Forouzan, “Data communication and Networking”, Fourth Edition,Tata McGraw-Hill, 2006.(Unit I to Unit V)

REFERENCE BOOKS:

1. Nader F. Mir, “Computer and Communication Networks”, Pearson Education, 2007
2. Comer, “Computer Networks and Internets with Internet Applications”, Fourth Edition, Pearson Education, 2003.
3. Andrew S. Tanenbaum, “Computer Networks”, Fourth Edition, 2003.
4. William Stallings, “Data and Computer Communication”, Sixth Edition, Pearson Education, 2000

15ECS052 SOFTWARE ENGINEERING 3 0 0 3

Course Objective:

- To provide an in-depth knowledge in software engineering paradigms, life cycles and Development processes.
- To impart a broad understanding of the discipline of software engineering and its application to the development and management of software systems

UNIT I SOFTWARE PROCESS MODELS 9

The Evolving role of Software – Software – The changing Nature of Software – Legacy software —A generic view of process– A layered Technology – A Process Framework –The Capability Maturity Model Integration (CMMI) – Process Assessment – Personal and Team Process Models - Product and Process - Process Models – The Waterfall Model – Incremental Process Models – Incremental Model – The RAD Model – Evolutionary Process Models – Prototyping – The Spiral Model – The Concurrent Development Model – Specialized Process Models – the Unified Process.

UNIT II REQUIREMENTS ENGINEERING 9

Software Engineering Practice – communication Practice – Planning practice Modeling practice– Construction Practice –Deployment - Requirements Engineering -Requirements Engineering tasks – Initiating the requirements Engineering Process-Eliciting Requirements – Developing Use cases – Building the Analysis Models –Elements of the Analysis Model – Analysis pattern – Negotiating Requirements –Validating Requirements.

UNIT III MODELLING 9

Requirements Analysis – Analysis Modeling approaches – data modeling concepts –Object oriented Analysis – Scenario based modeling – Flow oriented Modeling – Class based modeling – creating a behaviour model.

UNIT IV SOFTWARE DESIGN 9

Design Engineering – Design process -Design Quality-Design model-User interface Design – Testing strategies-strategies Issues for conventional and object oriented software-validation testing –system testing –Art of debugging – Project management

UNIT V SOFTWARE MEASUREMENT 9

Software evolution - Verification and Validation -Critical Systems Validation – Metrics for Process, Project and Product-Quality Management -Process Improvement –Risk Management- Configuration Management

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the fundamentals of software process models.

CO 2. Learn about Product and Process, Process Models and the Waterfall Model.

CO 3. Acquire knowledge on Software Engineering Practice and Deployment.

CO 4. Be well versed in Elements of the Analysis Model and Validating Requirements.

CO 5. Understand the Requirements Analysis.

CO 6. Be Familiar with the concept of Flow oriented Modeling and Class based modeling.

CO 7. Analyze Design Engineering and Design process.

CO 8. Discuss testing and Art of debugging.

CO 9. Identify Process metrics for software measurement.

CO 10. Assess, configure and manage various software risks.

TEXT BOOKS:

1. Roger S.Pressman, “Software Engineering: A Practitioner’s Approach”, McGraw Hill International edition, Sixth edition, 2005.

2. Ian Sommerville, “Software Engineering”, 8th Edition, Pearson Education, 2008.

REFERENCE BOOKS:

1. Stephan Schach, “Software Engineering”, Tata McGraw Hill, 2007

2. Pfleeger and Lawrence “Software Engineering: Theory and Practice”, Pearson Education, second edition, 2001.

15ECS053 Computer Networks Laboratory 0 0 3 2

Course Objective: To help the learner to understand the underlying concepts of networked systems and to be able to develop networking programs using Java.

List of Experiments:

1. Programs using TCP Sockets (like date and time server & client, echo server & client, etc..)
2. Programs using UDP Sockets (like simple DNS)
3. Programs using Raw sockets (like packet capturing and filtering)
4. Programs using RPC
5. Simulation of sliding window protocols
6. Experiments using simulators (like OPNET)
7. Performance comparison of MAC protocols
8. Implementing Routing Protocols
9. Performance comparison of Routing protocols
10. .Implementation of Logical and Physical Address
11. Simulation of ARP/RARP Protocol
12. Study of UDP and TCP performance

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the concept of TCP Sockets & UDP Sockets.

CO 2. Learn Writing programs using Raw sockets and RPC.

CO 3. Discuss Simulation of sliding window protocols

CO 4. Display Experiments using simulators..

CO 5. Understand the working principle of MAC protocols

CO 6. Compare and contrast MAC protocols.

CO 7. Handle Routing Protocols.

CO 8. Discuss Logical and Physical Address.

CO 9. Know about Simulation of ARP/RARP Protocol

CO 10. Demonstrate UDP and TCP performance.

15ECS054 Java Programming Laboratory 0 0 3 2

Course Objective:

- To create Java programs that leverage the object-oriented features.
- To learn how to create Persistent objects using serialization.
- To create applications that handles user events.
- To create application that accesses database using JDBC

List of Experiments:

1. JavaDoc comments for documentation
2. java.util package.
3. Lisp-like list in Java.
4. Java interface for ADT Stack.
5. Template for linked-list class in Java
6. Polymorphism.
7. Object serialization
8. Event-driven programming paradigm
9. Multi threading
10. Multi-threaded echo server and a corresponding GUI client in Java
11. JDBC to connect to a back-end database.
12. Mini-Project

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the JavaDoc comments and java.utilpackage.

CO 2. Process Lisp-like list.

CO 3. Implement Java interface for ADT Stack.

CO 4. Do Experiments using simulators Template for linked-list class in Java

CO 5. Implement Polymorphism.

CO 6. Demonstrate Object serialization.

CO 7. Handle Event-driven programming paradigms.

CO 8. Write code for Multi threading in Java

CO 9. Connect back end database using JDBC.

CO 10. Develop Mini-Project

15__055 Introduction to R Software 2 0 0 2

Course Objective

- R is free software that is capable of handling mathematical and statistical manipulations.
- R has its own programming language as well as built in functions to perform any specialized task.

Unit 1 Basic fundamentals 6

Basic fundamentals, installation and use of software, data editing, use of R as a calculator, functions and assignments.

Unit 2 Basic Operations 6

Use of R as a calculator, functions and matrix operations, missing data and logical operators.Conditional executions and loops, data management with sequences.Data management with repeats, sorting, ordering, and lists

Unit 3 Vector Indexing and Strings 6

Vector indexing, factors, Data management with strings, display and formatting.Data management with display paste, split, find and replacement, manipulations with alphabets, evaluation of strings, data frames.

Unit 4 Frames 6

Data frames, import of external data in various file formats, statistical functions, compilation of data.

Unit 5 Graphical and Statistical Functions 6

Graphics and plots, statistical functions for central tendency, variation, skewness and kurtosis, handling of bivarite data through graphics, correlations, programming and illustration with examples.

Total: 30h

Course Outcome:

Upon completion of this course, student will accomplish the following:

CO 1. Install various packages and work effectively in the R environment

CO 2. Learn the basics of R programming including objects, classes, vectors, attributes etc.

CO 3. Become proficient in basic data formatting and manipulating functions

CO 4. Import external data in various file formats

CO 5. Write functions using various methods and loops

CO 6. Learn the handling of bivariate data through graphics

References:

1. Introduction to Statistics and Data Analysis - With Exercises, Solutions and Applications in R By Christian Heumann, Michael Schomaker and Shalabh, Springer, 2016
2. The R Software-Fundamentals of Programming and Statistical Analysis -Pierre Lafaye de Micheaux, Rémy Drouilhet, Benoit Liquet, Springer 2013

3. A Beginner's Guide to R (Use R) By Alain F. Zuur, Elena N. Ieno, Erik H.W.G. Meesters, Springer 2009

15ECS061 INTERNET PROGRAMMING 3 0 0 3

Course Objective:

- To become familiar with the main uses of the Internet as the primary modern technology for online communication.
- To learn the basic features of web browsers such as Internet Explorer and Firefox.
- To understand the implications of Internet on society, primarily in the aspects of communication, commerce, crime, ethics, and privacy to create simple web pages using HTML, CSS and JavaScript.
- To understand the fundamentals of Web development and to design the static and dynamic web pages.

UNIT I BASIC NETWORK AND WEB CONCEPTS 9

Internet – Features of Internet – Domain Name System –World Wide Web – Web terms – TCP and UDP protocols – TCP and UDP Services – URLs –URL library functions – MIME – CGI – PERL– Introduction to SGML – XML: XML Basics – XML Vocabularies – DocumentObjectModel(DOM).

UNIT II JAVA PROGRAMMING 9

Java basics – Classes –Methods – Constructors– I/O streaming – Files – Looking up Internet Address - Socket programming – Client/Server programs – E-mail client – SMTP - POP3 programs – web page retrieval – protocol handlers – Content handlers - Applets – Image handling – Clipping - Remote Method Invocation.

UNIT III SCRIPTING LANGUAGES 9

HTML – forms – frames – tables – web page design – JavaScript: Basics of Client and Server Side Scripting – Introduction to scripting – Variables – Data types – Operators– Control Statements and Loops – functions: function definition – JavaScript Global Functions – arrays – objects – JavaScript Events– simple web applications.

UNIT IV DYNAMIC HTML 9

Dynamic HTML – DHTML technologies – cascading style sheets – object model and collections – Dynamic styles and positioning – event model – filters and transition – data binding – Tabular data control – Events – ActiveX control – Handling of multimedia data.

UNIT V SERVER SIDE PROGRAMMING 9

Servlets – deployment of simple servlets – web server (Java web server / Tomcat / Web logic) – HTTP GET and POST requests – Servlet chaining – session tracking – cookies – JDBC: Characteristics of JDBC– JDBC architecture – JDBC driver – Advantages of using java with JDBC – simple web applications – multi-tierapplications.

TOTAL: 45 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand basic network and web concepts. .

CO 2. Acquire knowledge on MIME, CGI and PERL.

CO 3. Discuss Java basics, I/O streaming, socket programming and web page retrieval

CO 4. Understand protocol handlers, Content handlers and Applets.

CO 5. Be Familiar with the concept of scripting languages.

CO 6. Describe JavaScript Events and simple web applications.

CO 7. Illustrate DHTML technologies.

CO 8. Discuss event model, data binding and ActiveX control of Dynamic HTML

CO 9. Be well versed in Characteristics and architecture of JDBC

CO 10. Be Familiar with the simple web applications and multi-tier applications

TEXT BOOKS:

1. Deitel, Deitel and Nieto, “Internet and World Wide Web – How to program”, Pearson EducationPublishers,2000.
2. Elliotte Rusty Harold, “Java Network Programming”, O’Reilly Publishers, 2002

REFERENCE BOOKS:

1. R.Krishnamoorthy & S.Prabhu, “Internet and Java Programming”, New Age InternationalPublishers,2004.
2. Thomno A. Powell, “The Complete Reference HTML and XHTML”, fourth edition, Tata McGrawHill,2003.
3. Naughton, “The Complete Reference – Java2”, Tata McGraw-Hill, 3rd edition, 1999.

15ECS062 OBJECT ORIENTED ANALYSIS AND DESIGN 3 0 0 3

Course Objective:

- To understand the system modelling and design based on requirements, converting design to code.
- To use various UML design diagrams and to apply the appropriate design patterns.
- To learn the basic Object oriented analysis and design skills through an elaborate case study.
- To apply the process of OOAD in software development.

UNIT I INTRODUCTION 9

Introduction to OOAD – What is OOAD? – What is UML? An Overview of Object Oriented Systems Development - Object Basics – Object Oriented Systems Development Life Cycle: The Software Development Process – Building High-Quality Software – OOSD: A Use-Case Driven Approach - Use case Modeling - Relating Use cases: include, extend and generalization.

UNIT II OBJECT ORIENTED METHODOLOGIES 9

Rumbaugh Methodology - Booch Methodology - Jacobson Methodology - Patterns – Frameworks – Unified Approach – Unified Modeling Language: Static and dynamic model – UML diagrams - UML class diagram – Use case diagram- UML dynamic modeling (Sequence diagram, Collaboration Diagram, State Diagram) - Activity Diagram – Implementation diagrams (Component diagram, Deployment diagram).

UNIT III OBJECT ORIENTED ANALYSIS 9

Identifying use cases : Business object analysis –The unified approach- Business process modeling – Use case model – Developing effective documentation - Object Analysis Classification : Classifications theory – Approaches for identifying classes – Noun phrase approach – Common class patterns approach – Use case driven approach – Classes, responsibilities and collaborators – Naming classes - Identifying Object relationships, Attributes and Methods: Associations – Super sub class relationship – A part of relationships (aggregation) – Class responsibility – Object responsibility.

UNIT IV OBJECT ORIENTED DESIGN 9

Design Axioms: The object oriented design process – Design axioms – Corollaries – Design patterns - Designing Classes: The process - Class visibility – Refining attributes – Designing methods and protocols. Access Layer: Object Storage and Object Interoperability: DBMS – Distributed databases and client server computing – Object relational systems – Multidatabase systems – Designing Access layer classes**.**

UNIT V SOFTWARE QUALITY AND USABILITY 9

View Layer : Designing Interface Objects : Designing view layer classes – Macro level , Micro level process – Purpose of a view layer interface – Prototyping the user interface- Software Quality Assurance: Quality Assurance Tests – Testing strategies – Impact of Object Orientation – Test Cases – Test Plan – Myer's Debugging Principles - System Usability and Measuring User Satisfaction : Usability Testing – User Satisfaction Test (Test Templates) - Mapping design to code**.**

TOTAL: 45 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the fundamentals of OOAD.

CO 2. Design the Software Development Process.

CO 3. Discuss object oriented design methodologies.

CO 4. Acquire knowledge on Unified Modeling Language.

CO 5. Be Familiar with use cases in object oriented analysis

CO 6. Use Attributes and Methods in use case driven approach

CO 7. Design axioms in object oriented system development

CO 8. Discuss Object relational and Multi database systems.

CO 9. Understand the purpose of a view layer interface.

CO 10. Be Familiar with the test Cases, test Plan and Myer's Debugging Principles

TEXT BOOKS:

1. Ali Bahrami, "Object Oriented Systems Development", Tata McGraw-Hill, 1999.
2. Craig Larman,"Applying UML and Patterns: An Introduction to object-oriented Analysis and Design and iterative development", Third Edition, Pearson Education,2005.

REFERENCE BOOKS:

1. Mike O'Docherty, "Object-Oriented Analysis & Design: Understanding System Development with UML 2.0", John Wiley & Sons, 2005.
2. James W- Cooper, Addison-Wesley, "Java Design Patterns – A Tutorial", 2000.

15___063 INFORMATION RETRIEVAL 3 1 0 3

Course Objective:

- To acquire knowledge in different phases and passes of Compiler, and specifying different types of tokens by lexical analyzer.
- To understand the use of Compiler tools like LEX, YACC, etc.
- To learn the different types of compiler tools that meets the requirements of the realistic constraints of compilers.

UNIT I INTRODUCTION 12

Introduction -History of IR- Components of IR – Issues –Open source Search engine Frameworks – The impact of the web on IR – The role of artificial intelligence (AI) in IR – IR Versus Web Search – Components of a Search engine- Characterizing the web.

UNIT II INFORMATION RETRIEVAL 12

Boolean and vector-space retrieval models- Term weighting – TF-IDF weighting- cosine similarity – Preprocessing – Inverted indices – efficient processing with sparse vectors – Language Model based IR – Probabilistic IR –Latent Semantic Indexing – Relevance feedback and query expansion.

UNIT III WEB SEARCH ENGINE – INTRODUCTION AND CRAWLING 12

Web search overview, web structure, the user, paid placement, search engine optimization/ spam. Web size measurement – search engine optimization/spam – Web Search Architectures – crawling – meta-crawlers- Focused Crawling – web indexes –- Near-duplicate detection – Index Compression – XML retrieval. AULibrary.com

UNIT IV WEB SEARCH – LINK ANALYSIS AND SPECIALIZED SEARCH 12

Link Analysis –hubs and authorities – Page Rank and HITS algorithms -Searching and Ranking – Relevance Scoring and ranking for Web – Similarity – Hadoop & Map Reduce – Evaluation – Personalized search – Collaborative filtering and content-based recommendation of documents and products – handling “invisible” Web – Snippet generation, Summarization, Question Answering, Cross- Lingual Retrieval.

UNIT V DOCUMENT TEXT MINING 12

Information filtering; organization and relevance feedback – Text Mining -Text classification and clustering – Categorization algorithms: naive Bayes; decision trees; and nearest neighbor – Clustering algorithms: agglomerative clustering; k-means; expectation maximization (EM).

TOTAL: 60h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the basics, components and issues of information retrieval

CO 2. Gain knowledge on open source search engine framework and the impact of web on IR

CO 3. Determine Boolean and vector-space retrieval models.

CO 4. Preprocess data and use various information retrieval techniques

CO 5. Describe the architecture of web search engine

CO 6. Implement index compression and use XML retrieval techniques

CO 7. Perform Link Analysis and specialized search

CO 8. Do Snippet generation, summarization and cross – lingual retrieval

CO 9. Accomplish Document text mining using various clustering algorithms

TEXT BOOKS:

1. C. Manning, P. Raghavan, and H. Schütze, Introduction to Information Retrieval , Cambridge University Press, 2008.

2. Ricardo Baeza -Yates and Berthier Ribeiro – Neto, Modern Information Retrieval: The Concepts and Technology behind Search 2nd Edition, ACM Press Books 2011.

3. Bruce Croft, Donald Metzler and Trevor Strohman, Search Engines: Information Retrieval in Practice, 1st Edition Addison Wesley, 2009.

4. Mark Levene, An Introduction to Search Engines and Web Navigation, 2nd Edition Wiley, 2010.

REFERENCE BOOKS:

1. Stefan Buettcher, Charles L. A. Clarke, Gordon V. Cormack, Information Retrieval: Implementing and Evaluating Search Engines, The MIT Press, 2010.

2. Ophir Frieder “Information Retrieval: Algorithms and Heuristics: The Information Retrieval Series “, 2nd Edition, Springer, 2004.

3. Manu Konchady, “Building Search Applications: Lucene, Ling Pipe”, and First Edition, Gate Mustru Publishing, 2008

15ECS064 OBJECT ORIENTED ANALYSIS AND DESIGN LAB 0 0 3 2

Course Objective: To learn the basic object oriented analysis and design skills through an elaborate case study UML design diagrams and to apply the appropriate design patterns

List of Experiments:

1. IEEE standard SRS document
2. Gantt chart.
3. Use Case model.
4. UML Activity diagram
5. UML Class diagram.
6. UML Sequence diagram.
7. UML Collaboration diagram
8. State Chart diagram.
9. UML package diagram.
10. Component and the Deployment diagrams.
11. Implementation in any application
12. Testing tools.

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand IEEE standard SRS document and Gantt chart.

CO 2. Design Use Case model and UML Activity diagram

CO 3. Generate UML Class, sequence, collaboration, component, deployment and state chart diagram for any project development

CO 4. Be familiar with testing tools.

15ECS065 INTERNET PROGRAMMING LABORATORY 0 0 3 2

Course Objective*:*

- To create a window applications using Java components
- To learn the networking concepts like Sockets, Datagram packets etc.
- To create a fully functional website with MVC architecture.

List of Experiments:

1. Java components Text fields, buttons, Scrollbar, Choice, List and Check box
2. Various Layouts - Flow Layout, Border Layout, Grid layout, Grid bag layout and card layout
3. Applets
4. Uniform Resource Locator
5. Sockets
6. Datagram sockets and datagram packets.
7. HTML tags
8. Web page creation
9. Create a web page with all types of Cascading style sheets.
10. Client Side Scripts for Validating Web Form Controls using DHTML
11. Programs in Java using Servlets: To invoke servlets from HTML forms.
12. Three-tier applications using servlets, JSP and Databases.

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Create java components like fields, buttons, Scrollbar, Choice, List and Check box
CO 2. Design various kinds of Layout
CO 3. Analyze and implement the concept of applets
CO 4. Generate the concept of Uniform Resource Locator
CO 5. Familiarize and implement the socket programming
CO 6. Build a web page using HTML tags
CO 7. Use cascading style sheet while creating web pages
CO 8. Construct Client Side Scripts for Validating Web Form Controls using DHTML
CO 9. Generate programs using Java servlets and invoke servlets using HTML forms
CO 10. Connect to the database and store data in database

15ECS071 COMPUTER GRAPHICS 3 0 0 3

Course Objective:

- To learn the basics of graphic systems and transformation techniques.
- To study the graphic designing methodologies like shading and adding texture to use in various applications.
- To understand the computer graphics techniques, focusing on 3D modeling, morphing, rendering.

UNIT I 2D PRIMITIVES 9

Overview of Graphics System –Video Display Devices-Input Devices-Hard copy Devices- output primitives – Line, Circle and Ellipse drawing algorithms - Attributes of output primitives – Two dimensional Geometric transformation – Basic, Composite, Other Transformations-Two dimensional viewing – Line, Polygon, Curve and Text clipping algorithms

UNIT II 3D CONCEPTS 9

Parallel and Perspective projections – Depth Queuing-Visible Line and Interface-Three dimensional object representation – Polygons surfaces, Curved lines and surfaces, Splines, Quadric Surfaces –Sphere, Elliposid, Torus-Visualization of data sets - 3D transformations – Translation, Rotation, Scaling and other Transformations, Viewing – Visible surface identification.

UNIT III GRAPHICS PROGRAMMING 9

Color Models – RGB, YIQ, CMY, HSV ,HLS– Animations – General Computer Animation Function, Raster Animations, Computer Animation Languages, Key frame Systems, Morphing - Graphics programming using OPENGL – Basic graphics primitives –Drawing three dimensional objects - Drawing three dimensional scenes

UNIT IV RENDERING 9

Introduction to Shading models –Specular Reflection- Adding Color –Shading and the graphics pipeline-Flat Shading and Smooth shading – Removing Hidden Surfaces-The depth Buffer Approach-Adding texture to faces –pasting the Texture on to a flat surface- Rendering texture – Adding shadows of objects - Shadows as Texture -Drawing Shadows.

UNIT V FRACTALS 9

Fractals and Self similarity –Successive Refinement of curves-Drawing Koch curves and snowflakes – fractional Dimension- Overview of Ray Tracing – Intersecting rays with other primitives – Adding Surface texture –Using Extents- Box and Sphere Extents- Using Projection Extents- Reflections and Transparency – Compound Objects : Boolean operations on Objects .

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Be well versed in line, circle, ellipse drawing algorithms and their implementation.

CO 2. Explain the two dimensional geometric transformations like translation, rotation, scaling and other transformations.

CO 3. Understand the three dimensional concepts and object representations.

CO 4. Be Familiar with the various types of three dimensional representation and their implementation.

CO 5. Analyze different types of visible surface detection techniques and the methods used in each type.

CO 6. Describe the color models and animation Function.

CO 7. Understand the concept of graphics programming using OPENGL.

CO 8. Acquire knowledge on rendering such as specular reflection, shading, colouring etc.

CO 9. Implement the concept of Fractals, drawing Koch curves, snow flakes

CO 10. Be familiar with box, sphere and projection extents.

TEXT BOOKS:

1. Donald Hearn, Pauline Baker, Computer Graphics – C Version, second edition, Pearson Education,2004. (Unit I to Unit III)

2. F.S. Hill, Computer Graphics using OPENGL, Second edition, Pearson Education, 2003.(Unit IV to Unit V)

REFERENCE BOOK:

1. James D. Foley, Andries Van Dam, Steven K. Feiner, John F. Hughes, Computer Graphics- Principles and practice, Second Edition in C, Pearson Education, 2007.

15ECS072 SOFTWARE TESTING 3 0 0 3

Course Objective:

- To learn the principles of validation testing, defect testing, system and component testing
- To understand the strategies for generating system test cases
- To understand the essential characteristics of tool used for test automation

UNIT I INTRODUCTION 9

Testing as an Engineering Activity – Role of Process in Software Quality – Testing as a Process – Basic Definitions – Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support for Developing a Defect Repository.

UNIT II TEST CASE DESIGN 9

Introduction to Testing Design Strategies – The Smarter Tester – Test Case Design Strategies – Using Black Box Approach to Test Case Design Random Testing – Requirements based testing – positive and negative testing -— Boundary Value Analysis – decision tables - Equivalence Class Partitioning state-based testing– cause effect graphing – error guessing - compatibility testing – user documentation testing – domain testing Using White–Box Approach to Test design – Test Adequacy Criteria –static testing vs. structural testing – code functional testing - Coverage and Control Flow Graphs – Covering Code Logic – Paths – Their Role in White–box Based Test Design – code complexity testing – Evaluating Test Adequacy Criteria.

UNIT III LEVELS OF TESTING 9

The Need for Levels of Testing – Unit Test – Unit Test Planning –Designing the Unit Tests. The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – scenario testing – defect bash elimination -System Testing – types of system testing - Acceptance testing –performance testing - Regression Testing – internationalization testing – ad-hoc testing -Alpha – Beta Tests – testing OO systems – usability and accessibility testing

UNIT IV TEST MANAGEMENT 9

People and organizational issues in testing – organization structures for testing teams –testing services - Test Planning – Test Plan Components – Test Plan Attachments –Locating Test Items – test management – test process - Reporting Test Results – The role of three groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group.

UNIT V CONTROLLING AND MONITORING 9

Software test automation – skills needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation- Test metrics and measurements –project, progress and productivity metrics – Status Meetings – Reports and Control Issues – Criteria for Test Completion – SCM – Types of reviews – Developing a review program – Components of Review Plans– Reporting Review Results. – evaluating software quality – defect prevention – testing maturity Model.

TOTAL : 45 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Create test strategies and plans, design test cases, prioritize and execute them
CO 2. Analyze requirements to determine appropriate testing strategies.
CO 3. Design and implement comprehensive test plans
CO 4. Instrument code appropriately for a chosen test technique
CO 5. Apply a wide variety of testing techniques in an effective and efficient manner
CO 6. Compute test coverage and yield according to a variety of criteria
CO 7. Identify the Types of errors and fault models
CO 8. Study the Methods of test generation from requirements
CO 9. Understand the limitations of various test tools
CO 10. Conduct reviews and inspections

TEXT BOOKS:

1. Srinivasan Desikan and Gopalaswamy Ramesh, " Software Testing – Principles and Practices", Pearson education, 2006.
2. Aditya P.Mathur, "Foundations of Software Testing", Pearson Education,2008.

REFERENCES:

1. Boris Beizer, "Software Testing Techniques", Second Edition, Dreamtech, 2003
2. Elfriede Dustin, "Effective Software Testing", First Edition, Pearson Education, 2003.
3. Renu Rajani, Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill, 2004.

15ECS073 .NET ENVIRONMENT 3 0 0 3

Course Objective : To assist the learner to understand the .NET Architecture, Object oriented concepts, to use ADO.NET for database connectivity and developing the ability to solve any type of problems by mapping with real world environment using ASP.NET and C#.

UNIT I INTRODUCTION TO C# 9

Introducing C# - Introduction to .Net framework and Architecture - Understanding .NET-Overview of C#- Literals- Variables- Constant Variables – Scope of Variables – Boxing and Unboxing - Data Types- Operators- Expressions- Branching- Looping- Methods- Arrays- Strings- Structures- Enumerations.

UNIT II OBJECT ORIENTED ASPECTS OF C# 9

Classes-Adding Variables – Adding Methods - Objects – Accessing class Members – Constructors – Abstract classes and Methods - Inheritance - Polymorphism – Interfaces - Operator Overloading - Delegates and Events - Errors and Exceptions.

UNIT III APPLICATION DEVELOPMENT ON .NET 9

Building Windows Forms Applications - Windows Forms Controls – Simple Windows Forms Application with controls and Events - ADO.NET Introduction - ADO.NET Architecture : Connected and Disconnected Architecture – Data Provider:Connection Object,Command Object, Data Reader - Executing a Command using ExecuteNonQuery ,ExecuteScalar , ExecuteReader Datasets : DataTable , DataColumn , DataRow , DataConstraints , DataRelation , DataAdapters

UNIT IV WEB BASED APPLICATION DEVELOPMENT ON .NET 9

Programming Web Applications with Web Forms using ASP.NET - ASP.NET controls - Understand Data Binding and various Data Sources in ASP.NET - Understand the creation of Master Pages and themes - Configuration of web applications using IIS configurations - State management in ASP.NET- Programming Web Services.

UNIT V THE CLR AND THE .NET FRAMEWORK 9

Assemblies- Versioning- Attributes- Reflection- Viewing MetaData- Type Discovery- Reflecting on a Type- Marshaling- Remoting- Understanding Server Object Types- Specifying a Server with an Interface- Building a Server- Building the Client- Using SingleCall- Threads.

TOTAL : 45 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Display proficiency in C# by building stand-alone applications in the .NET framework using C#.

CO 2. Understand object oriented features such as classes, inheritance, interfaces and polymorphism

CO 3. Design, document, code and test small Windows based applications.

CO 4. Build and analyze WEB based applications using ASP.NET

CO 5. Create distributed data-driven applications using the .NET Framework, C#, and ADO.NET

CO 6. Use the Visual Studio IDE to create and debug application and class library solutions and projects.

CO 7. Validate user input in a Windows Forms application

CO 8. To Manage IIS configuration and Services

CO 9. Add code to form and control event procedures in a Windows Forms application

CO 10. Understand the concept of assemblies and reflection

TEXT BOOKS:

1. Balagurusamy. E, “Programming in C#”, Tata McGraw-Hill, 2004. (Unit I, II)

2. Liberty.J, “Programming C#”, 2nd Edition., O’Reilly, 2002. (Unit III, IV, V)

3. Bill Hamilton, Matthew MacDonald , “ ADO.NET in a Nutshell “ ,O'Reilly Media (Unit III)

4. Jesse Liberty, Dan Maharry, Dan Hurwitz . “Programming ASP.NET 3.5” 4th Edition , O'Reilly Media (Unit IV)

REFERENCE BOOKS:

1. Herbert Schildt, “The Complete Reference: C#”, Tata McGraw-Hill, 2004.

2. Robinson et al, “Professional C#”, 2nd ed., Wrox Press, 2002.

3. Andrew Troelsen, “C# and the .NET Platform”, A! Press, 2003.

4. Thamarai Selvi, R. Murugesan, “A Textbook on C#”, Pearson Education,

5. ADO.NET in a Nutshell By Bill Hamilton, Matthew MacDonald Publisher: O'Reilly Media

6. Programming ASP.NET 3.5, 4th Edition By Jesse Liberty, Dan Maharry, Dan Hurwitz Publisher: O'Reilly Media

15ECS074 COMPUTER GRAPHICS LABORATORY 0 0 3 2

Course Objective:

- To understand and design the graphic concepts like compression, transformation and projections using various algorithms.
- To perform various editing operations using any animation software

List of Experiments:

1. Implement Bresenham's algorithms for line, circle and ellipse drawing
2. Perform 2D Transformations such as translation, rotation, scaling, reflection and sharing.
3. Implement Cohen-Sutherland 2D clipping and window-viewport mapping
4. Perform 3D Transformations such as translation, rotation and scaling.
5. Visualize projections of 3D images.
6. Conversion of color models.
7. Implement text compression algorithm
8. Implement image compression algorithm
9. Perform animation using any Animation software
10. Perform basic operations on image using any image editing software
11. Draw three dimensional objects and Scenes using any Animation software
12. Generate Fractal images using any image editing software.

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Be well versed in relationship between Bresenham's line, circle, elipse drawing algorithms and their implementation.

CO 2. Implement two dimensional geometric transformations like Translation, Rotaion, Scaling and other transformations.

CO 3. Develop the two dimensional clipping and window-view port mapping.

CO 4. Implement the concept of three dimensional transformations and their implementation.

CO 5. Demonstrate the visualize projections of 3D images.

CO 6. Analyse and create the concept of color models .

CO 7. Build text compression and image compression algorithms.

CO 8. Draw three dimensional objects and Scenes using any Animation software

15ECS075 OPEN SOURCE & .NET LABORATORY 0 0 3 2

Course Objective:

To familiarize with the operating system features and to develop applications in open source environment using PERL, PHP and Shell Scripts. To implement the basics of .Net framework using ASP.Net and ADO.Net

List of Experiments:

1. Kernel configuration, compilation and installation
2. Shell Scripting
3. Virtualization environment in kernels
4. Perl Scripting
5. Python Scripting
6. Php Scripting
7. Version Control System
8. .Net Console Application
9. .Net GUI Application
10. .Net Event Driven Application
11. ADO .Net Application
12. ASP .Net Application

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Become expertise in programming open Source Language like Perl, Python, Php
CO 2. Design and expertise in creating Shell scripts
CO 3. Develop the skill in environmental setup.
CO 4. Create several programs which enhance the programming skills in Python
CO 5. Use scripts, HTML while Developing PHP
CO 6. Develop PERL scripts for calculation and reporting
CO 7. Build .NET console applications
CO 8. Establish connection to the database using ADO.NET with front end application
CO 9. Design and construct a front application in ASP.NET with different controls which interacts with the database.

Syllabus

Discipline Specific Elective Courses

15ECS101 SOCIAL NETWORK ANALYSIS 3 0 0 3

Course Objective:

- Understand the concept of semantic web and related applications
- Learn knowledge representation using ontology.
- Understand human behaviour in social web and related communities.
- Learn visualization of social networks.

UNIT I INTRODUCTION 9

Introduction to Semantic Web: Limitations of current Web – Development of Semantic Web – Emergence of the Social Web – Social Network analysis: Development of Social Network Analysis – Key concepts and measures in network analysis – Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities – Web-based networks – Applications of Social Network Analysis.

UNIT II MODELLING, AGGREGATING AND KNOWLEDGE REPRESENTATION 9

Ontology and their role in the Semantic Web: Ontology-based knowledge Representation – Ontology languages for the Semantic Web: Resource Description Framework – Web Ontology Language – Modelling and aggregating social network data: State-of-the-art in network data representation – Ontological representation of social individuals – Ontological representation of social relationships – Aggregating and reasoning with social network data – Advanced representations.

UNIT III EXTRACTION AND MINING COMMUNITIES IN WEB SOCIAL NETWORKS 9

Extracting evolution of Web Community from a Series of Web Archive – Detecting communities in social networks – Definition of community – Evaluating communities – Methods for community detection and mining – Applications of community mining algorithms – Tools for detecting communities social network infrastructures and communities – Decentralized online social networks – Multi – Relational characterization of dynamic social network communities.

UNIT IV PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES 9

Understanding and predicting human behaviour for social communities – User data management – Inference and Distribution – Enabling new human experiences – Reality mining – Context – Awareness – Privacy in online social networks – Trust in online environment – Trust models based on subjective logic – Trust network analysis – Trust transitivity analysis – Combining trust and reputation – Trust derivation based on trust comparisons – Attack spectrum and countermeasures.

UNIT V VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS 9

Graph theory – Centrality – Clustering – Node-Edge Diagrams – Matrix representation – Visualizing online social networks, Visualizing social networks with matrix-based representations – Matrix and Node-Link Diagrams – Hybrid representations – Applications – Cover networks – Community welfare –Collaboration networks – Co-Citation networks.

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the Social Network architecture and applications
CO 2. Know the limitations of current web and the need for semantic web.
CO 3. Describe the key concepts and measures in network analysis
CO 4. Define the Ontology and its role in the Semantic Web.
CO 5. Understand the modeling, aggregating and knowledge representation of ontology
CO 6. Discuss the Extracting evolution of Web Community from a Series of Web Archive.
CO 7. Demonstrate Relational characterization of dynamic social network communities
CO 8. Gain knowledge on privacy in online social networks
CO 9. Predict human behavior and enable new human experiences
CO 10. Visualize social based networks with matrix-based representations.

TEXT BOOKS:

1. Peter Mika, “Social Networks and the Semantic Web”, First Edition, Springer 2007
2. Borko Furht, “Handbook of Social Network Technologies and Applications”, 1st Edition, Springer, 2010.

REFERENCES:

1. Guandong Xu ,Yanchun Zhang and Lin Li, “Web Mining and Social Networking – Techniques and applications”, First Edition Springer, 2011.
2. Dion Goh and Schubert Foo, “Social information Retrieval Systems: Emerging Technologies and Applications for Searching the Web Effectively”, IGI Global Snippet, 2008.
3. Max Chevalier, Christine Julien and Chantal Soulé-Dupuy, “Collaborative and Social Information Retrieval and Access: Techniques for Improved user Modelling”, IGI Global Snippet, 2009.
4. John G. Breslin, Alexander Passant and Stefan Decker, “The Social Semantic Web”, Springer, 2009.

15ECS102 DESIGN AND ANALYSIS OF ALGORITHMS 3 0 0 3

Course Objective:

- To Understand the different algorithm design techniques like greedy, divide and conquer, dynamic programming and backtracking.
- To learn and how to apply the various algorithmic design techniques in real time problems based on the time complexity.
- To learn various sorting and searching algorithms

UNIT I BASIC CONCEPTS OF ALGORITHMS 9

Algorithm Analysis – Time Space Tradeoff – Asymptotic Notations – Conditional asymptotic notation – Removing condition from the conditional asymptotic notation - Properties of big-Oh notation – Recurrence equations – Solving recurrence equations – Analysis of linear search.

UNIT II ANALYSIS OF SORTING AND SEARCHING ALGORITHMS 9

Divide and Conquer: General Method – Binary Search – Recursive binary search-iterative binary search-Finding Maximum and Minimum – Merge Sort –Merging two sorted sub array- Greedy Algorithms: General Method – Container Loading – Knapsack Problem.

UNIT III ALGORITHM DESIGN METHODS 9

Dynamic Programming: General Method – Multistage Graphs –Forward approach- backward approach- All-Pair shortest paths –Single source shortest path- Optimal binary search trees – 0/1 Knapsack – Travelling salesperson problem .

UNIT IV ALGORITHMIC TECHNIQUES 9

Backtracking: General Method: State space tree-General and Recursive back tracking algorithm-Estimating the efficiency – 8 Queens Problem – sum of Subsets: Recursive back tracking algorithm– graph coloring – Hamiltonian problem knapsack problems.

UNIT V GRAPH AND PROBLEM SOLVING TECHNIQUES 9

Graph Traversals:Breadth and Depth first search traversal – Connected Components – Spanning Trees – Biconnected components – Branch and Bound: General Methods (FIFO & LC) – 0/1 Knapsack problem: LC &FIFO brand and bound – Introduction toNP-HardandNP-Completeness.

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the steps involved in design &analysis of algorithms.

CO 2. Analyze the tradeoff between time and space complexity.

CO 3. Learn the various asymptotic notations used in specifying the time complexity of an algorithm.

CO 4. Understand the searching algorithm concepts.

CO 5. Identify the algorithm design method in the form of algorithm.

CO 6. Analyze the concept of algorithm techniques.

CO 7. Implement the techniques of graph traversals.

CO 8. Identify the problem belonging to the class P, NP hard or NP complete.

CO 9. Create approximation algorithm for any NP problems.

TEXT BOOKS:

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Computer Algorithms/ C++, Second Edition, Universities Press, 2007.(UNIT 2,3,4,5)
2. K.S. Easwarakumar, Object Oriented Data Structures using C++, Vikas Publishing House pvt. Ltd., 2000 (UNIT-1)

REFERENCE BOOKS:

1. T. H. Cormen, C. E. Leiserson, R.L.Rivest, and C. Stein, "Introduction to Algorithms", Third Edition, Prentice Hall of India Pvt. Ltd, 2009.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education, 2008.

15ECS103 MICROPROCESSORS AND MICROCONTROLLERS 3 0 0 3

Course Objective:

- To study the concepts and basic architecture of 8085, 8086, 8279, 8237, 8051 Pentium processor and Co-processor.
- To understand the importance of different peripheral devices and their interfacing to 8086.
- To know the design aspects of microprocessor and assembly language programs for various applications.

UNIT I THE 8085 MICROPROCESSOR 9

Introduction to Microprocessor – Evolution – Microprocessor architecture – Application – Introduction to 8085 – Architecture of 8085 Microprocessor - Pin diagram of 8085 Microprocessor – Addressing Modes – Instruction set – Instruction and Data formats – Instruction Timing Diagram – Programming the 8085 – Code conversion.

UNIT II 8086 SOFTWARE ASPECTS 9

Intel 8086 microprocessor – Introduction – Architecture – Registers – Pin Description – Instruction set and assembler directives – Addressing modes – Assembly language programming – Procedures – Macros – Interrupts and interrupt service routines – Operations – BIOS function calls.

UNIT III 8086 SYSTEM DESIGN 9

8086 signals and timing – Minimum/Maximum mode of operation – Addressing memory and I/O – Multiprocessor configurations – Coprocessor Configuration – Closely Coupled Configuration – Loosely Coupled Configuration – Communication between CPU and IOP.– System design using 8086.

UNIT IV I/O INTERFACING 9

Memory Interfacing and I/O interfacing with 8085 – Parallel communication interface – Serial communication interface – Asynchronous – Synchronous – Physical Standards – Timer – Keyboard and display controller(8279) – Interrupt controller – Direct Memory Access and DMA controller(8237) – Programming and applications – stepper Motor .

UNIT V MICROCONTROLLERS 9

8051 Micro controller hardware- Architecture – I/O pins – ports and circuits- Memory organization – Special function registers – Counters and Timers – Serial Data I/ O – Interrupts – 8051 instruction set – Addressing modes- Operand types- Operand addressing – Assembly language programming – I/O port programming.

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the concepts of 8085 microprocessors and apply the fundamentals of assembly level programming of 8085 microprocessors.

CO 2. Understand 8086 Microprocessor concepts, system configuration and memory organization.

CO 3. Be familiar with the concepts of 8086 Microprocessor architecture and its assembly level programming

CO 4. Interface Microprocessor with various peripheral devices and program the same for various applications.

CO 5. Classify and comprehend the working principle of I2C Standard, RS232C, RS485, and GPIB.

CO 6. Understand 8051 Microcontroller concepts, architecture and application of Microcontrollers

CO 7. Be familiar with external memory and interfacing the same to the 8051 Microcontroller

CO 8. Write assembly language programming of 8051 Microcontroller with various interfacing devices for diverse applications.

TEXT BOOKS:

1. Ramesh S.Gaonkar, "Microprocessor - Architecture, Programming and Applications with the 8085", Penram International publishing private limited, fifth edition. (1)

2. A.K. Ray & K.M.Bhurchandi, "Advanced Microprocessors and peripherals- Architectures, Programming and Interfacing", TMH, 2002 reprint.

REFERENCE BOOKS:

1. Douglas V.Hall, "Microprocessors and Interfacing: Programming and Hardware", TMH, Third edition
2. Yu-cheng Liu, Glenn A.Gibson, "Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design", PHI 2003
3. Mohamed Ali Mazidi, Janice Gillispie Mazidi, "The 8051 microcontroller and embedded systems", Pearson education, 2004.

15ECS104 MULTICORE PROGRAMMING 3 0 0 3

Course Objective:

- To understand the principles of Multiprocessor and parallel programming.
- To develop exciting new applications that can take advantage of on-chip parallelism.
- To Build and debug Multicore –Ready applications.

UNIT I INTRODUCTION TO MULTIPROCESSORS AND SCALABILITY ISSUES 9

Scalable design principles – Principles of processor design – Instruction Level Parallelism, Thread level parallelism. Parallel computer models –- Symmetric and distributed shared memory architectures – Performance Issues – Multi-core Architectures - Software and hardware multithreading – SMT and CMP architectures –Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture**.**

UNIT II PARALLEL PROGRAMMING 9

Fundamental concepts –Concurrency and Decomposition – parallel algorithm – tasks and decomposition threads and mapping threads versus cores Decomposition techniques– recursive decomposition– data decomposition Designing for threads – scheduling – Threading and parallel programming constructs – Synchronization – Critical sections – Deadlock Threading APIs.

UNIT III OPENMP PROGRAMMING 9

Openmp– Shared And Distributed Memory – Concepts – Parallel Directive – Data Scoping Rules Constructs– Directives-Calls – Threading A Loop – Thread Overheads – Performance Issues – Library Functions. Solutions To Parallel Programming Problems – Data Races, Deadlocks And Live Locks – Non-Blocking Algorithms – Memory And Cache Related Issues.

UNIT IV MPI PROGRAMMING 9

MPI Model – Error– Handling – Error Messages – Collective communication –Data decomposition – Communicators and Topologies – Point-to-Point Communication –Communication Modes – Communication Envelope- Rules-Datatype – Matching Rules – Ping pong – Message probing – Persistent communications – MPI Library.

UNIT V MULTITHREADED APPLICATION DEVELOPMENT 9

Algorithms – Program Development And Performance Tuning – Multithread Debugging Techniques – General Debugging Technique – Debugging In Multithreaded Application In Windows – Thread Windows – Trace Points-Break Point Filters – Naming Threads – Multithreaded Debugging Using GDB – Notification On Thread Creation-Setting Thread Specific Break Points

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the fundamentals of various multicore processor.

CO 2. Acquire knowledge on multi-core architecture techniques.

CO 3. Understand and Differentiate mapping threads and decomposition.

CO 4. Acquire knowledge on deadlock threading API.

CO 5. Analyze shared and disturbed memory concepts.

CO 6. Familiar with performance issues and its solution.

CO 7. Discuss error messages and error handling mechanisms in MPI programming

CO 8. Classify communication and topologies.

CO 9. Write algorithms and debug multi threaded techniques.

CO 10. Be well versed in multithreaded debugging using GDB.

TEXT BOOKS:

1. Shameem Akhter and Jason Roberts, “Multi-core Programming”, Intel Press, 2006.
2. Michael J Quinn, Parallel programming in C with MPI and OpenMP, Tata Mc graw Hill, 2004.(3)(4)

REFERENCES:

1. John L. Hennessey and David A. Patterson, “ Computer architecture – A quantitative approach”, Morgan Kaufmann/Elsevier Publishers, 5th. edition, 2012.
2. David E. Culler, Jaswinder Pal Singh, “Parallel computing architecture : A hardware/ software approach” , Morgan Kaufmann/Elsevier Publishers, 1999.

15ECS105 SYSTEM SOFTWARE 3 0 0 3

Course Objective:

- To understand the relationship between system software and machine architecture.
- To know the design and implementation of assemblers, linkers and loaders.
- To understand the macroprocessors, system software tools and internal working of hardware and software interface of a typical system.

UNIT I INTRODUCTION 9

System software and machine architecture – The Simplified Instructional Computer (SIC) Machine architecture: Memory- Registers-Data and instruction formats - addressing modes -instruction sets – Input / Output – SIC/XE Machine Architecture: Memory-Registers- Data and instruction formats - addressing modes -instruction sets – Input / Output – Programming examples.

UNIT II ASSEMBLERS 9

Basic assembler functions : A simple SIC assembler – Assembler algorithm and data structures - Machine dependent assembler features : Instruction formats and addressing modes – Program relocation - Machine independent assembler features : Literals –Symbol-defining statements – Expressions – Assembler Design Options : One pass assemblers and Multi pass assemblers - Implementation example : MASM assembler**.**

UNIT III LOADERS AND LINKERS 9

Basic loader functions: Design of an Absolute Loader – A Simple Bootstrap Loader -Machine dependent loader features: Relocation – Program Linking – Algorithm and Data Structures for a Linking Loader - Machine-independent loader features: Automatic Library Search – Loader Options - Loader design options: Linkage Editors - Dynamic Linking – Bootstrap Loaders - Implementation example : MSDOS linker.

UNIT IV MACRO PROCESSORS 9

Basic macro processor functions : Macro Definition and Expansion – Macro Processor Algorithm and data structures - Machine-Independent Macro Processor Features : Concatenation of Macro Parameters – Generation of Unique Labels – Conditional Macro Expansion – Keyword Macro Parameters - Macro within Macro - Implementation example : MASM Macro Processor – ANSI C Macro language.

UNIT V SYSTEM SOFTWARE TOOLS 9

Database Management Systems : Basic concept of a DBMS – Levels of Data Description – Use of a DBMS - Text editors : Overview of the Editing Process - User Interface – Editor Structure - Interactive debugging systems: Debugging functions and capabilities – Relationship with other parts of the system – User Interface Criteria.

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Describe the machine architecture of SIC and SIC/XE.

CO 2. Different addressing modes and addressing set.

CO 3. Find the feature differences between machine dependent and independent assemblers.

CO 4. Gain knowledge on one pass assembler and multi pass assembler.

CO 5. Discuss machine dependent and independent loader features.

CO 6. Understand the basic loader functions and linkage editors

CO 7. Acquire knowledge on macro processor algorithm and data structures.

CO 8. Know various system software tools.

CO 9. Understand the basic concepts of data base management systems.

TEXT BOOK:

1. Leland L. Beck, "System Software – An Introduction to Systems Programming", 3rd Edition, Pearson education Asia, 2011.

REFERENCE BOOKS:

1. John J. Donovan "Systems Programming", Tata McGraw-Hill Edition, 2009.
2. D. M. Dhamdhere, "Systems Programming and Operating Systems", Second Revised Edition, Tata McGraw Hill, 2009.
3. John R. Levine, Linkers & Loaders – Harcourt India Pvt. Ltd., Morgan Kaufmann Publishers, 2009.

15ECS106 COMPUTER ORGANIZATION AND ARCHITECTURE 3 0 0 3

Course Objective:

- To understand the architecture of computers and to analyze the performance using various addressing modes.
- To familiarize with hierarchical memory system including cache memories and virtual memory.
- To impart knowledge about different ways of communicating with I/O devices and standard I/O interfaces.

UNIT I BASIC STRUCTURE OF COMPUTERS 9

Functional units – Basic operational concepts – Bus structures – Performance and metrics – Instructions and instruction sequencing – Hardware – Software Interface – Instruction set architecture – Addressing modes – RISC – CISC – ALU design – Fixed point and floating point operations : Floating Point Numbers and Operations.

UNIT II BASIC PROCESSING UNIT 9

Some Fundamental concepts – Execution of a complete instruction: Branch instructions – Multiple bus organization – Hardwired control: A Complete Processor – Micro programmed control: Microinstructions – Microprogram Sequencing – Wide-Branch Addressing – Microinstructions with next address field – Prefetching and emulation – Nano programming.

UNIT III PIPELINING 9

Basic concepts: Role of Cache Memory – Pipeline Performance – Data Hazards – Instruction Hazards – Influence on Instruction Sets: Addressing modes – Condition Codes – Datapath and Control Considerations – Superscalar Operation: Out-of-Order Execution – Execution Completion – Dispatch Operation – Performance Considerations – Exception Handling.

UNIT IV MEMORY SYSTEM 9

Basic concepts – Semiconductor RAM – ROM – Speed – Size and cost – Cache Memories: Mapping Functions – Replacement Algorithms – Example – Performance Considerations: Interleaving – Hit Rate and Miss Penalty – Caches on the Processor Chip – Virtual Memories – Memory Management Requirements – Associative Memories – Secondary Storage devices.

UNIT V I/O ORGANIZATION 9

Accessing I/O devices – Interrupts : Interrupt Hardware – Enabling and Disabling Interrupts – Handling Multiple Devices – Controlling Device Requests – Exceptions – Direct Memory Access: Bus Arbitration – Buses: Synchronous Bus – Asynchronous Bus – Interface circuits: Parallel Port – Serial Port – Standard I/O Interfaces (PCI, SCSI, and USB), I/O devices and processors.

TOTAL: 45h

Course Outcome:

At the end of this course, the student will be able to

CO 1. Understand the Basic Structure of Computers.

CO 2. Draw the timing diagrams for Memory-Read, Memory-Write, I/O Read and I/O Write for Synchronous and Asynchronous buses.

CO 3. Understand the intricacies of representation and algorithm for addition, subtraction, division and multiplication of integer and floating point numbers.

CO 4. Clearly explain the differences between CISC and RISC processors.

CO 5. Understand the pipelining concepts used for speeding up the system.

CO 6. Gain Knowledge on the cache architecture and different cache mapping techniques.

CO 7. Explain the various types of Memories and Memory Management Techniques.

CO 8. Understand the concept of interrupt mechanism.

CO 9. Acquire knowledge on the architecture and functioning of Computer Peripherals.

CO 10. Understand the Computer Performance Metrics.

TEXT BOOK:

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, “Computer Organization”, Fifth Edition, Tata McGraw Hill, 2011.

REFERENCE BOOKS:

1. William Stallings, “Computer Organization and Architecture – Designing for Performance”, Seventh Edition, Pearson Education, 2009.

2. David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/Software interface”, Fifth Edition, Elsevier, 2014.
3. John P. Hayes, “Computer Architecture and Organization”, Third Edition, Tata 2014.McGraw Hill, 2014.
4. M. Morris Mano, “Computer system Architecture”, Third edition, Prentice Hall of India, 2007.

15ECS107 ARTIFICIAL INTELLIGENCE 3 0 0 3

Course Objective:

- To know about the basic knowledge representation, problem solving and learning methods,
- To design an intelligent agent that can solve ontological problems and to learn about the search strategies,
- To learn the applicability, strengths and weaknesses to solve particular engineering problems.

UNIT I INTRODUCTION 9

Artificial Intelligence: Definition-Turing Test-Relation with other Disciplines-History of AI Applications- Agent: Intelligent Agent-Rational Agent - Nature of Environments-Structure of Agent.-Problem Solving Agent - Problems: Toy Problems and Real-world Problems-Uninformed Search Strategies: BFS, DFS, DLS, IDS, Bidirectional Search - comparison of uninformed search strategies.

UNIT II PROBLEM SOLVING 9

Informed Search Strategies-Greedy best-first search-A* search-Heuristic functions-Local search Algorithms and Optimization problems - Online Search Agent-Constraint Satisfaction Problems-Backtracking Search for CSP’s – Local Search for Constraint Satisfaction Problems-Structure of Problems -Adversarial Search-Optimal Decision in Games-Alpha-Beta Pruning-Imperfect Real Time Decisions-Games that Include an Element of Chance.

UNIT III KNOWLEDGE REPRESENTATION 9

First-Order Logic:Syntax and Semantics of First-Order Logic: Models for first-order logic, Symbols and Interpretations, Terms, Atomic sentences, Complex sentences, Quantifiers, Equality - Using First-Order-Logic-Knowledge Engineering in First-Order-Logic- Inference in First-Order Logic: Inference rules-Unification and Lifting-Forward Chaining-Backward Chaining-Resolution.

UNIT IV LEARNING 9

Learning from Observations: Forms of Learning - Learning Decision Trees: Decision Trees as Performance elements, Expressiveness of decision trees, Inducing decision trees from examples, Choosing Attribute tests, Assessing the performance of the learning algorithm, Noise and overlifting, Broadening the applicability of decision trees – Ensemble Learning - A Logical Formulation of Learning - Knowledge in Learning - Explanation-Based Learning - Learning using Relevance Information - Inductive Logic Programming.

UNIT V APPLICATIONS 9

Communication –Communication as action -A formal grammar for a fragment of English – Syntactic Analysis – Augmented Grammars – Semantic Interpretation – Ambiguity and Disambiguation – Discourse Understanding – Grammar Induction. Perception –Image Formation –Early Image Processing Operations – Extracting Three Dimensional Information – Object Recognition – Using Vision for Manipulation and Navigation.

Total: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Identify problems that are amenable to solution by AI methods

CO 2. Apply appropriate AI methods to solve a given problems.

CO 3. Demonstrate different types of AI agent.

CO 4. Know various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms)

CO 5. Understand the fundamentals of knowledge representation (logic-based, frame based ,semantic nets) inference and theorem proving.

CO 6. Learn how to build simple knowledge based systems.

CO 7. Recognize working knowledge of reasoning in the presence of incomplete and/or uncertain information

CO 8. Ability to apply knowledge representation, reasoning and machine learning techniques to real world problems.

CO 9. Formalize a given problem in the language/framework of different AI methods. Implement basic AI algorithm.

CO 10. Design and carry out an empirical evaluation of different algorithms on problems formalization and state the conclusions that the evaluation supports.

TEXT BOOKS:

1. Stuart Russell, Peter Norvig, “Artificial Intelligence – A Modern Approach”, 3rd Edition, Pearson Education / Prentice Hall of India 2010.

2. Nils J. Nilsson, “Artificial Intelligence: A new Synthesis”, Harcourt Asia Pvt. Ltd, 2009.

REFERENCE BOOKS:

1. Elaine Rich and Kevin Knight, “Artificial Intelligence”, 2nd Edition, Tata McGraw-Hill, 2009.
2. Patrick Henry Winston, “Artificial Intelligence”, Pearson Education / PHI, 2004

15ECS108 PROGRAMMING PARADIGMS 3 0 0 3

Course Objective:

- To understand the principles and practices of object oriented programming in Java, including defining classes, invoking methods, packages and threading.
- To understand the concepts of designing the graphics programming using awt and java swing.
- To develop program using applets for potential inclusion in web page.

UNIT I OBJECT-ORIENTED PROGRAMMING – FUNDAMENTALS 9

Review of object oriented programming - Objects and classes in Java – Defining classes – Methods - Access specifiers – static members – static fields - static methods - static variables – constructors - Default constructor - parameterized constructor – finalize method – Arrays – Strings – Packages – user defined packages – Java Doc comments

UNIT II OBJECT-ORIENTED PROGRAMMING – INHERITANCE 9

Inheritance – class hierarchy – polymorphism - Runtime polymorphism - compile time polymorphisms– Encapsulation - static and dynamic binding – final keyword – abstract classes – the Object class: Method of object class – java Reflection – interfaces – Properties of interfaces – object cloning – inner classes – use of inner classes – proxies

UNIT III EVENT-DRIVEN PROGRAMMING 9

Graphics programming – Frame – Components – working with 2D shapes – Using color, fonts, and images – java AWT Basics - AWT event hierarchy – event Handling and listener – adapter classes – actions – mouse events – Model-View-Controller design pattern - Introduction to Swing - Swing Components - buttons – layout management .

UNIT IV GENERIC PROGRAMMING 9

Motivation for generic programming – generic classes – generic methods – generic code and virtual machine – inheritance and generics – reflection and generics – Exceptions handling fundamentals – exception hierarchy – Exception types – Exception handler: catch - throw – throws - finally – Stack Trace Elements - Assertions – logging.

UNIT V CONCURRENT PROGRAMMING 9

Multi-threaded programming – Multitasking – Thread Basics - interrupting threads –Life cycle of thread: thread states – thread properties – thread synchronization – types of synchronization – synchronized block in java- static synchronization – thread-safe Collections – Executors – synchronizers – threads and event-driven programming

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the fundamentals of object oriented programming.

CO 2. Define classes, methods and different types of constructors.

CO 3. Implement inheritance, polymorphism and encapsulation.

CO 4. Describe and write code in generic programming

CO 5. Create graphic applications using objects, events and adapter classes.

CO 6. Get knowledge on swing components, buttons and layout management.

CO 7. Handle exceptions at multiple situations.

CO 8. Discuss generic programming and its concepts.

CO 9. Differentiate multi-threading programming and multitasking.

CO 10. Acquire knowledge on different types of synchronization in concurrent programming

TEXT BOOKS:

1. Cay S. Horstmann and Gary Cornell, “Core Java: Volume I – Fundamentals”, Ninth Edition, Sun Microsystems Press, 2013.
2. K. Arnold and J. Gosling, “The JAVA programming language”, Third edition, Pearson Education, 2005.

REFERENCE BOOKS:

1. K. Arnold and J. Gosling, “The JAVA programming language”, Fourth edition, Pearson Education, 2005.
2. Timothy Budd, “Understanding Object-oriented programming with Java”, Updated Edition, Pearson Education, 2000.
3. C. Thomas Wu, “An introduction to Object-oriented programming with Java”, seventh Edition, Tata McGraw-Hill Publishing company Ltd., 2012.

15ECS109 CRYPTOGRAPHY AND NETWORK SECURITY 3 0 0 3

Course Objective:

- To understand the fundamental principles, algorithms of cryptographic techniques and expose them to various scenarios of cyber crime with an introduction to cyber law along with a thrust on security on the internet.
- To develop an understanding of information assurance as practiced in computer operating systems, distributed systems, networks and representative applications.

UNIT I INTRODUCTION 9

OSI Security Architecture - Classical Encryption techniques – Cipher Principles – Data Encryption Standard – The strength of DES - Block Cipher Design Principles and Modes of Operation - Evaluation criteria for AES – AES Cipher – Multiple Encryption and Triple DES – Placement of Encryption Function – Traffic Confidentiality – Key distribution – Random Number Generation.

UNIT II PUBLIC KEY CRYPTOGRAPHY 9

Key Management - Diffie- Hellman key Exchange – Elliptic Curve Arithmetic - Elliptic Curve Cryptography - Introduction to Number Theory – Confidentiality using Symmetric Encryption – Public Key Cryptography/RSA.

UNIT III AUTHENTICATION AND HASH FUNCTION 9

Authentication requirements – Authentication functions – Message Authentication Codes – Hash Functions – Security of Hash Functions and MACs – MD5 message Digest algorithm - Secure Hash Algorithm – RIPEMD – HMAC Digital Signatures – CMAC Digital Signatures - Digital Signatures - Authentication Protocols – Digital Signature Standard.

UNIT IV NETWORK SECURITY 9

Authentication Applications: Kerberos – X.509 Authentication Service – Electronic Mail Security: Pretty good privacy, S/MIME – IP Security – Web Security: Web security considerations, Secure socket layer and Transport layer Security – Authentication Header – Encapsulating Security Payload – Combining Security Associations – Key Management.

UNIT V SYSTEM LEVEL SECURITY 9

Intruders: Intrusion detection – password management – Malicious software: Viruses and related Threats, Virus Counter measures, Distributed Denial of Service Attacks – Firewalls: Firewall Design Principles, Trusted Systems, Common Criteria for Information Technology Security Evaluation – Internet standards and internet security.

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand OSI security architecture and the design principles of Block cipher.

CO 2. Acquire knowledge on block cipher modes of operation

CO 3. Explain encryption techniques

CO 4. Describe key management in public key cryptography.

CO 5. Understand Hash Functions and Authentication Protocols.

CO 6. Familiarize with MD5 message Digest algorithm.

CO 7. Analyze the Electronic Mail Security and IP Security.

CO 8. Discuss Encapsulating Security Payload and Key Management.

CO 9. Gain knowledge on Intrusion detection and Distributed Denial of Service Attacks.

CO 10. Evaluate Firewall Design Principles and Internet standards and internet security

TEXT BOOKS:

1. William Stallings, “Cryptography And Network Security – Principles and Practices”, Prentice Hall of India, 5th Edition, 2013.

2.Atul Kahate, “Cryptography and Network Security”, Tata McGraw-Hill, 2011.

REFERENCE BOOKS:

1. Bruce Schneier, “Applied Cryptography”, John Wiley & Sons Inc, 2015.

2. Charles B. Pfleeger, Shari Lawrence Pfleeger, “Security in Computing”, 5th Edition, Pearson education, 2015.

15ECS110 THEORY OF COMPUTATION 3 0 0 3

Course Objective:

- To construct finite state machines and the equivalent regular expressions.
- To understand and prove the equivalence of languages described by finite state machines and regular expressions. To construct and prove pushdown automata and the equivalent context free grammars.
- To construct Turing machines and Post machines for a variety of issues in the mathematical development of computer science theory, particularly finite representations for languages and machines.

UNIT I AUTOMATA 9

Introduction- Basic Mathematical Notation and techniques- Finite State systems - Basic Definitions - Introduction to formal proof – Additional forms of proof – Inductive proofs –Finite Automata (FA) – Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions - Equivalence of NFA and DFA – Equivalence of NDFA's with and without €-moves.

UNIT II REGULAR EXPRESSIONS AND LANGUAGES 9

Introduction – Regular set – Regular Expression – FA and Regular Expressions: Equivalence of NFA and Regular Expression – Direct method for Conversion of Regular Expressions to Finite Automata - Conversion of Finite Automata to Regular Expressions - Applications of Regular Expression – Identity rules - Proving languages not to be regular – Closure properties of regular languages .

UNIT III CONTEXT-FREE GRAMMARS AND LANGUAGES 9

Grammar Introduction– Types of Grammar - Context-Free Grammar (CFG) – Derivation tree – Relationship between derivation and derivation tree - Trees – Ambiguity in grammars and languages –Definition of the Pushdown automata - Moves – Languages of a Pushdown Automata –Equivalence of Pushdown automata and CFG– Deterministic Pushdown Automata.

UNIT IV PROPERTIES OF CONTEXT-FREE LANGUAGES 9

Simplification of CFG – Elimination of Useless symbols - Unit productions - Null productions - Normal forms for CFG: Chomsky's Normal form – Greibach Normal form – Applications of Context Free Grammer - Pumping Lemma for CFL – Problems based on pumping Lemma - Closure Properties of CFL – Turing Machines: Definitions – Models – Programming Techniques for TM.

UNIT V UNDECIDABILITY 9

A language that is not Recursively Enumerable (RE) – An undecidable problem that is RE – Undecidable problems about Turing Machine – Post's Correspondence Problem – Intractable problems: The classes P and NP: The class of languages P – Kruskal's Algorithm - The class of languages NP – Travelling Salesman's Problem.

TOTAL: 45h

Course Outcome:

At the end of this course, the student will be able to

CO 1. Understand the Basic mathematical notations and techniques of automata and Finite Automata.

CO 2. Gain knowledge on Equivalence of NFA, DFA and closure properties of regular languages

CO 3. Understand the Direct method for Converting Regular Expressions to Finite Automata.

CO 4. Familiarize with the Applications of Regular Expression.

CO 5. Describe Context free grammars and languages

CO 6. Find the equivalence of pushdown automata and context free grammar.

CO 7. Understand the Normal forms for CFG: Chomsky's Normal form.

CO 8. Discuss Closure Properties of CFL.

CO 9. Analyze the Post's Correspondence Problem and P, NP class problems

TEXT BOOKS:

1. J.E. Hopcroft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computations", 3rd Edition, Pearson Education, 2008.
2. H.R. Lewis and C.H. Papadimitriou, "Elements of the theory of Computation", Pearson Education, 2005.

REFERENCE BOOKS:

1. J. Martin, "Introduction to Languages and the Theory of Computation", Third Edition, Tata Mc Graw Hill, 2007.
2. Micheal Sipser, "Introduction of the Theory and Computation", Thomson Brokecole, 1997.

15ECS111 SOFT COMPUTING 3 0 0 3

Course Objective:

- To gain the Knowledge about Fuzzy logic and Knowledge engineering.
- To be familiar with design of various neural networks.
- To learn the fuzzy logic concepts and genetic programming.

UNIT I FUZZY SET THEORY 9

Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set-theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If-Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

UNIT II OPTIMIZATION 9

Derivative-based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton's Method – Step Size Determination – Derivative-free Optimization – Genetic Algorithms and search space – general genetic algorithm – operators – Generational cycle – stopping condition – constraints – classification genetic programming – multilevel optimization – Simulated Annealing – Random Search – Downhill Simplex Search.

UNIT III ARTIFICIAL INTELLIGENCE 9

Introduction, Knowledge Representation – Reasoning, Issues and Acquisition: Prepositional and Predicate Calculus Rule Based knowledge Representation Symbolic Reasoning Under Uncertainity Basic knowledge Representation Issues Knowledge acquisition – Heuristic Search: Techniques for Heuristic search Heuristic Classification -State Space Search: Strategies Implementation of Graph Search Search based on Recursion Patent-directed Search Production System and Learning.

UNIT IV NEURO FUZZY MODELING 9

Adaptive Neuro – Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm –Learning Methods that Cross-fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum – Fuzzy reasoning – Fuzzy inference systems – Overview of fuzzy expert system-Fuzzy decision making.

UNIT V APPLICATIONS OF COMPUTATIONAL INTELLIGENCE 9

Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction. – A fusion approach of multispectral images with SAR– Optimization of traveling salesman problem using genetic algorithm approach – Soft computing based hybrid fuzzy controllers.

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Be well versed in fuzzy sets, soft computing and parameterization.

CO 2. Explain the rules of fuzzy interface systems and different fuzzy models.

CO 3. Understand various optimization methods and genetic algorithms.

CO 4. Implement the concept of generational cycle, annealing and simplex search.

CO 5. Learn knowledge representation and uncertainty in Artificial intelligence.

CO 6. Demonstrate the concept of heuristic search techniques and recursion patent.

CO 7. Analyze the neuro fuzzy inference systems and learning algorithms.

CO 8. Describe fuzzy spectrum, expert system and decision making.

CO 9. Determine recognition, kinematics problems and color recipe predictions.

CO 10. Exhibit the applications of computational intelligence.

TEXT BOOKS:

1. J.S.R.Jang, C.T.Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing”, Pearson Education 2008.
2. N.P.Padhy, “Artificial Intelligence and Intelligent Systems”, Oxford University Press, 2006. (3)

REFERENCES:

1. Elaine Rich & Kevin Knight, Artificial Intelligence, Second Edition, Tata Mcgraw Hill Publishing Comp., 2006, New Delhi.
2. Timothy J.Ross, “Fuzzy Logic with Engineering Applications”, McGraw-Hill, 4th Edition, 2016.
3. Davis E.Goldberg, “Genetic Algorithms: Search, Optimization and Machine Learning”, 4th Edition, 2008.
4. S. Rajasekaran and G.A.V.Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI, 2005.
5. R.Eberhart, P.Simpson and R.Dobbins, “Computational Intelligence - PC Tools”, AP Professional, Boston,1996
6. Amit Konar, “Artificial Intelligence and Soft Computing Behaviour and Cognitive model of the human brain”, CRC Press, 2008.

15ECS112 ADVANCED OPERATING SYSTEMS 3 0 0 3

Course Objective:

- To understand the distributed System architecture and multiprocessor operating system.
- To gain knowledge on Distributed operating system concepts that includes architecture, Mutual exclusion algorithms, Deadlock detection algorithms and agreement protocols.
- To gain insight on to the distributed resource management components viz. the algorithms for implementation of distributed shared memory, recovery and commit protocols.

UNIT I DISTRIBUTED OPERATING SYSTEM 9

Architectures of Distributed Systems - System Architecture types - issues in distributed operating systems - communication networks – communication primitives. Theoretical Foundations - inherent limitations of a distributed system – lamp ports logical clocks – vector clocks – casual ordering of messages – global state – cuts of a distributed Computation – termination detection. Distributed Mutual Exclusion – introduction – the classification of mutual exclusion and associated algorithms – a comparative performance analysis.

UNIT II DISTRIBUTED DEADLOCK AND RESOURCE MANAGEMENT 9

Distributed Deadlock Detection -Introduction - deadlock handling strategies in distributed systems – issues in deadlock detection and resolution – control organizations for distributed deadlock detection – centralized and distributed deadlock detection algorithms –hierarchical deadlock detection algorithms. Agreement protocols – Introduction –the system model, a classification of agreement problems, solutions to the Byzantine agreement problem, applications of agreement algorithms. Distributed resource management: introduction-architecture – mechanism for building distributed file systems – design issues – log structured file systems.

UNIT III FAILURE RECOVERY AND FAULT TOLERANCE 9

Distributed shared memory – Architecture – Algorithms for implementing DSM – Memory coherence and protocols – design issues. Distributed Scheduling – Introduction – issues in load distributing – components of a load distributing algorithm – stability – load distributing algorithm – performance comparison – selecting a suitable load sharing Algorithm – requirements for load distributing – Task migration and associated issues. Failure Recovery and Fault tolerance: introduction– basic concepts – Classification of failures – backward and forward error recovery, backward error recovery- recovery in concurrent systems – consistent set of check points – synchronous and asynchronous check pointing and recovery – check pointing for distributed database systems- recovery in replicated distributed databases.

UNIT IV CRYPTOGRAPHY AND SECURITY OPERATING SYSTEM 9

Protection and security -preliminaries, the access matrix model and its implementations – safety in matrix model- advanced models of protection. Data security – cryptography: Model of cryptography, conventional cryptography- modern cryptography, Private key cryptography, Data encryption standard- Public key cryptography – Multiple encryption – Authentication in Distributed systems.

UNIT V MULTIPROCESSOR AND DATABASE OPERATING SYSTEMS 9

Multiprocessor operating systems - basic multiprocessor system architectures – Inter connection networks for multiprocessor systems –Caching –hypercube architecture. Multiprocessor Operating System - structures of multiprocessor operating system, operating system design issues- threads- process synchronization and scheduling.
Database Operating systems :Introduction- requirements of a database operating system Concurrency control : theoretical aspects – introduction, database systems – a concurrency control model of database systems- the problem of concurrency control – Serializability – theory- distributed database systems, concurrency control algorithms introduction, basic synchronization primitives, lock based algorithms-timestamp based algorithms, optimistic algorithms – concurrency control algorithms, data replication.

TOTAL: 45h

Course Outcome:

At the end of this course, the student will be able to

CO 1. Understand the different types of system architecture and design issues in distributed operating systems.
CO 2. Know the classification of mutual exclusion and associated algorithms.
CO 3. Determine deadlock handling strategies in distributed systems.
CO 4. Familiarize with the classification of agreement problems and its applications.
CO 5. Understand distributed resource management techniques.
CO 6. Analyze the algorithms for implementing distributed shared memory.
CO 7. Evaluate the performance of load distributing and load sharing algorithms.
CO 8. Handle failure recovery and fault tolerance in operating systems.
CO 9. Examine safety in matrix model and advanced models of protection.
CO 10. Implement data security using cryptography techniques and to discuss the requirements and architecture of microprocessor and database operating system.

TEXT BOOK:

1. Mukesh Singhal, Niranjan G.Shivaratri, "Advanced concepts in operating systems: Distributed, Database and multiprocessor operating systems", TMH, 2001.

REFERENCES:

1. Andrew S.Tanenbaum, "Modern operating system", PHI, 2014
2. Pradeep K.Sinha, "Distributed operating system-Concepts and design", PHI, 2003.
3. Andrew S.Tanenbaum, "Distributed operating system", Pearson education, 2013

15ECS113 UNIX INTERNALS 3 0 0 3

Course Objective:

- To understand the kernel, I/O & files, process control, scheduling and memory management policies in unix.
- To understand the file organization and management.
- To know the various system calls and to have knowledge of process architecture, process control & scheduling and memory management.

UNIT I OVERVIEW 9

General Overview of the System : History – System structure – User perspective – Operating system services – Assumptions about hardware. Introduction to the Kernel : Architecture of the UNIX operating system – Introduction to system concepts. The Buffer Cache: Buffer headers – Structure of the buffer pool – Scenarios for retrieval of a buffer – Reading and writing disk blocks – Advantages and disadvantages of the buffer cache.

UNIT II FILE SUBSYSTEM 9

Internal representation of files: Inodes –Access Inodes – Releasing Inodes – Algorithm - Structure of a regular file – Allocation of contiguous file and fragmentation of free space - Directories – Conversion of a path name to an Inode – Algorithm - Super block – Inode assignment to a new file – Algorithm – Allocation of disk blocks – Algorithm.

UNIT III SYSTEM CALLS FOR THE FILE SYSTEM 9

File System Calls - Open – Algorithm for opening a file - Read – Write - Algorithm for reading and writing a file – File and record locking – Adjusting the position of file I/O – Lseek – Close – File creation – Creation of special files – Changing directory, root, owner, mode – stat and fstat – Pipes – Dup – Mounting and unmounting file systems – link – unlink.

UNIT IV PROCESSES 9

Process states and transitions – Layout of system memory – The context of a process – Saving the context of a process – Manipulation of the process address space - Sleep. Process Control : Process creation – Signals – Process termination – Awaiting process termination – Invoking other programs – user id of a process – Changing the size of a process - Shell – System boot and the INIT process– Process Scheduling.

UNIT V MEMORY MANAGEMENT AND I/O 9

Memory Management Policies : Swapping – Allocation of Swap Space - Swapping Processes Out - Demand paging – Data Structure for Demand Paging – Algorithm for Demand Paging - - The I/O Subsystem : Driver Interface – Algorithm for open and close a device – Disk Drivers - Algorithm – Terminal Drivers– Streams – Inter process communication.

TOTAL: 45 h

Course Outcome:

At the end of this course, the student will be able to

CO 1. Understand the architecture of UNIX operating system.

CO 2. Know the concepts, merits and demerits of buffer cache.

CO 3. Analyze the representation of file Inodes and allocation of contiguous files.

CO 4. Write an algorithm for assignment and inode to a new file and allocation of disk blocks.

CO 5. Represent various system calls for file subsystem.

CO 6. Identify process states, transition and process control mechanism.

CO 7. Learn about the different Process states and also to learn the memory organization.

CO 8. Analyze multiple Process scheduling Techniques.

CO 9. Demonstrate memory management policies and its implementation.

CO 10. Create algorithms for I/O Subsystem and device drivers.

TEXT BOOK:

1. Maurice J. Bach, “The Design of the Unix Operating System”, Pearson Education, 2006

REFERENCE BOOKS:

1. B. Goodheart, J. Cox, “The Magic Garden Explained”, Prentice Hall of India, 1994.
2. S. J. Leffler, M. K. Mckusick, M. J. .Karels and J. S. Quarterman., “The Design and Implementation of the 4.3 BSD Unix Operating System”, Addison Wesley, 1998.

15ECS114 USER INTERFACE DESIGN 3 0 0 3

Course Objective: To gain knowledge about how to create a User Interface, how to use different type of controls, Menu usage and its different types and components, different methodologies used to implement it and how to use multimedia, prototypes and analyzing different types of testing

UNIT I INTRODUCTION 9

Human Computer Interface – A brief History of Screen Design - Characteristics Of Graphics Interface –Direct Manipulation Graphical System – Web User Interface –Popularity –Characteristic of Web Interface Principles of User Interface Design

UNIT II HUMAN COMPUTER INTERACTION 9

User Interface Design Process – Obstacles –Usability –Human Characteristics In Design – Human Interaction Speed –Business Functions and Requirement Analysis : Direct Methods and Indirect Methods – Basic Business Functions – Design Standards – System Training – Structures Of Menus – Functions Of Menus–Contents Of Menu– Formatting – Phrasing The Menu – Selecting Menu Choice–navigating Menus– Kinds of Graphical Menus.

UNIT III WINDOWS 9

Window Characteristics– Components– Presentation Styles– Types– Managements– Organizations– Operations– Web Systems– Device Based Controls Characteristics–Screen Based Controls Characteristics – Operate Control – Text Entry Controls – Selection Control–Combination Control– Custom Control– Presentation Control.

UNIT IV MULTIMEDIA 9

Text For Web Pages – Providing the Proper Feedback– Guidance & Assistance–International Consideration – Accessibility– Icons– Image– Multimedia – Coloring.

UNIT V WINDOWS LAYOUT– TEST 9

Prototypes – Kinds Of Tests – Analyze ,Modify and Retest – Evaluating the Working System - Information Search – Visualization –Hypermedia – Software Tools : Interface Design Tools,Software Testing Tools

TOTAL: 45 h

Course Outcome:

At the end of this course, the student will be able to

CO 1. Understand the concept of Human Computer Interface and Direct Manipulation Graphical System.

CO 2. Acquire knowledge on Web User Interface and Popularity.

CO 3. Discuss User Interface Design Process, Obstacles and Usability.

CO 4. Know about Structures, Functions, Contents, Formats and Phrasing of Menu.

CO 5. Understand Window Characteristics, Presentation Styles, Organizations and Operations.

CO 6. Use Operate Control, Text Entry Controls, Selection Control, Combination Control, Custom Control and Presentation Control in interface design.

CO 7. Determine Text for Web Pages.

CO 8. Desscribe International Consideration and Accessibility of multimedia

CO 9. Identify Prototypes and Kinds Of Tests in windows layout

CO 10. Gain knowledge on the concept of Visualization and Hypermedia.

TEXT BOOKS:

1. Wilbent. O. Galitz ,“The Essential Guide To User Interface Design”, John Wiley& Sons, 2009
2. Ben Sheiderman, “Design The User Interface”, Pearson Education, 2013

REFERENCES:

1. Alan Cooper, “The Essential Of User Interface Design”, Wiley – Dream Tech Ltd.,2002

15ECS115 DISTRIBUTED SYSTEMS 3 0 0 3

Course Objective:

- To learn the concepts of Distributed system with examples like resource sharing.
- To understand the different types of communication process like client-server communication, group communication and distributed objects.
- To understand the Distributed File System, Distributed debugging and Distributed Memory,

UNIT I DISTRIBUTED SYSTEM AND COMMUNICATION 9

Characterization of Distributed Systems - Introduction- Examples-Resource Sharing and the Web-Challenges. System Models-Architectural- Fundamental-Inter process Communication-Introduction-API for Internet protocols-External data representation and marshalling--Client-server communication- Group communication-Case study: Interprocess Communication in UNIX.

UNIT II DISTRIBUTED OBJECTS 9

Introduction:Distributed object middleware,component based middleware-Distributed Objects and Remote Invocation-Communication between distributed objects-Remote procedure calls-Events and notifications-Case study: Java RMI. Operating System Support-Introduction-OS layer-Protection-Processes and threads-Communication and invocation OS architecture.

UNIT III DISTRIBUTED FILE SYSTEM 9

Introduction:Distributed File Systems,characteristics of file system,Distributed file system requirements- File service architecture-Case Study:Sun Network File System-Enhancements and further developments. Name Services-Introduction-Name Services and the Domain Name System-Directory Services-Case Study: Global Name Service.

UNIT IV INTRODUCTION TO CLOCK EVENTS 9

Time and GlobalStates-Introduction-Clocks,events and process states-Synchronizing physical clocks:synchronization in a synchronous system,cristian's method for synchronizing clock, The Berkeley algorithm,Network time protocol-Logical time and logical clocks-Global states-Distributed debugging. Coordination and Agreement-Introduction-Distributed mutual exclusion-Elections-Multicast communication-Consensus and related problems.

UNIT V DISTRIBUTED SHARED MEMORY 9

Distributed Shared Memory-Introduction-Design and implementation issues-Sequential consistency and Ivy case study Release consistency and Munin case study-Other consistency models-CORBA CaseStudy: Introduction, CORBA RMI,CORBA services,CORBA Architecture,CORBA remote object references,CORBA client and server examples.

Total: 45h

Course Outcome:

At the end of this course, the student will be able to

CO 1. Understand the concept of distributed systems and communication.

CO 2. Gain insights on External data representation and marshalling, Client-server communication and Group communication.

CO 3. Describe Distributed object middleware and component based middleware.

CO 4. Acquire knowledge on Remote procedure calls, Events and notification of distributed objects.

CO 5. Analyze Distributed File Systems and Distributed file system requirements.

CO 6. Understand the Name Services, Domain Name System and Directory Services.

CO 7. Describe Clocks, events and process states.

CO 8. Explain Berkeley algorithm, Network time protocol, Logical time and logical clocks, Global states and Distributed debugging.

CO 9. Gain insights on Distributed Shared Memory Design and implementation issues.

CO 10. Understand the concept of RMI, services, Architecture and remote object references of CORBA.

TEXT BOOK:

1. George Coulouris, Jean Dollimore, Tim Kindberg, , "Distributed Systems: Concepts and Design", 4th Edition, Pearson Education, 2011.

REFERENCES:

1. A.S. Tanenbaum and M. V. Steen, "Distributed Systems: Principles and Paradigms", Second Edition, Prentice Hall, 2013.

2. M.L.Liu, “Distributed Computing Principles and Applications”, Pearson Addison Wesley, 2004.

3. Mukesh Singhal, “Advanced Concepts In Operating Systems”, McGrawHill Series in Computer Science, 2008

4. Nancy A. Lynch, "Distributed Algorithms", The Morgan Kaufmann Series in Data Management System, Morgan Kaufmann Publishers, 2000.

15ECS116 GRID COMPUTING 3 0 0 3

Course Objective:

- To understand the concept of parallel and distributed computing, the anatomy and physiology of grid and grid security and to analyze how resources are managed.
- To know the application of grid computing and to understand the technology and tool kits to facilitate the grid computing.

UNIT I CONCEPTS AND ARCHITECTURE 9

Introduction-Parallel and Distributed Computing-Cluster Computing-Grid Computing- Anatomy and Physiology of Grid-Review of Web Services:SOAP,WSDL,UDDI,WS-Inspection,WS-Inspection and UDDI-OGSA:service instance semantics,service data semantics,OGSA port types-WSRF: Introduction, WSRF and OGSI/GT3,WSRF and OGSA.

UNIT II GRID MONITORING 9

Grid Monitoring Architecture (GMA):consumer,The directory service,producers,monitoring data - An Overview of Grid Monitoring Systems: Autopilot, CODE, GridICE, JAMM, Monitoring and discovery service,Network Weather Service-Relational-Grid Monitoring Architecture-Other Monitoring Systems:Ganglia,GridMon,GRM/PROVE,Nagios,Net logger,SCALEA-G

UNIT III GRID SECURITY AND RESOURCE MANAGEMENT 9

Grid Security-A Brief Security Primer-PKI-X509 Certificates-Grid Security-Grid Scheduling and Resource Management: Introduction-Scheduling Paradigms:centralized scheduling,distributed scheduling and ,hierarchial scheduling- Working principles of Scheduling -A Review of Condor, SGE, PBS and LSF-Grid Scheduling with QoS.

UNIT IV DATA MANAGEMENT AND GRID PORTALS 9

Data Management-Categories and Origins of Structured Data-Data Management Challenges-Architectural Approaches-Collective Data Management Services-Federation Services-Grid Portals:Introduction,First-Generation Grid Portals: A three-tiered architecture,grid portals service,implementation,toolkits,Second-Generation Grid Portals.

UNIT V GRID MIDDLEWARE 9

Introduction: Middlewares definition, purpose, grid layered architecture - Case Studies: Recent version of Globus Toolkit: Architecture model, programming model, Implementation, high level service and GLite: Architecture, Components and Features.

Total: 45h

Course Outcome:

At the end of this course, the student will be able to

CO 1. Understand the key concepts of parallel, distributed, grid and cluster computing.

CO 2. Know about the different web services in grid computing.

CO 3. Acquire knowledge on grid monitoring architecture and other monitoring systems.

CO 4. Know network weather service and net logger.

CO 5. Implement the grid security, scheduling and resource management.

CO 6. Evaluate different scheduling paradigms particularly grid scheduling with QoS.

CO 7. Explain data management of structured data and architectural approaches.

CO 8. Identify first and second generation grid portals and to implement the technology and tool kits for facilitating grid computing.

CO 9. Examine the importance and applications of Grid middleware.

CO 10. Analyze the architectural model, programming model, components and features of grid middleware

TEXT BOOK:

1. Maozhen Li, Mark Baker, The Grid Core Technologies, John Wiley & Sons ,2005.

REFERENCES:

1. Ian Foster & Carl Kesselman, The Grid 2 – Blueprint for a New Computing Infrascture , Morgan Kaufman – 2004

2.Joshy Joseph & Craig Fellenstein, “Grid Computing”, Pearson Education 2004.

3.Fran Berman,Geoffrey Fox, Anthony J.G.Hey, “Grid Computing: Making the Global Infrastructure a reality”, John Wiley and sons, 2003

15ECS117 CLOUD COMPUTING 3 0 0 3

Course Objective:

- To understand the concept of cloud and utility computing.
- To understand the various issues in cloud computing.
- To familiarize with the types of virtualization and the lead players in cloud.

UNIT I INTRODUCTION, PRINCIPLES AND ARCHITECTURE 9

Cloud Computing : Vision, reference model, characteristics and challenges – historical development – building cloud computing environment – computing platforms and Technologies – Parallel Vs distributed computing – Elements of parallel and distributed computing – Technologies for distributed computing. Cloud Computing Architecture: Cloud reference model - NIST Cloud Computing Reference Architecture – types of Clouds - economics – open challenges.

UNIT II VIRTUALIZATION 9

Characteristics of virtualized environments - Taxonomy of virtualization techniques - Execution virtualization - Machine reference model - Hardware-level virtualization – Hypervisors - Hardware virtualization techniques - Operating system-level virtualization - Programming 210 language-level virtualization - Application-level virtualization - Other types - Virtualization and cloud computing - Pros and cons of virtualization - Technology examples - Xen: Paravirtualization - VMware: full virtualization - Full virtualization and binary translation - Microsoft Hyper-V.

UNIT III CLOUD INFRASTRUCTURE 9

Cloud Computing and Services Model – Public, Private and Hybrid Clouds – Cloud Eco System - IaaS - PaaS – SaaS. Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources. Case Study: Amazon Web Service reference, GoGrid, Rackspace.

UNIT IV CLOUD PROGRAMMING AND SOFTWARE ENVIRONMENT 11

Cloud capabilities and platform features – data features and databases - Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce – Hadoop Library from Apache – Dryad and DryadLINQ – sawzall and Pig Latin - Mapping Applications - Programming Support of Google App Engine - Amazon AWS – Microsoft Azure - Cloud Software Environments -Eucalyptus, Open Nebula, OpenStack. Case Study: Amazon Web Service reference, GoGrid, Rackspace.

UNIT V CLOUD PLATFORMS AND APPLICATION 9

Amazon web services - Compute services - Storage services - Communication services - Google AppEngine - Architecture and core concepts – Cloud Security and Trust management. Application life cycle - Cost model – Observations - Microsoft Azure - SQL Azure – Scientific Applications –Business and Consumer Application - Energy efficiency in clouds - Market-based management of clouds - Federated clouds/InterCloud - Third-party cloud services.

TOTAL: 45 h

Course Outcome:

At the end of this course, the student will be able to

CO 1. Understand the key technologies, strengths limitations and the possible applications for state-of-the-art cloud computing.

CO 2. Clearly understand the broad perceptive of cloud architecture model.

CO 3. Gain a basic knowledge of virtualization and its types.

CO 4. Design and develop highly scalable cloud-based applications by creating and configuring virtual machines on the cloud and building private cloud.

CO 5. Know the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.

CO 6. Compare, contrast, and evaluate the key trade-offs between multiple approaches to cloud system design, and Identify appropriate design choices when solving real-world cloud computing problems.

CO 7. Explore some important cloud computing driven commercial systems such as: Google Apps, Microsoft Azure and Amazon Web Services and other businesses cloud applications.

CO 8. Develop and deploy cloud application using popular cloud platforms.

CO 9. Make recommendations on cloud computing solutions for an enterprise.

TEXT BOOKS:

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2013.

2. Rajkumar Buyya, Christian Vecchiola. S.Thamarai Selvi, “Mastering Cloud Computing”, McGraw Hill Education, 2013.

REFERENCE BOOKS:

1. James E. Smith, Ravi Nair, “Virtual Machines: Versatile Platforms for Systems and Processes”, Elsevier/Morgan Kaufmann, 2005.

2. George Reese, “Cloud Application Architectures: Building Applications and Infrastructure in the Cloud” O'Reilly, 2009

3. Ronald L. Krutz, Russell Dean Vines, “Cloud Security – A comprehensive Guide to Secure Cloud Computing”, Wiley – India, 2010.

4. John W.Rittinghouse and James F.Ransome, “Cloud Computing: Implementation, Management, and Security”, CRC Press, 2016.

15ECS118 MOBILE AND PERVASIVE COMPUTING 3 0 0 3

Course Objective:

- To know about the Conceptual, theoretical, and applicable aspects of pervasive computing.
- To learn the applications of location and context-aware technologies, new types of user interfaces for pervasive computing.
- To understand the system architecture and infrastructure for pervasive computing.

UNIT I MOBILE NETWORKS 9

Cellular Wireless Networks – GSM: Mobile service – system architecture – radio Interface – protocols – Localizing and Calling – handover – Security – Data services. Frequency Allocation – Routing – Mobility Management – Security – GPRS: Architecture – Network elements – Quality of service – Mobile station classes.

UNIT II WIRELESS NETWORKS 9

Wireless LANs and PANs – IEEE 802.11: System Architecture - Protocol Architecture – MAC Layer – MAC Management. HIPERLAN: HIPERLAN 1 – WATM – BRAN – HIPERLAN 2. Blue Tooth: Architecture – Radio layer – Baseband layer – L2CAP – Security – SDP – IEEE 802.15. Wi-Fi: Architecture – Interface. WiMAX.

UNIT III ROUTING 9

Mobile IP: IP Packet delivery – Agent Discovery – Registration – Tunneling and Encapsulation – Optimizations – Reverse Tunneling – Ipv6 – IP Micro-mobility support. DHCP – Mobile Ad-Hoc Networks: Routing – Destination sequence distance vector – dynamic source routing – metrics. Proactive and Reactive Routing Protocols – Multicast.

UNIT IV TRANSPORT AND APPLICATION LAYERS 9

Mobile TCP– WAP – Architecture WAP Protocol stack– WWW Programming Model– Wireless Datagram Protocol – Wireless Transport Layer Security – Wireless Transaction Protocol – Wireless Session Protocol – Wireless Application Environment – Wireless Telephony Application Architecture – Wireless Markup Language – WMLScripts.

UNIT V PERVASIVE COMPUTING 9

Pervasive computing infrastructure Security issues. Applications - Device Technology - Hardware, Human-machine Interfaces, Biometrics, and Operating systems– Device Connectivity: Protocols – Security - Device Management. Pervasive Web Application architecture: Scalability – web Applications – Application architecture.

TOTAL : 45h

Course Outcome:

At the end of this course, the student will be able to

CO 1. Understand the Signal Propagation, Multiplexing and Modulation of mobile and pervasive computing

CO 2. Acquire knowledge on MAC, SDMA ,TDMA, FDMA and CDMA.

CO 3. Discuss the System and Protocol Architecture of IEEE 802.11.

CO 4. Understand the principles of Wireless networks like HIPERLAN and Bluetooth.

CO 5. Explain the advantages and limitations of Mobile AD HOC Networks and Routing Protocols.

CO 6. Understand DSDV, DSR and AODV Routing Techniques , Quality of service in Mobile Ad hoc Networks.

CO 7. Handle routing of Mobile Internet Protocol, IP Packet Delivery, Tunneling and Encapsulation.

CO 8. Discuss the Procedure of Mobile IPv6, Route Optimization, Movement Detection and Dynamic Home Agent Address Discovery.

CO 9. Find the infrastructure security issues and applications of pervasive computing

CO 10. Be well versed in the concept of Pervasive Web Application architecture

TEXT BOOKS:

1. Jochen Schiller, “Mobile Communications”, PHI, Second Edition, 2008.(1,2,3)
2. Jochen Burkhardt, Pervasive Computing: Technology and Architecture of Mobile Internet Applications, Addison-Wesley Professional; 3rd edition, 2007(5).

REFERENCES:

1. Frank Adelstein, Sandeep KS Gupta, Golden Richard, Fundamentals of Mobile and Pervasive Computing, McGraw-Hill 2005
2. Debashis Saha, Networking Infrastructure for Pervasive Computing: Enabling Technologies, Kluwer Academic Publisher, Springer; 2011
3. Introduction to Wireless and Mobile Systems by Agrawal and Zeng, Brooks/ Cole (Thomson Learning), 2015(4)
4. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, Principles of Mobile Computing, Springer, New York, 2013.(4).

15ECS119 DATA WAREHOUSING AND DATA MINING 3 0 0 3

Course Objective:

- To introduce the concept of data warehousing with special emphasis on architecture and design.
- To introduce the concept of data mining with a detail coverage of basic tasks, metrics, issues, and implication.
- To learn the core topics like classification, clustering and association rules.

UNIT I DATA WAREHOUSING 9

Data warehousing Components: Data Warehouse Database**,** Sourcing, Acquisition, Cleanup and Transformation Tool, Data Warehouse Administration and Management**,** Information Delivery System –Building a Data warehouse –- Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata.

UNIT II BUSINESS ANALYSIS 9

Reporting and Query tools and Applications – Tool Categories – The Need for Applications – Cognos Impromptu – Online Analytical Processing (OLAP) – Need –Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multi relational OLAP – Categories of Tools – OLAP Tools and the Internet - Data Cube Technology, From Data warehousing to Data Mining.

UNIT III DATA MINING 9

Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems- comparison of classification and prediction methods – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues –Data Preprocessing.- , Mining Descriptive Statistical Measures in Large Databases.

UNIT IV ASSOCIATION RULE MINING AND CLASSIFICATION 9

Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction - Basic Concepts - Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Backpropagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods - Prediction

UNIT V CLUSTERING, APPLICATIONS AND TRENDS IN DATA MINING 9

Cluster Analysis - Types of Data – Categorization of Major Clustering Methods - Kmeans– Partitioning Methods – Hierarchical Methods - Density-Based Methods –Grid Based Methods – Model-Based Clustering Methods – Clustering High Dimensional Data- Constraint – Based Cluster Analysis – Outlier Analysis – Data Mining Applications.- Case Study.

TOTAL: 45 h

Course Outcome:

At the end of this course, the student will be able to

CO 1. Understand the purpose and need of data warehouse and data mining.

CO 2. Gain knowledge on data warehouse components, building a data warehouse, mapping the Data Warehouse to a Multiprocessor Architecture and metadata.

CO 3. Understand the concept of OLAP and data cube technology.

CO 4. Know about the Cognos Impromptu and Online Analytical Processing (OLAP).

CO 5. Understand the Categories of OLAP Tools.

CO 6. Explain the functionalities and classification of data mining systems

CO 7. Identify the issues and understand the integration of a data mining system with a datawarehouse.

CO 8. Classify the association rule mining methods in DWDM.

CO 9. Understand various Kinds of Association Rules, Decision Tree Induction, Bayesian Classification, Support Vector Machines and Other Classification Methods of data mining

CO 10. Understand Cluster Analysis, Outlier Analysis and Data Mining Applications.

TEXT BOOKS:

1. Alex Berson and Stephen J. Smith, " Data Warehousing, Data Mining & OLAP", Tata McGraw – Hill Edition, Tenth Reprint 2007.(I & II)
2. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Second Edition, Elsevier, 2007. (III to V)

REFERENCES:

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, " Introduction To Data Mining", Person Education, 2007.
2. K.P. Soman, Shyam Diwakar and V. Ajay ", Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, " Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.
4. Daniel T.Larose, "Data Mining Methods and Models", Wile-Interscience, 2006.

15ECS120 DIGITAL IMAGE PROCESSING 3 0 0 3

Course objective:

- To learn and understand the principles, concepts and various techniques for the processing & analysing of images.
- To have a clear understanding of the concepts and shills necessary to define and carry out some image processing tasks.

UNIT-I FUNDAMENTALS OF IMAGE PROCESSING 9

Introduction - The origin of Digital Image Processing - Examples-Fundamentals - Components in Digital Image Processing - Elements of Visual Perception - Image Sensing and Acquisition - Image sampling and Quantization: Basic Concepts in Sampling and Quantization, Representing Digital Images, Spatial and Intensity Resolution, Image Interpolation - Some Basic Relationship between pixels - Color models.

UNIT-II IMAGE ENHANCEMENT 9

Spatial Domain: Basic Integrity Transformation functions - Histogram Processing: Histogram Equalization, Histogram Matching (Specification), Local Histogram Processing, Using Histogram Statistics for Image Enhancement - Fundamentals of Spatial Filtering-Smoothing Spatial Filters - Sharpening spatial filters - Frequency Domain: Introduction to Fourier Transform – Image Smoothing using frequency domain filters – Sharpening using frequency domain filters.

UNIT-III IMAGE RESTORATION AND SEGMENTATION 9

Restoration: Noise models – Restoration in the presence of Noise Only (Spatial filtering) - Periodic noise reduction by frequency Domain filtering - Image reconstruction from Projections.

Segmentation: Fundamentals - Point, Line and Edge detection – Thresholding - Region Based segmentation –Use of Motion in Segmentation.

UNIT-IV MULTI RESOLUTION PROCESSING AND IMAGE COMPRESSION 9

Multi resolution processing: Image Pyramids-Subband coding-The Haar Transform – Image Compression: Coding Redundancy, Spatial and Temporal Redundancy, Irrelevant Information, Image Compression models – Some Basic Compression Methods: Huffman Coding, Golomb Coding, Arithmetic Coding, LZW Coding, Run–Length Coding, Symbol-Based Coding, Bit-Plane Coding, Block Transform Coding, Predictive Coding, Wavelet Coding.

UNIT-V MORPHOLOGICAL IMAGE PROCESSING 9

Morphological Image Processing: Erosion and Dilation, Opening and Closing, The Hit-or-Miss Transformation, Some basic morphological algorithms - Image Representation and Description: Boundary Descriptors, Regional Descriptors – Object Recognition: Patterns and Pattern Classes, Recognition based on Decision Theoretic Methods.

TOTAL : 45 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the fundamentals of digital image processing

CO 2. Describe visual perception, sensing, sampling and quantization of image

CO 3. Understand and examine the different types of resolutions, interpolations and color models

CO 4. Generate and find the histogram of an image.

CO 5. Denoise an image by the use of various filters according to the application

CO 6. Describe restorations of noise models and image reconstruction.

CO 7. Do image analysis by the process of segmentation and thresholding.

CO 8. Understand and implement various lossy and lossless image compression techniques.

CO 9. Perform morphological transformation of an image by various methods

TEXT BOOK:

1. Rafael C.Gonzalez and Richard E.Woods, “Digital Image Processing”, Third Edition, Pearson Education, 2010.

REFERENCE BOOKS:

1. Rafael C.Gonzalez, Richard E.Woods, Steven L. Eddins, “Digital Image Processing using Matlab”, Third Edition, Tata McGraw Hill Pvt. Ltd, 2011.

2. William K Pratt, Digital Image Processing, John Willey (2001).

15ECS121 JAVA TO BUSINESS APPLICATION 3 0 0 3

Course Objective:

To facilitate the understanding of Quality Management principles and process.

UNIT I E-BUSINESS APPLICATION DESIGN 9

Server technology - client/server Vs n-tier - e-business components - distributed applications - JDBC for dynamic data - access to stored procedures - various models for e-business application design - Model-based e-business architectures - UML for e-business .

UNIT II E-BUSINESS ENTERPRISE COMPONENT SPECIFICATION 9

e-business enterprise components : system context models - high-level operation specs - state charts for system models - event charts: horizontal and vertical expansion - elaborating models - relating the levels of detail - building a system spec -Enterprise component design - Design patterns : Two-way Link – Observer - Recursive Composite - State Delegation - Interface Decoupling – Domain coupling.

UNIT III COMPONENT TECHNOLOGY & J2EE PLATFORM 9

Pluggable code and connector protocols - component kits, Beans, and building tools - component architecture - common models - common couplings - wrapping existing assets - product Vs component building - frameworks: generic models - generalization of two example static models - collaborations: generic designs for interactions - roles - synthesis of collaborations - J2EE platform.

UNIT IV J2EE DISTRIBUTED SERVICES 9

J2EE distributed services - J2EE containers – Design with Session Beans : client sessions - benefits of stateless Session Beans - business logic encapsulation - modelling user interaction - command beans - a high performance alternative - data access objects - value objects - façade to Entity Beans.

UNIT V DESIGN WITH ENTITY BEANS 9

Data and rules encapsulation - Enterprise Information Systems (EISs) - one row Entity Beans (single table mapping) - joins, views, and database issues - updating the model in MVC architecture - persisting transactions - Web and enterprise technology collaborations - Distributed application design - e-business application templates.

TOTAL: 45h

Couse Outcome:

At the end of this course, the student will be able to

- Understand the architecture of client / server and n-tier Server technology

- Design various models for e-business application
- Acquire knowledge on e-business enterprise components specification
- Discuss and compare product and component building
- Explain interface decoupling and domain coupling in e-business enterprise component specification
- Be familiar with distributed services and containers of J2EE
- Design with session beans and entity beans in J2EE
- Be well versed in enterprise information system, distributed application design and e-business application templates

TEXT BOOK:

1. Jim Keogh, “J2Ee: The Complete Reference”, Tata McGraw-Hill Edition 2002, 28th Reprint 2010.

REFERENCES:

1. Web reference: http://java.sun.com.
2. Patrick Naughton, “COMPLETE REFERENCE: JAVA2”, Tata McGraw-Hill, 2003

15ECS122 TCP/IP DESIGN AND IMPLEMENTATION 3 0 0 3

Course Objective:

- To learn the principles of network and the current wiring standards.
- To understand the basic design issues in both local and wide area networks, and the basics of the most common protocols.

UNIT I INTRODUCTION 9

Internetworking concepts and architecture model – classful Internet address – CIDR – Subnetting and Supernetting – AARP – RARP- IP- IP Routing – ICMP – IPV6 IPv6 Addressing-IPv6 Datagram Encapsulation and Formatting- IPv6 Datagram Size, Fragmentation, Reassembly, and Routing-ICMP-IPV6 Neighbor Discovery Protocol..

UNIT II TCP 9

Services – header – connection establishment and termination – interactive data flow –bulk data flow – timeout and retransmission Setting the Retransmission TimeoutTimer-Based Retransmission- Fast Retransmit- Retransmission with Selective Acknowledgments - Spurious Timeouts and Retransmissions - Packet Reordering and Duplication - Destination Metrics- Repacketization -Attacks Involving TCP Retransmission – persist timer – keep alive timer – futures and performance.

UNIT III IP IMPLEMENTATION 9

IP global software organization – routing table – routing algorithms - Link State Routing - Distance Vector Routing - Hierarchical Routing - RIP - OSPF - BGP - Broadcast and Multicast Routing – fragmentation and reassembly - Neighbor Discovery Protocol. – error processing (ICMP) – Multicast Processing (IGMP).

UNIT IV TCP IMPLEMENTATION I 9

Data structure and input processing – transmission control blocks – segment format –comparison – finite state machine implementation – Output processing – mutual exclusion – computing the TCP Data length -TCP Congestion Control -The Classic Algorithms Evolution of the Standard Algorithms -Handling Spurious RTOs-the Eifel Response Algorithm - Sharing Congestion State - TCP Friendliness TCP in High-Speed Environments - Delay-Based Congestion Control- Active Queue Management and ECN- Attacks Involving TCP Congestion Control.

UNIT V TCP IMPLEMENTATION II 9

Timers – events and messages – timer process - TCP Persist Timer - Silly Window Syndrome - Keep alive Timer - Window Scale Option - Analyzing TCP/IP traffic - Packet Analysis - TCP/IP Diagnostic Tools and Utilities. – deleting and inserting timer event –flow control and adaptive retransmission – congestion avoidance and control – urgent data processing and push function.

TOTAL : 45 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand and build the internetworking architecture with supernetting and subnetting access

CO 2. Develop and use various addressing techniques of TCP

CO 3. Establish connection and termination using TCP

CO 4. Set time out timer and retransmission with selective acknowledgement.

CO 5. Understand and Develop various routing algorithms.

CO 6. Discuss error processing and multi cast processing in IP implementation

CO 7. Evaluate input and output processing during TCP implememtation.

CO 8. Acquire knowledge on congestion control and attacks involving TCP Congestion control.

CO 9. Build timer, events and messages using TCP.

CO 10. Analyze TCP/IP Diagnostic tools and utilities.

TEXT BOOKS:

1. Douglas E Comer,"Internetworking with TCP/IP Principles,Protocols and Architecture", Vol. 1 and 2, 5th Edition
2. W.Richard Stevans "TCP/IP Illustrated" Vol 1.2003.

REFERENCES:

1. Forouzan, " TCP/IP Protocol Suite" Second Edition, Tate MC Graw Hill, 2003.
2. W.Richard Stevens "TCP/IP Illustrated" Volume 2, Pearson Education 2003

15ECS123 SOFTWARE PROJECT MANAGEMENT 3 0 0 3

Course Objective:

- To understand the basic knowledge of software management principles.
- To familiarize in choosing an appropriate project development methodology and identifying project risks, monitoring and tracking project deadlines.
- To develop the capability to work in a team environment and be aware of different modes of communications.

UNIT I INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT 9

Project Definition – Contract Management – Activities Covered by Software Project Management – Plans, Methods and Methodologies – Management – Objectives – Stakeholders – Requirement Specification – Management control – Activities Covered By Software Project Management – Overview Of Project Planning – Stepwise Project Planning.

UNIT II PROJECT EVALUATION 9

Strategic Assessment – Technical Assessment – Cost Benefit Analysis –Cash Flow Forecasting – Cost Benefit Evaluation Techniques : Net Profit – Payback Period – Return on Investment – Net Present Value – Internal Rate of Return – Risk Evaluation : Identification and Ranking – Cost-benefit Analysis – Risk Profile Analysis – Using Decision Trees.

UNIT III ACTIVITY PLANNING 9

Objectives – Project Schedule – Sequencing and Scheduling Activities –Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning and Control.

UNIT IV MONITORING AND CONTROL 9

Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value Analysis – Prioritizing Monitoring – Getting Project Back to Target – Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance.

UNIT V MANAGING PEOPLE AND ORGANIZING TEAMS 9

Introduction – Understanding Behavior – Organizational Behaviour : a Background – Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation– The Oldman – Hackman Job Characteristics Model – Working In Groups – Becoming A Team –Decision Making – Leadership – Organizational Structures – Stress –Health and Safety – Case Studies.

TOTAL : 45 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Analyze project management principles.

CO 2. Understand what is project management and activities covered by software project management

CO 3. Evaluate project and provide technical assessment of a projects.

CO 4. Assess risk and Analyze cost benefit using different evaluation techniques.

CO 5. Design project schedule using different sequencing and scheduling activities.

CO 6. Be familiar with activity planning by identifying, analyzing and managing the nature of risk.

CO 7. Monitor and control software project management by visualizing the progress, monitoring cost, analysing earned value, prioritizing monitoring, etc

CO 8. Discuss different types of contract, stages in contract placement and contract management.

CO 9. Understand the organizational behaviour and structure by vvarious job characteristics model.

TEXT BOOK:

1. Bob Hughes, Mikecotterell, “Software Project Management”, Third Edition, Tata McGraw Hill, 2004.

REFERENCES:

1. Ramesh, Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
2. Royce, “Software Project Management”, Pearson Education, 1999.
3. Jalote, “Software Project Manangement in Practive”, Pearson Education, 2002.

15ECS124 SOFTWARE QUALITY ASSURANCE 3 0 0 3

Course Objective:

- To understand the quality management processes and to distinguish between various activities of quality assurance, quality planning and quality control.
- To know the importance of standards in the quality management process and their impact on the final product.
- To understand the SQA processes from planning till execution.

UNIT I FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE 9

The Role of SQA: Objectives – Benefits – Goals – Role – Process - SQA Plan : Need and Content of SQA Plan – SQA considerations – SQA people : Roles and Responsibilities of SQA People – Characteristics of Good SQA Engineer – Quality Management – Software Configuration Management : SCM Plan – Roles – Activities – Baselines – Requirement Phase – Implementation Phase.

UNIT II MANAGING SOFTWARE QUALITY 9

Managing Software Organizations: Commitment – Management System – Managing Software Quality: Measurement Criteria – Establishing a Software Quality Program – Estimating Software Quality – Removal Efficiency – Quality Goals and Plans – Tracking and Controlling Software Quality – Defect Prevention - Software Quality Assurance Management.

UNIT III SOFTWARE QUALITY ASSURANCE METRICS 9

Software Quality : Views – Measuring Quality – Criteria - Total Quality Management (TQM) : Principles – Cost – TQM Implementation Approaches – Ways of Improving Quality – Methods for Generating Ideas – Advantages – Barriers – Software Quality Metrics: Product Quality – In-Process – Maintenance quality – Software Quality Metrics Analysis.

UNIT IV SOFTWARE QUALITY PROGRAM 9

Software Quality Program Concepts – Establishment of a Software Quality Program: Tasks – Scope – Minimal Quality Assurance Effort – Quality Plan – Software Quality Assurance Planning: An Overview – Purpose & Scope: Management – Documentation – SPCM – Reviews and Audits – Validation, Verification and Testing – Problem Reporting.

UNIT V SOFTWARE QUALITY ASSURANCE STANDARDIZATION 9

Software Standards–ISO 9000 Quality System Standards : Process Model - Capability Maturity Model and the Role of SQA in Software Development Maturity – SEI CMM Level 5 –Comparison of ISO 9000 Model with SEI's CMM : Model Orientation – ISO 9000 Weaknesses – CMM Weaknesses - SPICE (Software Process Improvement and Capability Determination).

TOTAL : 45 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the roles and responsibilities of SQA (software quality assurance) people

CO 2. Discuss the plan, roles, activities and baselines of software configuration management

CO 3. Manage software organization and software quality measurement criteria.

CO 4. Prevent defects by tracking and enhancing the software quality

CO 5. Design principles of total quality management and analyze the approach of TQM implementation.

CO 6. Analyze the scope and tasks of software quality program.

CO 7. Discuss software quality assurance planning.

CO 8. Maintain ISO 9000 quality system standards.

CO 9. Understand the role of SQA in software development maturity models.

TEXT BOOKS:

1. Mordechai Ben-Menachem / Garry S Marliss, “Software Quality”, Vikas Publishing House, Pvt, Ltd., New Delhi.(UNIT III to V), 2007.
2. Watts S Humphrey, “ Managing the Software Process”, Pearson Education India, 01-Sep-1989 Inc. (UNIT I and II)

REFERENCES:

1. Gordon G Schulmeyer, “Handbook of Software Quality Assurance”, Third Edition, Artech House Publishers 2007
2. Nina S Godbole, “Software Quality Assurance: Principles and Practice”, Alpha Science International, Ltd, 2004.

15ECS125 INFORMATION SECURITY 3 0 0 3

Course Objective*:*

- To understand the basics of Information Security and to know the legal, ethical and professional issues in Information Security.
- To know the aspects of risk management and to become aware of various standards and the technological aspects of Information Security.

UNIT I INTRODUCTION 9

Information security: Definition, History, Critical Characteristics of Information-NSTISSC Security Model- Components of an Information System- Securing the Components-Balancing Security and Access-The System Development Life Cycle- The Security System Development Life Cycle

UNIT II SECURITY INVESTIGATION 9

Need for Security- Business Needs: protecting the functionality of an organization, enabling the safe operation of an application, protecting the data that organization collects and use, safeguarding technology assets in organization-Threats-Attacks- Legal, Ethical and Professional Issues: Law and ethics in Information security, relevant U.S Laws, International laws and legal bodies, ethics and information security, codes of ethics and professional organization.

UNIT III SECURITY ANALYSIS 9

Risk Management: Introduction- Risk Identification: plan and organize the process, asset identification and inventory, classifying and prioritizing information assets, information assets valuation, identifying and prioritizing threats, vulnerability identification and Assessing Risk, Assessing and Controlling Risk

UNIT IV LOGICAL DESIGN 9

Blueprint for Security- Information Security Poicy, Standards and Practices- ISO17799/BS 7799-NIST Models-VISA International Security Model- Design of Security Architecture- Planning for Continuity: Business impact analysis, incident response planning, disaster recovery planning, business continuity planning, crisis management, model for a consolidated contingency plan, law enforcement involvement.

UNIT V PHYSICAL DESIGN 9

Security Technology- IDS- Scanning and Analysis Tools-Cryptography: Foundation of cryptology, cipher methods, cryptographic algorithms, cryptographic tools, protocols for secure communications, attacks on cryptosystems-Access Control Devices- Physical Security-Security and Personnel

Total: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the basics of information security.

CO 2. Analyze the types of threats in information security and the associated attacks

CO 3. Demonstrate the system development life cycle in information security.

CO 4. Protect the functionality of an organization and enable the state operation of application.

CO 5. Understand international laws and analyze codes and ethics of professional organization.

CO 6. Acquire knowledge on risk identification plan and the process organization.

CO 7. Assess and control risks in security analysis.

CO 8. Design and implement various security models in information security

CO 9. Discuss different tools for physical design and analysis in enhancing information security.

TEXT BOOK:

1. Michael E Whitman and Herbert J Mattord, “Principles of Information Security”, Vikas Publishing House, New Delhi, 2009

REFERENCES:

1. Micki Krause, Harold F. Tipton, “ Handbook of Information Security Management”, Vol 1-3 CRC Press LLC, 2004.
2. Stuart Mc Clure, Joel Scrambray, George Kurtz, “Hacking Exposed”, Tata McGraw- Hill, 2003
3. Matt Bishop, “ Computer Security Art and Science”, Pearson/PHI, 2002

15ECS126 E- COMMERCE 3 0 0 3

Course Objective:

- To understand the nature of e-Commerce and recognize the business impact and potential of e-Commerce.
- To learn the technologies required to make e-Commerce viable.
- To know about the current drivers and inhibitors facing the business world in adopting and using e-Commerce.
- To get the awareness of the economic consequences of e-Commerce.

UNIT I INTRODUCTION 9

Traditional commerce and E commerce - Categories of Electronic commerce – Business models – Revenue models – Business processes. Internet and WWW – role of WWW – value chains – strategic business – Revenue Strategy issues - Industry value chains - supply chain management – role of E commerce.

UNIT II INFRASTRUCTURE FOR E COMMERCE 9

Packet switched networks – Routing packets. TCP/IP protocol script: IP Addressing – Domain names – E-mail protocols. Internet utility programs – SGML, HTML and XML – web client and servers – Web client/server architecture – intranet and extranets – Public and private networks – Virtual private network.

UNIT III WEB BASED TOOLS FOR E COMMERCE 9

Web server: Server computers – performance evaluation – Hardware architectures. web server software feature sets – web server software and tools – Internet Utility programs – Data analysis software – Link checking utilities. web protocol – search engines – intelligent agents –EC software – web hosting – cost analysis.

UNIT IV SECURITY 9

Computer security classification – copy right and Intellectual property – electronic commerce threats: Secrecy threats – Integrity threats – Necessity threats Encryption solutions. Protecting client computers – electronic payment systems – electronic cash – strategies for marketing – sales and promotion – cryptography – authentication.

UNIT V INTELLIGENT AGENTS 9

Definition and capabilities – limitation of agents – History of software agents – Characteristics and properties aof agents – Telescript Agent Language – safe-Tcl – security – web based marketing – search engines and Directory registration – online advertisements – Portables and info mechanics – website design issues.

TOTAL : 45 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Design and implement various business models of E-Commerce

CO 2. Explain policy and regulatory issues in E-commerce.

CO 3. Understand the basic networking concepts.

CO 4. Design and implement the web client server architecture.

CO 5. Acquire knowledge on web server concepts and its performance evaluation.

CO 6. Be familiar with web-based tools for e-commerce.

CO 7. Enhance the security features and its protocols.

CO 8. Understand the intelligent agents and security threats

TEXT BOOKS:

1. Ravi Kalakota, Andrew B. Whinston " frontiers of Electronic Commerce", Pearson Education, 2008.

2. Gary P Schneider "Electronic commerce", Thomson learning & James T Peny Cambridge USA, 2001.

3. Manlyn Greenstein and Miklos "Electronic commerce" McGraw-Hill, 2002.

REFERENCES:

1. Efraim Turvan J.Lee, David kug and chung, "Electronic commerce" Pearson Education Asia 2001.

2. Brenda Kienew E commerce Business Prentice Hall, 2001.

15ECS127 Essentials of Object Oriented Programming using Java 3 0 0 3

Course Objective:

- To equip students with the required object oriented programming skills required to build highly reusable and robust software systems
- To acquire skills required to develop applications in Java

UNIT I INTRODUCTION TO JAVA 9

Introduction to Java and Eclipse, Object-Oriented Programming, Introduction to SDLC, Introduction to UML, Java Basics (The basic building blocks of Java, variables and primitive types, Objects and Messages, String & String Buffer, Wrapper classes, Building Classes

UNIT II INHERITANCE AND EXCEPTIONS 9

Debugging, Inheritance and Refactoring, Interfaces, Collections, Serialization and Streams, Exceptions and Exception Handling, Utility Classes, Threads and Synchronization

UNIT III WEB COMPONENTS 9

Java Beans, Web Component Introduction, Java Servlets, Java Servlets API, Java Server Pages, JSP Specification and Syntax, Page Designer

UNIT IV DEBUGGING WEB APPLICATIONS 9

Debugging Web Applications, Web Archive Deployment Descriptor, Http: Session Management, Cookie API, Management of Application Data, URL Rewriting.

UNIT V SERVER SIDE APPLICATIONS 9

JSP Expression Language, JSP Tag Files – Custom Tags, Xdoclets Annotations, Connecting to database, Web Application Security, Java EE Packaging and deployment, Best Practices for Server side Application.

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Explain the concepts in object oriented programming paradigm

CO 2. Acquire knowledge on Serialization, Exceptions and Exception handling

CO 3. Understand and work on Java web components

CO 4. Understand how Java achieves platform portability

CO 5. Write well-documented and elegant programs in Java

CO 6. Use the object oriented technique to address the real time problems

CO 7. Develop excellent debugging skills

CO 8. Aware of the best practices for server side application

TEXT BOOK:

IBM Course Material

15ECS128 Foundation course in Enterprise Application Development using IBM Rational Tools 3 0 0 3

Course Objective:

- To analyze, design, develop and deploy web applications using Java
- To learn web components such as servlets and custom tags

UNIT I J2EE WEB COMPONENTS 9

J2EE Web Component Introduction, Servlet Overview, Supporting Perspectives for Developing J2EE Applications, Simple Registration Servlet, J2EE Container Services Overview, Servlet API (Part I), Library Case Study Flow, Building the Library Database, Parameter Servlet.

UNIT II JAVA SERVER PAGES 9

Java Server Pages Overview, Java Server Pages Specifications and Syntax, Page Designer in Application Developer, Web Application Debugging, Servlet API (Part II), Web Archive Deployment Descriptor, Calling JSP Pages from a Servlet.

UNIT III SESSION MANAGEMENT 9

Session State Storage Issues, Cookie API, Http Session: Management of Application Data, URL Rewriting, Session Management, Best Practices for Session Management.

UNIT IV JAVA SERVER PAGES WITH JAVA BEANS 9

JavaBeans and the Model-View-Controller Patter, Create a JavaBean, Java Server Pages with Java Beans, Combining Servlets, JSP Pages, and JavaBeans, JSP Expression Language, Using JSP Expression Language, JSP Custom Tags, JSP Tag Files, Servlet Filtering.

UNIT V SERVLET LISTENERS 9

Servlet Listeners, Best Practices for Server-Side Application Development, J2EE Packaging and Deployment, Installing an Application in Web Sphere Application Server V6.1, Web Application Security.

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the fundamentals of J2EE web components

CO 2. Acquire knowledge on session state storage issues and best practices for session management

CO 3. Be familiar with the supporting perspectives for developing J2EE applications

CO 4. Develop Java Server Pages with Java Beans

CO 5. Understand how to combine servlets and configure a JSP to use tags

CO 6. Install an Application in Web Sphere Application Server V6.1

CO 7. Be aware of the server-side application development and web application security

TEXT BOOK:

IBM Course Material

15ECS129 FOUNDATION IN CLOUD COMPUTING 3 0 0 3

Course Objective:

- To provide students with the fundamentals and essentials of cloud computing
- To understand the cloud computing services and tools in their life scenarios
- To learn IBM cloud computing architecture

UNIT I INTRODUCTION TO CLOUD COMPUTING 9

Overview of Cloud Computing, Concepts, Cloud service delivery models, Cloud deployment scenarios.

UNIT II SECURITY AND SERVICE MANAGEMENT 9

Security in cloud computing, IBM cloud computing architecture, Introduction to Service Management.

UNIT III VIRTUALIZATION AND CLOUD MANAGEMENT 9

Virtualization, Cloud Management Platform, ITIL based Service Management and Service Orchestration -Cloud Computing and Service Management.

UNIT IV CLOUD PERFORMANCE AND ISSUES 9

Customer Project Experiences & How to implement Cloud services, Considerations for Building Cloud services, Cloud Performance Considerations, Cloud Resiliency,

UNIT V HYBRID CLOUDS 9

Cloud Service Metering, Accounting and Billing, Aspects of Hybrid Clouds, Disruptive Network Trends

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the overview and service delivery models of cloud computing

CO 2. Acquire knowledge on IBM cloud computing architecture

CO 3. Understand the security features and service management in cloud computing

CO 4. Explain the considerations for building cloud services and cloud performance

CO 5. Be familiar with the underlying principles of cloud virtualization, cloud storage and data management

CO 6. Compare and analyze different cloud computing solutions

CO 7. Explain the aspects of hybrid clouds and disruptive network trends

CO 8. Develop and deploy cloud application for an enterprise

TEXT BOOK:

1. IBM Course Material

15ECS130 Enterprise Mobile application development using IBM Worklight 3 0 0 3

Course Objective:

- To learn the basics of IBM Worklight studio
- To develop, deploy and publish applications for mobile platforms using IBM Worklight mobile development platform

UNIT I INTRODUCTION TO IBM WORKLIGHT 9

Mobile overview, Introduction to IBM Worklight, Overview of Worklight Studio, Developing and testing the user interface.

UNIT II IBM WORKLIGHT CLIENT-SIDE DEVELOPMENT 9

IBM Worklight client-side development: Core APIs, IBM Worklight client-side development: Local storage APIs, Working with UI frameworks.

UNIT III WORKLIGHT APIs 9

Worklight integration adapters, Native page and web page integration, Using Worklight native APIs.

UNIT IV SECURITY IN MOBILE APPLICATION DEVELOPMENT 9

Security, Location services, Push notification.

UNIT V APPLICATION TO DEVELOPMENT 9

Migrating an application from development to production, Team development, IBM Worklight Application Center.

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the fundamentals of IBM Worklight studio

CO 2. Develop and test the user interface

CO 3. Acquire knowledge on IBM Worklight client-side development and API

CO 4. Use Worklight native APIs

CO 5. Understand the issues and handle security in mobile application development

CO 6. Develop and publish applications for mobile platforms

CO 7. Migrate an application from development to production.

TEXT BOOK:

IBM Course Material

15ECS131 Development of IOT Based Applications 3 0 0 3

Course Objective:

- To understand the core concept, role and scope of smart sensors in IOT
- To learn the fundamentals of Raspberry Pi and communication protocols between various IOT components

UNIT I INTERNET OF THINGS - AN INTRODUCTION 9

Internet of Things - An introduction, Sensors & Actuators- motion/temperature/light sensors and relays/stepper motors, Processing Elements - Raspberry Pi, Arduino, and Edison

UNIT II ON TREK WITH JAVASCRIPT 9

On Trek with JavaScript - JS and testing waters, Node.js, installation on a Raspberry Pi

UNIT III PROTOCOLS 9

Protocols - communication protocol between various IOT components – MQ Telemetry Transport, Node-RED – wiring various devices and API s.

UNIT IV IOT IN ACTION 9

IoT in Action – Developing IOT Applications on IBM Bluemix.

UNIT V IOT - WHAT'S BREWING 9

IoT - What's Brewing, Case studies – Real Life examples.

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the role of sensors and actuators in Internet of Things

CO 2. Acquire knowledge on Raspberry Pi, Arduino and Edison

CO 3. Be familiar with JavaScript and testing waters

CO 4. Understand the working of different communication protocols between various IOT components

CO 5. Elaborate on wiring various devices and APIs

CO 6. Develop IOT applications on IBM Bluemix

CO 7. Understand the need of IOT in different sectors

TEXT BOOK:

IBM Course Material

15ECS132 Fundamentals of Enterprise Apps Development for Cloud Deployment 3 0 0 3

Course Objective:

- To learn the fundamentals of cloud computing
- To Understand the application development using DevOps Service on Bluemix
- To learn the Bluemix services in mobility and Bigdata.

UNIT I INTRODUCTION TO BLUEMIX 9

Cloud computing overview, Consumption View – IaaS (Soft Layer), PaaS (IBM Bluemix), Blue Mix Architecture, Blue Mix Overview and Dashboard Setup and installations - Eclipse and CF plugins, Case Study 1: Building an Application from a Boilerplate in the Bluemix UI, Case Study 2: Deploying a Java web app that uses the PostGreSQL service with the IBM Bluemix Eclipse tools, Case Study 3: Building and Deploying the Java version with the IBM Bluemix Eclipse tools.

UNIT II DEVELOPMENT OF APPS USING BLUEMIX SERVICES 9

Registering Services in BluemixTM, Deploying a Node.js app that uses the MySQL service with command line tools, Build a Twitter Influencer Application in Bluemix, Building and Deploying the Node.js version with the IBM Bluemix Eclipse tools, Deploying the Python version with command line tools.

UNIT III DEVELOPMENT OF APPS USING DEV OPS SERVICES ON BLUE MIX 9

Overview of Dev Ops, Overview Bluemix DevOps Services, Part 1: Importing and deploying the application from DevOps, Part 2: (Optional) Updating the application, JEE Cloud Trader Benchmark Application on Bluemix that use performance analysis capabilities.

UNIT IV BLUEMIX SERVICES IN MOBILITY & BIG DATA 9

Overview of Services in the areas of Mobile Apps Development & Big Data

UNIT V DATA MANAGEMENT SERVICES 9

Building an Application with Mobile Backend as a Service (MBaaS) on Bluemix platform, Data Management service - Build an BI application using Map Reduce Service to perform analytics for Big Data Sets .

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the Blue Mix Architecture and to exploit the Installation and setup procedures.

CO 2. Acquire knowledge on Building, Deploying a web application using PostGreSQL and IBM Bluemix.

CO 3. Be familiar with Bluemix DevOps Services

CO 4. Explore the different techniques in Mobile Apps Development & Big Data.

CO 5. Build an Application with Mobile Backend as a Service (MBaaS) on Bluemix platform.

CO 6. Build an BI application using Map Reduce Service.

CO 7. Perform analytics for Big Data Sets

TEXT BOOK:

IBM Course Material

15ECS133 CYBER FORENSICS 3 0 0 3

Course Objective:

- To learn the security issues in transport and network layer
- To understand the fundamentals of firewalls and computer forensics
- To understand the process of analyzing and understanding the forensic data

UNIT I NETWORK LAYER SECURITY &TRANSPORT LAYER SECURITY 9

IPSec Protocol – IP Authentication Header – IP ESP – Key Management Protocol for IPSec . Transport layer Security: SSL protocol, Cryptographic Computations – TLS Protocol.

UNIT II E-MAIL SECURITY & FIREWALLS 9

PGP – S/MIME – Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls – Firewall designs – SET for E-Commerce Transactions.

UNIT III INTRODUCTION TO COMPUTER FORENSICS 9

Introduction to Traditional Computer Crime, Traditional problems associated with Computer Crime. Introduction to Identity Theft & Identity Fraud. Types of CF techniques – Incident and incident response methodology – Forensic duplication and investigation. Preparation for IR: Creating response tool kit and IR team. – Forensics Technology and Systems – Understanding Computer Investigation – Data Acquisition. AULibrary.com

UNIT IV EVIDENCE COLLECTION AND FORENSICS TOOLS 9

Processing Crime and Incident Scenes – Working with Windows and DOS Systems. Current Computer Forensics Tools: Software/ Hardware Tools.

UNIT V ANALYSIS AND VALIDATION 9

Validating Forensics Data – Data Hiding Techniques – Performing Remote Acquisition – Network Forensics – Email Investigations – Cell Phone and Mobile Devices Forensics

TOTAL: 45h

Course Outcome:

At the end of this course, the student will be able to

CO 1. Gain in depth knowledge in the field of Computer forensics.

CO 2. Be familiar and get skilled in Windows operating System.

CO 3. Acquire knowledge on Forensic Investigative smart Practices.

CO 4. Understand the importance and need for smart practices in computer investigation.

CO 5. Know the ethical standards of the profession and apply those standards to all aspects of the study and practice of digital forensics.

CO 6. Evaluate the effectiveness of available digital forensics tools and use them in a way that optimizes the efficiency and quality of digital forensics investigations.

CO 7. Describe web and mobile device foresenics.

TEXT BOOKS:

1. Man Young Rhee, “Internet Security: Cryptographic Principles”, “Algorithms and Protocols”, Wiley Publications, 2003.
2. Nelson, Phillips, Enfinger, Steuart, “Computer Forensics and Investigations”, Cengage Learning, India Edition, 2008.

REFERENCES:

1. John R.Vacca, “Computer Forensics”, Cengage Learning, 2005
2. Richard E.Smith, “Internet Cryptography”, 3rd Edition Pearson Education, 2008.
3. Marjie T.Britz, “Computer Forensics and Cyber Crime”: An Introduction”, 3rd Edition, Prentice Hall, 2013.

Syllabus

Generic Elective Courses

15___151 ANALOG AND DIGITAL COMMUNICATION 3 0 0 3

Course Objective:

- To Understand the data and pulse communication techniques and to get familiarize with source and error control coding.
- To gain knowledge on multi-user radio communication.
- To learn analog and digital modulation techniques, communication receiver and transmitter design, line coding techniques, noise analysis, and multiplexing techniques.

UNIT I FUNDAMENTALS OF ANALOG COMMUNICATION 9

Principles of amplitude modulation, AM envelope, frequency spectrum and bandwidth, modulation index and percent modulation, AM Voltage distribution, AM power distribution, Angle modulation - FM and PM waveforms, phase deviation and modulation index, frequency deviation and percent modulation, Frequency analysis of angle modulated waves. Bandwidth requirements for Angle modulated waves.

UNIT II DIGITAL COMMUNICATION 9

Introduction, Shannon limit for information capacity, digital amplitude modulation, frequency shift keying, FSK bit rate and baud, FSK transmitter, BW consideration of FSK, FSK receiver, phase shift keying – binary phase shift keying – carrier recovery – squaring loop, Costas loop, DPSK.

UNIT III DIGITAL TRANSMISSION 9

Introduction, Pulse modulation, PCM – PCM sampling, sampling rate, signal to quantization noise rate, companding – analog and digital – percentage error, delta modulation, adaptive delta modulation, differential pulse code modulation, pulse transmission – Intersymbol interference, eye patterns.

UNIT IV DATA COMMUNICATIONS 9

Introduction, History of Data communications, Standards Organizations for data communication, data communication circuits, data communication codes, Error control, Error Detection, Error correction, Data communication Hardware, serial and parallel interfaces, data modems, Asynchronous modem, Synchronous modem, low-speed modem, medium and high speed modem, modem control.

UNIT V SPREAD SPECTRUM AND MULTIPLE ACCESS TECHNIQUES 9

Introduction, Pseudo-noise sequence, DS spread spectrum with coherent binary PSK, processing gain, FH spread spectrum, multiple access techniques – wireless communication, TDMA and CDMA in wireless communication systems

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Elaborate and explain about frequency spectrum, bandwidth, modulation index and power distribution of AM waves.

CO 2. Give the expression for frequency spectrum and Bandwidth

CO 3. Explain the principle of Angle modulation. Derive phase deviation, modulation index and frequency deviation.

CO 4. Derive the spectrum and bandwidth of FSK modulated waves.

CO 5. Explain the principle of FSK and DPSK with a neat diagram.

CO 6. Find the modulation index and bandwidth requirements in Analog communication

CO 7. Understand the modulation techniques in Digital communication

CO 8. Acquire knowledge on the principles of transmitter and receiver in Digital communication

CO 9. Be familiar with the concept of sampling, quantization and pulse code modulation

CO 10. Explain error correction and detection techniques in data communication

CO 11. Discuss spread spectrum and multiple access techniques.

TEXT BOOKS:

1. Wayne Tomasi, “Advanced Electronic Communication Systems”, 6 Edition, Pearson Education, 2007.
2. Simon Haykin, “Communication Systems”, 4th Edition, John Wiley & Sons., 2001.

REFERENCE BOOKS:

1. H.Taub,D L Schilling ,G Saha ,”Principles of Communication”3/e,2007.
2. B.P.Lathi,”Modern Analog And Digital Communication systems”, 3/e, Oxford University Press, 2007
3. Blake, “Electronic Communication Systems”, Thomson Delmar Publications, 2002.
4. Martin S.Roden, “Analog and Digital Communication System”, 3rd Edition, PHI, 2002.

15___152 CONTROL SYSTEMS 3 0 0 3

Course Objective:

- To understand the methods of representation of systems and to desire their transfer function models.
- To provide adequate knowledge in the time response of systems and steady state error analysis.
- To accord basic knowledge in obtaining the open loop and closed–loop frequency responses of systems.
- To understand the concept of stability of control system and methods of stability analysis.
- To study the three ways of designing compensation for a control system.

UNIT I SYSTEMS AND THEIR REPRESENTATION 9

Basic elements in control systems – Open and closed loop systems – Electrical analogy of mechanical and thermal systems – Transfer function – Synchros – AC and DC servomotors – Block diagram reduction techniques – Signal flow graphs.

UNIT II TIME RESPONSE 9

Time response – Time domain specifications – Types of test input – I and II order system response – Error coefficients – Generalized error series – Steady state error – P, PI, PID modes of feedback control.

UNIT III FREQUENCY RESPONSE 9

Frequency response – Bode plot – Polar plot – Determination of closed loop response from open loop response – Correlation between frequency domain and time domain specifications.

UNIT IV STABILITY OF CONTROL SYSTEM 9

Characteristics equation – Location of roots in S plane for stability – Routh Hurwitz criterion – Root locus construction – Effect of pole, zero addition – Gain margin and phase margin – Nyquist stability criterions.

UNIT V COMPENSATOR DESIGN 9

Performance criteria – Lag, lead and lag-lead networks – Compensator design using bode plots.

TOTAL: 45 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the method of representation of systems and it's transfer function.

CO 2. Analyze the basic elements in control systems and function of open and closed systems and electrical and mechanical systems and it's transfer function.

CO 3. Determine the time response of first and second order system, error coefficients and error series and steady state error.

CO 4. Plot the frequency response in bode and polar plot.

CO 5. Determine the closed loop response from open loop response and correlations between frequency domain and time domain representations.

CO 6. Find out the characteristics equation and locations of roots in S plane for stability and Routh Hurwitz criterions.

CO 7. Determine the pole, zero addition, gain margin and phase margin and nyquist stability criterions

CO 8. Understand the performance of Lag, lead and lag-lead networks.

TEXT BOOKS:

1. Nagrath, I.J. and M. Gopal, 'Control Systems Engineering', New Age International Publishers,4th Edition 2006

2. Benjamin C. Kuo, "Automatic Control systems", Pearson Education, New Delhi, 9th Edition

REFERENCE BOOKS:

1. Ogata, K. 'Modern Control Engineering', 5th edition, PHI, New Delhi, 2010

2. Norman S. Nise, "Control Systems Engineering", 6th Edition, John Wiley, New Delhi, 2011

3. SamarajitGhosh," Control systems", 2nd Edition,Pearson Education, New Delhi, 2009

15___153 DIGITAL SIGNAL PROCESSING 3 0 0 3

Course Objective:

- To understand the design linear discrete-time systems and filters and to analyze their behavior.
- To learn how to represent continuous-time signals and linear systems in discrete time, so that such signals can be recovered in continuous time when necessary.
- To compute approximations to Fourier transforms of continuous-time signals with finite discrete time methods.

UNIT I SIGNALS AND SYSTEMS 9

Basic elements of DSP – converting to analog to digital -concepts of frequency in Analog and Digital Signals – sampling theorem – Discrete – time signals, systems – Analysis of discrete time LTI systems – Z transform – Convolution (linear and circular) – Correlation

UNIT II FREQUENCY TRANSFORMATIONS 9

Introduction to DFT – Properties of DFT –general filter procedure- low pass to band pass transformation-band pass filter-Filtering methods based on DFT – FFT Algorithms Decimation – in – time Algorithms, Decimation – in – frequency Algorithms Use of FFT in Linear Filtering – DCT.

UNIT III IIR FILTER DESIGN 9

Structures of IIR –IIR filter issues- Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (HPF, BPF, BRF) filter design using frequency translation.

UNIT IV FIR FILTER DESIGN 9

Structures of FIR –FIR filter design specification-FIR filter in transposed structure- FIR filter design by optimization-Linear phase FIR filter – Filter design using windowing techniques Frequency sampling techniques – Finite word length effects in digital Filters.

UNIT V APPLICATIONS 9

Multirate signal processing – Speech compression – Adaptive filter -overview of adaptive filter-application of Adaptive filter-Stochastic Gradient Approach-LMS Algorithm Steps– Musical sound processing- single echo filter-multiple echo filter – reverberation – flanging - image enhancement

TOTAL: 45 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the basic concepts of signals and systems.

CO 2. Be familiar with the different frequency transformation techniques.

CO 3. Learn the different algorithms and properties of DFT and FFT.

CO 4. Design and analyze the IIR filters.

CO 5. Design the digital FIR filter at the end of the course.

CO 6. Demonstrate the applications if FFT to digital signal processing at the end of the course.

CO 7. Understand the different algorithms related to adaptive filter.

CO 8. Create any filters using MATLAB by the end of the course

TEXT BOOKS:

1. John G. Proakis & Dimitris G.Manolakis, “Digital Signal Processing – Principles, Algorithms & Applications”, Fourth edition, Pearson education / Prentice Hall, 2007.

2. Emmanuel C..Ifeachor, & Barrie.W.Jervis, “Digital Signal Processing”, Second edition, Pearson Education / Prentice Hall, 2002.

REFERENCES:

1. Alan V.Oppenheim, Ronald W. Schafer & Hohn. R.Back, “Discrete Time Signal Processing”, Pearson Education, 2nd edition, 2005.

2. Andreas Antoniou, “Digital Signal Processing”, 2nd Edition, Tata McGraw Hill, 2009.

15___154 HIGH SPEED NETWORKS 3 0 0 3

Course Objective:

- To understand the basis of ATM and Frame relay concepts.
- To learn the various types of LAN's and to know about their applications and techniques involved to support real-time traffic and congestion control in ATM.
- To understand the basis of ISA queuing discipline.

UNIT I HIGH SPEED NETWORKS 9

Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection – ATM Cell – ATM Service Categories – AAL. High Speed LAN's: Fast Ethernet – Gigabit Ethernet– Fibre Channel – Wireless LAN's, WiFi and WiMax Networks applications, requirements – Architecture of 802.11.

UNIT II CONGESTION AND TRAFFIC MANAGEMENT 8

Queuing Analysis – Queuing Models – Single Server Queues – Effects of Congestion –Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

UNIT III TCP AND ATM CONGESTION CONTROL 11

TCP Flow control – TCP Congestion Control – Retransmission – Timer Management –Exponential RTO backoff – KARN's Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Frame work, Traffic Control – ABR traffic Management – ABR rate control, RM cell formats – ABR Capacity allocations – GFR traffic management.

UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES 8

Integrated Services Architecture – Approach, Components, Services- Queuing Discipline – FQ – PS – BRFQ – GPS – WFQ – Random Early Detection – Differentiated Services.

UNIT V PROTOCOLS FOR QOS SUPPORT 9

RSVP – Goals & Characteristics, Data Flow, RSVP operations – Protocol Mechanisms – Multiprotocol Label Switching – Operations, Label Stacking – Protocol details – RTP – Protocol Architecture – Data Transfer Protocol– RTCP.

TOTAL: 45 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand Asynchronous transfer modes, its architecture, logical connection, cell and service categories.

CO 2. Be familiar with High Speed LANs such as Fast Ethernet, Gigabit Ethernet and its applications.

CO 3. Perform queuing analysis for congestion control and traffic management.

CO 4. Control congestion in packet switching networks.

CO 5. Familiar with the flow control, congestion control and performance of TCP over ATM.

CO 6. Understand the requirements, attributes, management framework and control of ABR and GFR traffic management.

CO 7. Be familiar with the architecture, approach. Components, services and queuing discipline of integrated services.

CO 8. Be familiar with multiprotocol label switching and stacking operations

TEXT BOOK:

1. William Stallings, “High speed networks and internet”, Second Edition, Pearson Education, 2002.

REFERENCES:

1. Warland, Pravin Varaiya, “High performance communication networks”, Second Edition , Jean Harcourt Asia Pvt. Ltd., 2001.

2. Irvan Pepelnjk, Jim Guichard, Jeff Apcar, “MPLS and VPN architecture”, Cisco Press, Volume 1 and 2, 2003.

3. Abhijit S. Pandya, Ercan Sea, “ATM Technology for Broad Band Telecommunication Networks”, CRC Press, New York, 2004.

15___155 ROBOTICS 3 0 0 3

Course Objective:

- To study microcontroller operations for robotics and the different interfaces to implement in a microcontroller.
- To learn how Microchip PIC micro PIC16F627 can be erased and reprogrammed.
- To learn how different sensors, outputs, and peripherals can be wired to a microcontroller to work cooperatively and create a high-level control program.
- To design robots in a real time environment.

UNIT I SCOPE OF ROBOTS AND INTELLIGENCE 9

The scope of industrial Robots - Definition of an industrial robot - Need for industrial robots - applications. Robot Intelligence – State Space Search – Problem Reduction – Use of Predicate – logic – means Ends Analysis – Problem Solving – Robot Learning – Robot Task Planning – Basic Problems in Task Planning.

UNIT II SOFTWARE DEVELOPMENT 9

Source files, object files, libraries, linkers and hex files – Assemblers – Interpreters – Compilers - Simulators and Emulators - Integrated development environments.

UNIT III THE MICROCHIP PIC micro (R) MICROCONTROLLER 9

Different PIC micro MCU devices and features - Application development tools - Basic circuit requirements - The PIC16F627 - EL cheapo PIC micro programmer circuit.

UNIT IV THE MICROCONTROLLER CONNECTIONS 9

Hardware interface sequencing- Robot C programming template – Protyping with the PIC micro microcontroller – Intercomputer communications- RS232 - HyperTerminal RS 232 terminal emulator- RS 232 interface example between PC and PIC micro MCU – Bidirectional synchronous interfaces – Output devices – LEDS – PWM power level control – Sensors – Whiskers for physical object detection – iR collision detection sensors- IR remote controls- Ultrasonic distance measurement- Light level sensors- Sound sensors- Odometry for motor control and navigation – Radio control servos.

UNIT V BRINGING ROBOTS TO LIFE 9

Real time operating system (RTOS) – Example application running in an RTOS – State machines – Randomly moving a robot application with IR remote control - Behavioral programming - Neural networks and Artificial intelligence.

Total: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the scope, definition and need for industrial robots

CO 2. Learn and plan robot tasks using artificial intelligence

CO 3. Acquire knowledge on assemblers, interpreters, compilers and simulaters of software development

CO 4. Understand various PIC microcontrollers and their features

CO 5. Explain application development tools in PIC controllers

CO 6. Understand the basics of Robot C programming

CO 7. Use different IR, ultrasonic, light and sound sensors in robots

CO 8. Apply neural networks and artificial intelligence to activate robots and function like a human being

TEXT BOOK:

1. Myke Predko, “Programming Robot Controllers” – McGrawHill, 1st edition, 2003.

REFERENCES :

1. Michael slater, “Microprocessor – based design: A comprehensive Guide to Effective Hardware Design”, Prentice Hall, 1989.

2. Myke Predko, “Programming and customizing the 8051- micro-controller”, Tata McGraw-Hill, New Delhi, 2000.

3. Kenneth J. Ayala, “The 8051 micro-controller architecture, programming and applications”, Penram International publishers, Mumbai, 1997.

4. Murphy Robin R,” Introduction to AI Robotics”, MIT Press, 2000.

5. Siegwart R and Nourbakhsh I.R, “Introduction to Autonomous mobile Robots”, Prentice Hall India, 2005.

15___156 EMBEDDED SYSTEMS 3 0 0 3

Course Objective:

- To introduce the difference between embedded systems and general purpose systems.
- To learn how to optimize hardware designs of custom single-purpose processors.
- To study the different approaches in optimizing general-purpose processors and to introduce different peripheral interfaces to embedded systems.
- To understand the design tradeoffs made by different models of embedded systems

UNIT I EMBEDDED COMPUTING 9

Challenges of Embedded Systems – Embedded system design process. Embedded processors – 8051 Microcontroller-Architecture-memory organization- ARM architecture- processor –product code description- main features of Instruction sets - programming.

UNIT II MEMORY AND INPUT / OUTPUT MANAGEMENT 9

Programming Input and Output – Issues in IO Management- IO Organization -Memory system mechanisms – Memory devices and Input and output devices- memory interfacing – Interrupts handling- Issues in Handling Interrupts- Identifying the source of interrupt.

UNIT III PROCESSES AND OPERATING SYSTEMS 9

Multiple tasks and processes – Context switching – Scheduling policies – Inter process communication-IPC unicast and multicast-message passing- Cooperating Processes –purpose of IPC-inter process methods-inter process mechanisms – Performance issues.

UNIT IV EMBEDDED SOFTWARE 9

Programming embedded systems in assembly and C – Meeting real time constraints – Multi-state systems and function sequences.-functional characteristics-functional description-Embedded software development tools – Emulators and debuggers.

UNIT V EMBEDDED SYSTEM DEVELOPMENT 9

Design issues and techniques – Control System Modeling and Design- embedded system development experience-Exemplary embedded system- Embedded system development methodology-Electronic Design and Analysis -Case studies – Complete design of example embedded systems.

TOTAL: 45 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the design process and challenges involved in embedded system

CO 2. Classify the architecture and memory organization of the microcontroller

CO 3. Identify the source of interrupt and handle it

CO 4. Understand the different input and output memory devices and their interfacing

CO 5. Identify the purpose of inter process, its methods, mechanisms and performance issues

CO 6. Acquire knowledge on embedded software development tools using emulators and debuggers

CO 7. Model and design control systems with different techniques

CO 8. Understand and analyze the development methodology of embedded system

TEXT BOOKS:

1. Wayne Wolf, “Computers as Components: Principles of Embedded Computer System Design”, Elsevier, Third Edition, 2012.

2. Michael J. Pont, “Embedded C”, Pearson Education , Second Edition, 2008.

REFERENCES:

1. Steve Heath, “Embedded System Design”, Elsevier, Second Edition, 2005.

2. Muhammed Ali Mazidi, Janice Gillispie Mazidi and Rolin D. McKinlay, “The 8051 Microcontroller and Embedded Systems”, Pearson Education, Second edition, 2007.

15___157 PRINCIPLES OF MANAGEMENT & PROFESSIONAL ETHICS 3 0 0 3

Course Objective:

- To have a clear understanding of the managerial functions like planning, organizing, staffing, leading and controlling.
- To study the evolution of management
- To study the functions and principles of management
- To learn the application of the principles in an organization
- To learn the engineering ethics and human values

UNIT I OVERVIEW OF MANAGEMENT 9

Definition - Management - Role of managers - Evolution of Management thought – Organization and the environmental factors – Trends and Challenges of Management in Global Scenario.

UNIT II PLANNING & ORGANIZING 9

Nature and purpose of planning and Organizing - Planning process - Types of plans – Managing by objective (MBO) Strategies - Types of strategies - Policies - Decision Making - Types of decision - Decision Making Process - Rational Decision Making Process - Decision Making under different conditions. - Organization structure - Formal and informal groups I organization - Line and Staff authority - Departmentation - Span of control - Centralization and Decentralization - Delegation of authority - Staffing - Selection and Recruitment - Orientation - Career Development - Career stages – Training - Performance Appraisal.

UNIT III DIRECTING & CONTROLLING 9

Creativity and Innovation - Motivation and Satisfaction - Motivation Theories - Leadership Styles - Leadership theories - Communication - Barriers to effective communication – Organization Culture - Elements and types of culture - Managing cultural diversity. Process of controlling - Types of control - Budgetary and non-budgetary control techniques - Managing Productivity - Cost Control - Purchase Control - Maintenance Control - Quality Control - Planning operations.

UNIT IV ENGINEERING ETHICS & HUMAN VALUES 9

Definition - Societies for engineers – Code of Ethics – Ethical Issues involved in cross border research - Ethical and Unethical practices – case studies – situational decision making - Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

UNIT V SAFETY RESPONSIBILITIES AND RIGHTS 9

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination – Global issues - Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers

– Engineers as Expert Witnesses and Advisors – Moral Leadership –Code of Conduct – Corporate Social Responsibility.

TOTAL: 45 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the management roles, skills and evolution of the management in global scenario.

CO 2. Know the functions and principles of management

CO 3. Understand the planning, organizing, directing and controlling system of the management.

CO 4. Identify and analyze the ethical issue in the subject matter under investigation.

CO 5. Understand the own ethical values and the social context problems.

CO 6. Identify the ethical concerns in research and intellectual contexts including academic integrity.

CO 7. Know the importance of yoga and meditation for professional excellence and stress management

CO 8. Understand the Safety responsibilities and Intellectual Property Rights.

TEXT BOOKS:

1. Stephen P. Robbins and Mary Coulter, 'Management', Prentice Hall of India, 13th Edition.
2. Charles W L Hill, Steven L McShane, 'Principles of Management', Mcgraw Hill Education, Third Edition, 2010.
3. Mike W. Martin and Roland Schinzinger, “Ethics in Engineering”, Tata McGraw Hill, New Delhi, Fourth Edition, 2014.

REFERENCE BOOKS:

1. Hellriegel, Slocum & Jackson, ' Management - A Competency Based Approach', Thomson South Western, 11 th edition.
2. Harold Koontz, Heinz Weihrich and Mark V Cannice, 'Management - A global & Entrepreneurial Perspective', Tata Mcgraw Hill, 14th edition, 2013.
3. Andrew J. Dubrin, 'Essentials of Management', Thomson Southwestern, 9th edition, 2012.
4. Charles B. Fleddermann, “Engineering Ethics”, Pearson Prentice Hall, New Jersey, 4th edition, 2012.
5. John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, New Delhi 7th edition, 2012.

15___158 FUNDAMENTALS OF NANO SCIENCE 3 0 0 3

Course Objective:

- To learn the basic concepts of nano science and nanotechnology and their applications in various fields of Science and Engineering.
- To understand the scope of nano materials potential use in products manufactured by various industries.

UNIT I INTRODUCTION 9

Nanoscale Science and Technology- Implications for Physics, Chemistry, Biology and Engineering-Classifications of nanostructured materials- nano particles- quantum dots,nanowires-ultra-thinfilms-multilayered materials. Length Scales involved and effect on properties: Mechanical, Electronic, Optical, Magnetic and Thermal properties. Introduction to properties and motivation for study (qualitative only).

UNIT II PREPARATION METHODS 10

Bottom-up Synthesis-Top-down Approach: Precipitation, Mechanical Milling, Colloidal routes, Self-assembly, Vapour phase deposition, MOCVD, Sputtering, Evaporation, Molecular Beam Epitaxy, Atomic Layer Epitaxy, MOMBE.

UNIT III PATTERNING AND LITHOGRAPHY FOR NANOSCALE DEVICES 7

Introduction to optical/UV electron beam and X-ray Lithography systems and processes-transmission of mask feture-lithography electron range-steps in the mask fabrication-steps in photo lithography- Wet etching, dry (Plasma /reactive ion) etching, Etch resists-dip pen lithography

UNIT IV PREPARATION ENVIRONMENTS 9

Clean rooms: specifications and design, air and water purity, requirements for particular processes, Vibration free environments: Services and facilities required. Working practices, sample cleaning, Chemical purification, chemical and biological contamination, Safety issues, flammable and toxic hazards, biohazards.

UNIT V CHARECTERISATION TECHNIQUES 10

X-ray diffraction technique, Scanning Electron Microscopy - environmental techniques, Transmission Electron Microscopy including high-resolution imaging, Surface Analysis techniques- AFM, SPM, STM, SNOM, ESCA, SIMS-Nano indentations.

TOTAL: 45 h

Course Outcome:

At the end of this course, the Student will be able to

CO1: Acquire knowledge on nanotechnology principles and industrial Applications.

CO2: Understand the Nano-scale paradigm in terms of properties at the Nano-scale dimensions.

CO3: Explain the concept of materials science, chemistry, physics, biology and engineering.

CO4: Assess the current nanotechnology solutions in design, engineering and manufacturing.

CO5: Determine patterning and lithography for Nano-scale devices.

CO6: Describe UV electron beam and x-ray lithography system process

CO7: Understand the technology issues that may impede the adoption of nanotechnology.

CO8: Identify career paths and skills for career changes towards Nanotechnology.

CO9: Illustrate the latest characterization techniques.

CO10: Describe the surface analysis techniques such as AFM, SPM, STM, SNOM, ESCA, SIMS.

TEXT BOOKS:

1. A.S. Edelstein and R.C. Cammearata, eds., Nanomaterials: Synthesis, Properties and Applications, Institute of Physics Publishing, Bristol and Philadelphia, 1998.

2. N John Dinardo, Nanoscale charecterisation of surfaces & Interfaces, Second edition, Weinheim Cambridge, Wiley-VCH, 2008

REFERENCE:

1. G Timp (Editor), Nanotechnology, AIP press/Springer, 2012

2. Akhlesh Lakhtakia (Editor) The Hand Book of Nano Technology, “Nanometer Structure”, Theory, Modeling and Simulations. Prentice-Hall of India (P) Ltd, New Delhi, 2007

15___159 INTELLECTUAL PROPERTY RIGHTS 3 0 0 3

Course Objective:

- To know how to protect the rights of the university, its innovators, inventors, research sponsors and the public.
- To learn how to eliminate the infringement, improper exploitation and abuse of the university's intellectual assets.

UNIT I INTRODUCTION 9

Introduction – Invention and Creativity – Intellectual Property (IP) – Importance –Need for IPR- Protection of IPR - IPR in India – Genesis and Development IPR in abroad - some important examples of IPR – Basic types of property (i). Movable Property - Immovable Property and - Intellectual Property- Competing Rationales for Protection of Intellectual Property Rights

UNIT II APPLICATIONS OF IP 9

IP – Patents- Procedure for Opposition- Revocation of Patents - Ownership and Maintenance of Patents- Assignment and licensing of Patents – Copyrights and related rights – Trade Marks and rights arising from Trademark registration – Definitions – Industrial Designs and Integrated circuits –Protection of Geographical Indications at national and International levels – Application Procedures -

UNIT III IP ESSENTIALS 9

International convention relating to Intellectual Property – Establishment of WIPO –Mission and Activities – History – General Agreement on Trade and Tariff (GATT) –TRIPS Agreement- Copyright and Related Rights- Trademarks - Geographical Indications - Industrial Designs - Layout-Designs (Topographies) of Integrated Circuits - Protection of Undisclosed- The text of the TRIPS Agreement.

UNIT IV GLOBAL PERSPECTIVE 9

Indian Position Vs WTO and Strategies – Economics of intellectual property**-** Other intellectual property conventions - Indian IPR legislations – commitments to WTO-Patent Ordinance and the Bill – Draft of a national Intellectual Property Policy –Present against unfair competition- TRIPS work in the WTO - WTO bodies - IPR Enforcement - Global Value of Digital Piracy.

UNIT V TRENDS IN IP 9

Case Studies on – Patents (Basumati rice, turmeric, Neem, etc.) – Copyright and related rights – Trade Marks – Industrial design and Integrated circuits – Geographic indications– Protection against unfair competition- India's IP regime –Development- Legislation- International Searching Authority and International Preliminary Examining Authority- IPR on Internet.

TOTAL: 45 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the Importance and Need for IPR

CO 2. Assess different types of intellectual property rights

CO 3. Explain the concept of patent, Ownership and Maintenance of Patents

CO 4. Discuss TRIPS Agreement, Copyright and Related Rights

CO 5. Create Layout-Designs (Topographies) of Integrated Circuits and implement.

CO 6. Differentiate between Indian Position Vs WTO in global perspective

CO 7. Define the principles of Global Value of Digital Piracy

CO 8. Acquire knowledge about Industrial design and Integrated circuits

CO 9. Illustrate International Searching Authority and International Preliminary Examining Authority

TEXT BOOK:

1. Subbaram N.R. “Handbook of Indian Patent Law and Practice “, S. Viswanathan Printers and Publishers Pvt. 3rd Edition 2006.

REFERENCES:

1. Eli Whitney, United States Patent Number: 72X, Cotton Gin, 2004.
2. Intellectual Property Today: Volume 8, No. 5, 2006, [www.iptoday.com].
3. Using the Internet for non-patent prior art searches, Derwent IP Matters, July 2000.

15___160 INDIAN CONSTITUTION AND SOCIETY 3 0 0 3

Course Objective:

- To understand various legal principles, and to get familiarize with the concept of judicial activism.
- To know the public interest litigation that is often used in environmental cases.
- To understand how courts influence environmental decision making in India.

UNIT I INTRODUCTION 9

Historical Background – Constituent Assembly of India – Philosophical foundations of the Indian Constitution – Preamble – Fundamental Rights – Directive Principles of State Policy – Fundamental Duties – Citizenship – Constitutional Remedies for citizens- Relation between Law and Public Opinion- Law as an instrument of social change.

UNIT II UNION GOVERNMENT 9

Union Government – Structures of the Union Government and Functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial Review- Political Parties: National and Regional- Changing Nature of Party System- Government Response to Changing Political Scenario - Political obligation.

UNIT III STATE GOVERNMENT 9

"State" Meaning and Scope in Modern Perspective– Structure and Functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System in States – High Courts and other Subordinate Courts - Creation of new states - The inter-state disputes on resources -Freedom of Trade- Commerce and Intercourse.- Welfare State and Development.

UNIT IV FEDERAL SYSTEM 9

Indian Federal System – Center – State Relations – Nagar Palikas and Panchayati Raj - President's Rule – Constitutional Amendments – Constitutional Functionaries - Assessment of working of the Parliamentary System in India- Elections: Election Commission, Electoral Reforms, Criminalization of Politics- Distribution of Powers in Indian federalism.

UNIT V SOCIOLOGY 9

Society : Nature, Meaning and definition; Indian Social Structure; Caste, Religion, Language in India; Constitutional Remedies for citizens – Political Parties and Pressure Groups; Right of Women, Children and Scheduled Castes and Scheduled Tribes and other Weaker Sections- Women's Movement in India before and after Independence- personal troubles and public and social problems.

Total: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Discuss Philosophical foundations of the Indian Constitution

CO 2. Provide Knowledge on Fundamental Rights and Fundamental Duties

CO 3. Understand the Structures of the Union Government and Functions

CO 4. Determine the Government Response to Changing Political Scenario

CO 5. Demonstrate the Structure and Functions of state Government

CO 6. Explain the principles of Welfare State and Development.

CO 7. Understand the concept of Indian Federal System

CO 8. Assess the working of the Parliamentary System in India

CO 9. Identify the Constitutional Remedies for citizens

CO 10. Discuss Women's Movement in India before and after Independence

TEXT BOOKS:

1. Durga Das Basu, " Introduction to the Constitution of India ", Prentice Hall of India, New Delhi.2008

2. R.C.Agarwal, (1997) "Indian Political System", S.Chand and Company, New Delhi.

3. Maciver and Page, " Society: An Introduction Analysis ", Mac Milan India Ltd., New Delhi.

4. K.L.Sharma, (1997) "Social Stratification in India: Issues and Themes", Jawaharlal Nehru University, New Delhi.

REFERENCES:

1. Sharma, Brij Kishore, " Introduction to the Constitution of India:, Prentice Hall of India, New Delhi.2015

2. U.R.Gahai, "Indian Political System ", New Academic Publishing House, Jalaendhar.

3. R.N. Sharma, "Indian Social Problems ", Media Promoters and Publishers Pvt. Ltd.

15___161 ENGINEERING ECONOMICS 3 0 0 3

Course Objective:

To enable students to understand the fundamental economic concepts applicable to engineering and to learn the techniques of incorporating inflation factor in economic decision making.

UNIT I INTRODUCTION TO ECONOMICS 8

Introduction to Economics- Flow in an economy, Law of supply and demand, Concept of Engineering Economics – Engineering efficiency, Economic efficiency, Scope of engineering economics – Element of costs, Marginal cost, Marginal Revenue, Sunk cost, Opportunity cost, Break-even analysis – V ratio, Elementary economic Analysis – Material selection for product Design selection for a product, Process planning.

UNIT II VALUE ENGINEERING 10

Make or buy decision, Value engineering – Function, aims, Value engineering procedure. Interest formulae and their applications –Time value of money, Single payment compound amount factor, Single payment present worth factor, Equal payment series sinking fund factor, Equal payment series payment Present worth factor- equal payment series capital recovery factor – Uniform gradient series annual equivalent factor, Effective interest rate, Examples in all the methods.

UNIT III CASH FLOW 9

Methods of comparison of alternatives – present worth method (Revenue dominated cash flow diagram), Future worth method (Revenue dominated cash flow diagram, cost dominated cash flow diagram), Annual equivalent method (Revenue dominated cash flow diagram, cost dominated cash flow diagram), rate of return method, Examples in all the methods.

UNIT IV REPLACEMENT AND MAINTENANCE ANALYSIS 9

Replacement and Maintenance analysis – Types of maintenance, types of replacement problem, determination of economic life of an asset, Replacement of an asset with a new asset – capital recovery with return and concept of challenger and defender, Simple probabilistic model for items which fail completely.

UNIT V DEPRECIATION 9

Depreciation- Introduction, Straight line method of depreciation, declining balance method of depreciation-Sum of the years digits method of depreciation, sinking fund method of depreciation/ Annuity method of depreciation, service output method of depreciation-Evaluation of public alternatives- introduction, Examples, Inflation adjusted decisions – procedure to adjust inflation, Examples on comparison of alternatives and determination of economic life of asset.

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the basics of Engineering Economics

CO 2. Acquire knowledge on Value Engineering procedure

CO 3. Familiarize with different categories of Equal payment series.

CO 4. Analyze the various categories of Cash Flow Diagram

CO 5. Explain the principles of Replacement and Maintenance analysis

CO 6. Differentiate multiple methods of depreciation

CO 7. Evaluate Simple probabilistic model for items which fail completely

TEXT BOOK:

1. Panneer Selvam, R, “Engineering Economics”, Prentice Hall of India Ltd, New Delhi, 2001.

REFERENCES:

1. Chan S.Park, “Contemporary Engineering Economics”, Prentice Hall of India, 2011.
2. Donald.G. Newman, Jerome.P.Lavelle, “Engineering Economics and analysis” Engg. Press, Texas, 2010.
3. Degarmo, E.P., Sullivan, W.G and Canada, J.R, “Engineering Economy”, Macmillan, New York, 2011.
4. Zahid A khan: Engineering Economy, “Engineering Economy”, Dorling Kindersley, 2012

15___162 OPERATIONS RESEARCH 3 0 0 3

Course Objective:

To provide knowledge and training in using optimization techniques under limited resources for the engineering and business problems.

UNIT I LINEAR MODELS 15

The phase of an operation research study - Linear programming - Graphical method- Simplex algorithm - Duality formulation - Sensitivity analysis.

UNIT II TRANSPORTATION MODELS AND NETWORK MODELS 8

Transportation Assignment Models Traveling Salesman problem-Networks models Shortest route Minimal spanning tree - Maximum flow models -Project network - CPM and PERT networks - Critical path scheduling Sequencing models.

UNIT III INVENTORY MODELS 6

Inventory models - Economic order quantity models - Quantity discount models - Stochastic inventory models - Multi product models - Inventory control models in practice.

UNIT IV QUEUEING MODELS 6

Queueing models – Queueing systems and structures - Notation parameter - Single server and multi server models - Poisson input - Exponential service - Constant rate service - Infinite population - Simulation.

UNIT V DECISION MODELS 10

Decision models - Game theory - Two person zero sum games - Graphical solution- Algebraic solution- Linear Programming solution - Replacement models - Models based on service life - Economic life- Single / Multi variable search technique - Dynamic Programming - Simple Problem.

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the fundamentals of Linear model

CO 2. Solve the real time problems using optimization techniques

CO 3. Acquire knowledge on transportation assignment, network and sequencing models.

CO 4. Solve various problems such as Inventory models, Queuing model and Decision model.

CO 5. Understand the working principle of dynamic programming

TEXT BOOK:

1. Taha H.A., ¡§Operations Research¡¨, Sixth Edition, Prentice Hall of India, 2003.

REFERENCES:

1.Shennoy G.V. and Srivastava U.K., ¡§Operation Research for Management¡¨, Wiley Eastern, 1994.

2. Bazara M.J., Jarvis and Sherali H., ¡§Linear Programming and Network Flows¡¨, John Wiley, 1990.

3. Philip D.T. and Ravindran A., ¡§Operations Research¡¨, John Wiley, 1992.

4. Hillier and Libeberman, ¡§Operations Research¡¨, Holden Day, 1986

5. Budnick F.S., ¡§Principles of Operations Research for Management¡¨, Richard D Irwin, 1990.

15___163 TOTAL QUALITY MANAGEMENT 3 0 0 3

Course Objective:

To facilitate the understanding of Quality Management principles and process.

UNIT I INTRODUCTION 9

Introduction – Need for quality – Evolution of quality – Definitions of quality – Dimensions of product and service quality – Basic concepts of TQM – TQM Framework – Contributions of Deming, Juran and Crosby – Barriers to TQM – Quality statements – Customer focus – Customer orientation, Customer satisfaction, Customer complaints, Customer retention – Costs of quality.

UNIT II TQM PRINCIPLES 9

Leadership – Strategic quality planning, Quality Councils – Employee involvement – Motivation, Empowerment, Team and Teamwork, Quality circles Recognition and Reward, Performance appraisal – Continuous process improvement – PDCA cycle, 5S, Kaizen – Supplier partnership – Partnering, Supplier selection, Supplier Rating.

UNIT III TQM TOOLS AND TECHNIQUES I 9

The seven traditional tools of quality – New management tools – Six sigma: Concepts, Methodology, applications to manufacturing, service sector including IT – Bench marking – Reason to bench mark, Bench marking process – FMEA – Stages, Types.

UNIT IV TQM TOOLS AND TECHNIQUES II 9

Control Charts – Process Capability – Concepts of Six Sigma – Quality Function Development (QFD) – Taguchi quality loss function – TPM – Concepts, improvement needs – Performance measures.

UNIT V QUALITY SYSTEMS 9

Need for ISO 9000 – ISO 9001-2008 Quality System – Elements, Documentation, Quality Auditing – QS 9000 – ISO 14000 – Concepts, Requirements and Benefits – TQM Implementation in manufacturing and service sectors..

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the basics of Total Quality Management System.

CO 2. Be Familiar with Customer focus, orientation, satisfaction, complaints and retention

CO 3. Acquire knowledge on Employee involvement, Motivation and Empowerment

CO 4. Explain Six sigma Concepts and its Methodology.

CO 5. Analyze Bench marking process and its different stages

CO 6. Utilize Total Quality Management Tools and Techniques

CO 7. Understand the need for ISO9000 and its principles

TEXT BOOK:

1. Dale H. Besterfiled, et at., “Total quality Management”, Third Edition, Pearson Education Asia, Indian Reprint, 2006.

REFERENCES:

1. James R. Evans and William M. Lindsay, “The Management and Control of Quality”, 8th Edition, First Indian Edition, Cengage Learning, 2012.
2. Suganthi.L and Anand Samuel, “Total Quality Management”, Prentice Hall (India) Pvt. Ltd., 2006.
3. Janakiraman. B and Gopal .R.K., “Total Quality Management – Text and Cases”, Prentice Hall (India) Pvt. Ltd., 2006.

15___164 DIGITAL PRINCIPLES AND SYSTEM DESIGN 3 0 0 3

Course Objective:

- To understand different methods used for the simplification of Boolean functions.
- To design and implement Combinational circuits, synchronous sequential circuits and asynchronous sequential circuits.
- To study the fundamentals of VHDL / Verilog HDL

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES 9

Review of binary number systems - Binary arithmetic – Binary codes – Boolean algebra and theorems - Boolean functions – Simplifications of Boolean functions using Karnaugh map and tabulation methods – Implementation of Boolean functions using logic gates.

UNIT II COMBINATIONAL LOGIC 9

Combinational circuits – Analysis and design procedures - Circuits for arithmetic operations - Code conversion – Introduction to Hardware Description Language (HDL)

UNIT III DESIGN WITH MSI DEVICES 9

Decoders and encoders - Multiplexers and demultiplexers - Memory and programmable logic - HDL for combinational circuits

UNIT IV SYNCHRONOUS SEQUENTIAL LOGIC 9

Sequential circuits – Flip flops – Analysis and design procedures - State reduction and state assignment - Shift registers – Counters – HDL for Sequential Circuits.

UNIT V ASYNCHRONOUS SEQUENTIAL LOGIC 9

Analysis and design of asynchronous sequential circuits - Reduction of state and flow tables – Race-free state assignment – Hazards- ASM Chart.

TOTAL: 45 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the various number systems and perform arithmetic operations in them

CO 2. Analyze Boolean expression using K-Map and tabulation techniques

CO 3. Understand different methods used for simplification of Boolean functions

CO 4. Use Boolean simplification technique to design a combinational hardware circuit

CO 5. Design and analyze combinational circuits

CO 6. Implement synchronous and asynchronous sequential circuits

CO 7. Reduce state tables and assign states

CO 8. Write programs in HDL for combinational and sequential circuits

TEXT BOOK:

1. M. Morris Mano, “Digital Design”, 5th edition, Pearson Education, 2013.

REFERENCE BOOKS:

7. Jr.,Charles H.Roth, “Fundamentals of Logic Design”, 7th Edition, Jaico Publishing House, Cengage Earning, 7th edition, 2014.
3. Donald D.Givone, “Digital Principles and Design”, Tata McGraw-Hill, 2007

Syllabus

Skill Enhancement Elective Courses

15GPD251 PERSONALITY DEVELOPMENT I 2 0 0 2

UNIT I SOFT SKILLS I 6

Introduction to Personality Development – Meaning-Features of personality=Dimensions of Personality=Determinants of Personality-Features and Traits- Components of self concept-Barriers-Self analysis

UNIT II SOFT SKILLS II 6

Importance of Soft Skills – First impression-Work Place requirements-Discipline-Cleanliness-Hygiene-general Appearance--Building Confidence—Concept of Thinking and Usage-Value of Time-Focus & Commitment.

UNIT III SOFT SKILLS IN ACTION 6

Grooming – Attire – Understanding others- – Stability & Maturity Development – Strength s – Weakness – Opportunities-threats -Merits of SWOT Analysis-Components-how to convert weakness into strengths-Goal settings

UNIT IV SELF AWARENESS AND SELF ESTEEM 6

Definitions-Components of self awareness-Developing Self awareness-Self esteem-meaning-Steps to improve self esteem

UNIT V SELF MOTIVATION 6

Motivation –Meaning-Techniques of self motivation-Motivation & goal setting – Motivation and emotion – Motivation at work.

Total: 30 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Develop interpersonal skills and be an effective goal oriented team player.
CO 2. Develop professionals with idealistic, practical and moral values.
CO 3. Develop communication and problem solving skills.
CO 4. Re-engineer attitude and understand its influence on behavior.
CO 5. Enhance the holistic development and improve their employability skills.
CO 6. Emerge from a process of reflection on the essential contents of a course.
CO 7. Focus on the application and integration of acquired knowledge and skills.

REFERENCES

1. Personality Development And Soft Skills---Barun K Mitra, Oxford Publication
2. Seven habits of Higly Effective people – Stephen R. covey
3. Emotion, motivation and Self regulation - Nathan C. Hall , McGill University, Canada, Thomas Goetz, University of Konstanz, Germany
4. http://www.emeraldgrouppublishing.com/
5. Psychology of Selfesteem – Nathaniel Branden, Nash (1st edition), Jossey-Bass (32nd anniversary edition

15GPD252 PERSONALITY DEVELOPMENT II 2 0 0 2

UNIT I Soft Skills III 6

Basic Etiquette – Email etiquette – Business etiquette – Telephone etiquette – Meeting etiquette – Adjustment of Role & Leadership – Team Management & Development

UNIT II QUANTITATIVE APTITUDE I 6

Percentage – Profit Loss -Discount – Ratio Proportion – Time & Work – Time, Speed &Distancel. Problems relating to ages- Permutation &Combination-Probability

UNIT III QUANTITATIVE APTITUDE II 6

Mensuration Clocks and Calendars- Boats-Simple Interest –Compound Interest- Fractions and Decimals – Square roots – Functions.

UNIT IV ANALYTICAL PROBLEMS 6

Introduction – Linear Sequencing – Seating Arrangements – Distribution/Double Line Up – Selection – Ordering and Sequencing – Binary Logic – Venn Diagrams –Directions.

UNIT V LOGICAL PROBLEMS 6

Introduction to Logical problems – Cause and Effect – Course of Action – Statement and Assumption – Letter and Symbol series – Analogies.

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Develop the confidence & skills to interact with the business environment and at networking events & client functions in a manner that enhances the Company Brand.

CO 2. Engage with clients & colleagues in a polished and professional manner, ensuring positive first & last impressions.

CO 3. Master effective email structures to achieve clarity and successful communication.

CO 4. Recognize a variety of leadership theories

CO 5. Demonstrate the ability to use theories in the practice of leadership.

CO 6. Display the critical thinking skills and abilities to lead others toward common goals.

CO 7. Demonstrate an understanding of group dynamics and effective teamwork.

CO 8. Think reflectively and to convey thoughts and feelings.

CO 9. Communicate effectively in a range of group sizes and across multiple media types.

Establish and maintain trust in others to complete projects and tasks.

REFERENCE BOOKS

1. Personality Enrichment--K R Dhanalakshmi And N S Raghunathan, Margham Publications

2. Personality Development --Dr V M Selvaraj Bhavani Publications
3. Quantitative Aptitude – R. S Aggarwal
4. Logical and Analytical Reasoning (English) 30th Edition – A.K Gupta

15GPD253 PERSONALITY DEVELOPMENT III 2 0 0 2

UNIT I VERBAL APPTITUDE I 6

Phonetics/Neutral Accent/Pronunciation – Speech Mechanism/Mouth & Face Exercise – Vowels & Consonants – Sounds – Syllable and Syllable Stress/ Word Stress – Sentence Stress & Intonation – Articulation Exercise – Rate of Speech / Flow of Speech / Idiomatic Phrases.

UNIT II VERBAL APTITUDE II 6

Singular/plural-present tense/past tense—genders - Prepositions-conjunctions-Choice of words—simple sentences—compound sentences- summarising phrases—Synonyms—Antonyms—Analogies—Similar Words

UNIT III SOFT SKILLS IV 6

Attitude—Meaning- Features of attitude-Formation-Personality Factors-Types of attitude-change in attitude-Developing Positive attitude.

UNIT IV TIME MANAGEMENT 6

Definition –Meaning-Importance, Value of time as an important resource- comparison of Time and Money-Circle of influence and circle of control—Definition of URGENT and IMPORTANT—Time Wasters and how to reduce—Procrastination—meaning and impact- 4 Quadrants.

UNIT V TEAM BUILDING 6

Meaning—Aspects of team building—Process of team building—Types of Teams-Team ethics and Understanding-Team trust and commitment

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Collect and analyze data for the purpose of resolving an issue(s) directly related to organizational behavior.

CO 2. Undertake complete and submit a project using appropriate planning, methodological, evaluative and presentation techniques.

CO 3. Develop a range of core (or transferable) skills, including: communication - orally and in writing problem – solving learning to learn (use of resources) and team-working.

CO 4. Understand the benefits of positive thinking and how negative thinking weakens and disempowers.

CO 5. Create a mission statement to identify their long term goals.

CO 6. Design believable positive affirmations to support them through troubled times.

CO 7. Identify characteristics of successful people.

Identify why some people seem to be more positive.

REFERENCE BOOKS

1. Managing Soft Skills And Personality--B N GhoshMcgraw Hill Publications

2. Principles and Practices of Management Shejwalkar and Ghanekar McGraw Hill Latest
3. Time management for Busy people – Roberta roesch, TatamcGraw-Hill Edition
4. Personality Development --Dr V M Selvaraj, Bhavani Publications

15GPD254 PERSONALITY DEVELOPMENT IV 2 0 0 2

UNIT I Soft SKILLS V 6

Assertiveness—Meaning—Importance of assertiveness- Characteristics of assertive communication-Merits –forms of assertion—Causes of misunderstanding

UNIT II Communication Skills 6

Meaning—Elements of communication—Functions of communication—Principles of communication—Formal and Informal communication—Barriers in Communication—Characteristics of good communication—Feedback—communication systems.

UNIT III Presentation Skills I 6

Meaning—Importance of Presentation—Concept of 5 w's and one H--- understanding the audience—Types of presentations—How to make effective presentation

UNIT IV Presentation Skills II 6

Use of slide, PPT's.and visuals—Rules for slide presentation—precautions ---seminars and conferences-Steps to eliminate Stage fear.

UNIT V Change Management 6

Definition – Necessity - Resistance towards Change – 10 Principles of Change Management – Leaders approach – Effective Change management.

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Create effective presentations and determine primary and secondary objectives.

CO 2. Build a presentation, develops an introduction, capture the audience attention, organize the body of the presentation, use transitions, and conclude the presentation.

CO 3. Use a presentation process, prepare before speaking in a presentation, deliver a presentation, and use nonverbal communication aids.

CO 4. Handle the questions effectively, approach the question-and-answer session, responsibilities during a session, and handle challenging questions.

CO 5. Persuade a presentation, understand the goals of persuasion, organize a persuasive presentation, and use the methods of persuasion.

CO 6. Incorporate, understand and create the types of visual aids

CO 7. understand the difference between leadership and management.

CO 8. Empower, motivate and inspire others.

CO 9. Gain insight into your patterns, beliefs and rules.

CO 10. Understand good leadership behaviors.

REFERENCE BOOKS:

1. Helping employees embrace change - LaClair, J. and Rao, R. Helping Employees Embrace Change, McKinsey Quarterly, 2002, Number 4.
2. Who Moved My Cheese by Spencer Johnson published by Vermilion first edition
3. Effective Communication. Adair, John. London: Pan Macmillan Ltd., 2003.
4. Business Communication Today: Bovee, Courtland L, John V. Thill & Barbara E. Schatzman.Tenth Edition. New Jersey: Prentice Hall, 2010.

15NSS255 NSS - I 2 0 0 2

Unit-01 Introduction and basic concepts of NSS 6

NSS: History, philosophy, aims, objectives –Emblem: flag, motto, song, badge- NSS functionaries: Organizational structure, roles and responsibilities.

Unit-02 NSS Programs and activities 6

Concept of regular activities- special camping-day camps-Basis of adoption of village/slums, Methodology of conducting survey-Financial pattern of the scheme- other youth program/schemes of GOI- Coordination with different agencies- Maintenance of the dairy

Unit-03 Understanding youth 6

Youth: Definition, profile of youth, categories – youth: Issues, challenges and opportunities - Youth as an agent of social change.

Unit-04 Community Mobilization 6

Mapping of community stakeholders-Designing the message in the context of the problem and the culture of the community-Identifying methods of mobilization-Youth adult partnership

Unit-05 Volunteerism and Shramdan 6

Indian Tradition of volunteerism-Needs& Importance of volunteerism- Motivation and constraints of volunteerism-Shramdan as a part of volunteerism.

TOTAL: 30h

15NSS 256 NSS - II 2 0 0 2

Unit-01 Importance and Role of youth leadership 7

Meaning and types of leadership-Qualities of good leaders; traits of leadership- Importance and role of youth leadership

Unit-02 Life competencies 7

Definition and importance of life competencies-Communication- Inter personal- Problem solving and decision-making

Unit-03 Social harmony and National Integration 8

Indian history and culture-Role of youth in peace-building and conflict resolution- Role of youth in Nation building

Unit-04 Youth development programmes in India 8

National youth policy-Youth development programmes at the National level,state level and voluntary sector-Youth focused and youth-led organization

Conducting surveys on special theme and preparing a report thereof.

TOTAL: 30h

15NSS257 NSS - III 2 0 0 2

Unit-01 Citizenship 6

Basic features of constitution of India-Fundamental Rights and duties- Human rights- Consumer awareness and the legal rights of consumer- RTI

Unit-02 Family and society 6

Concept of family-community(PRIs and community-based organization) and society-Growing up in the family-dynamics and impact-Human values-Gender justice

Unit-03 Health, Hygiene & sanitation 6

Health Education Definition, needs and scope-Food and nutrition- Safe drinking water- water born diseases and sanitation(Swachh Bharath Abhiyan)-National Health Programme- Reproductive health

Unit-04 Youth health 6

Healthy Lifestyles-HIV AIDS, Drugs and substance abuse- Home nursing- First aid .

Unit-05 Youth and Yoga 6

Yoga: History, philosophy and concept-Myths and misconceptions about yoga- Different yoga traditions and their impact-Yoga as a preventive,promotive and curative method- Yoga as a tool for healthy lifestyle

Preparation of research project report.

TOTAL: 30h

15NSS258 NSS - IV 2 0 0 2

Unit-01 Environment issues 7

Environment: conservation, enrichment and sustainability-Climate change- Waste management- Natural resource management(Rainwater harvesting, energy conservation, wasteland development, soil conservations and afforestation)

Unit-02 Disaster management 7

Introduction to Disaster management-classification of disasters-Role of youth in disaster management

Unit-03 Project Cycle Management 8

Project planning-Project implementation- Project monitoring- Project evaluation-Impact Assessment

Unit-04 Documentation and reporting 8

Collection and analysis of data- Preparation of Documentation/Reports- Dissemination of documents/Reports

Workshops/seminars on personality development and improvement of communication skills.

TOTAL: 30h

15NSS259 NSS - V 2 0 0 2

Unit-01 Vocational skill development 15

This unit will aim to enhance the employment potential of the NSS volunteers- alternately to help them to set up small business enterprises. For this purpose, a list of 12-15 vocational skills will be drawn up ,based on local conditions and opportunities - Each volunteer will have the option to select two skill-areas out of this list-one such skill in each semester-The education institution (or the university)will make arrangements for developing these skills in collaboration with established agencies that possess the necessary expertise in the related vocational skills.

Unit-02 Entrepreneurship Development 8

Definitions & meaning- Qualities of good Entrepreneur- Steps/ways in opening an enterprise- Role of financial and support service Institutions.

Unit-03: Youth and crime 7

Sociological and Psychological Factors influencing youth crime- Peer monitoring in preventing crimes Awareness about Anti-Ragging -Cyber Crime and its prevention- Juvenile justice

TOTAL: 30h

15NSS260 NSS - VI 2 0 0 2

Unit-01 Vocational skill development 15

This unit will aim to enhance the employment potential of the NSS volunteers- alternately to help them to set up small business enterprises. For this purpose, a list of 12-15 vocational skills will be drawn up ,based on local conditions and opportunities-Each volunteer will have the option to select two skill-areas out of this list-one such skill in each semester-The education institution (or the university)will make arrangements for developing these skills in collaboration with established agencies that possess the necessary expertise in the related vocational skills.

Unit-02 Civil/Self defense 5

Civil defense services-aims and objectives of civil defense - Needs for Self defense training

Unit-03 Resource Mobilisation 3

Writing a project proposal- Establishment of SFUs

Unit-04 Additional life skills 7

Positive thinking- Self confidence and self esteem- Setting life goals and working to achieve them-Management of stress including time management.

TOTAL: 30h