BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE & ENGINEERING

SEMESTER-WISE CREDIT DISTRIBUTION

A. Definition ofCredit:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) perweek	0.5 credit
2 HoursPractical(Lab)/week	1 credit

HUMANITIES AND SOCIAL SCIENCES INCLUDING MANAGEMENT COURSES

Sl. No	Code No.	Course Title	Hours per week			Total Credits	Semester
			Lecture	Tutorial	Practical		
1	HSMC-201	English	2	0	2	2	2
2	HSMC-301	Humanities- I (Development of Societies)	3	0	0	3	3
3	HSMC-401	Management-I (Organizational Behaviour/ Finance & Accounting)	3	0	0	3	4
4	HSMC-501	Humanities- II (Principles Of Management And Critical Thinking)	3	0	0	3	5
					Total Credits:	**11**	

BASIC SCIENCE COURSE [BSC]

Sl. No	Code No.	Course Title	Hours per week			Total Credits	Semester
			Lecture	Tutorial	Practical		
1	PH-101A	Physics-I (Semiconductor, Waves and Optics)	3	1	3	5.5	1
2	AMCSE- 201	Mathematics-II (Probability and Statistics)	3	1	0	4	2
3	AMCSE-101	Mathematics-I (Calculus and Linear Algebra)	3	1	0	4	1
4	CH-201	Chemistry-I	3	1	3	5.5	2
5	AMCSE-301	Mathematics-III (Differential Calculus)	3	0	0	3	3
					Total Credits:	22	

ENGINEERING SCIENCE COURSE [ESC]

Sl. No	Code No.	Course Title	Hours per week			Total Credits	Semester
			Lecture	Tutorial	Practical		
1	BEE-101	Basic Electrical Engineering	3	1	2	5	1
2	ME-101	Engineering Graphics & Design	1	0	4	3	1
3	CSE-201	Programming for Problem Solving	3	0	4	5	2
4	ME-201P	Workshop/Manufacturing Practices	1	0	4	3	2
5	ECE-302	Digital System Design	3	0	2	4	3
6	CSE-501	Web and Internet Technology	3	0	4	5	5
					Total Credits:	25	

PROFESSIONAL CORE COURSES [PCC]

Sl. No	Code No.	Course Title	Hours per week			Total Credits	Semester
			Lecture	Tutorial	Practical		
1	CSE-301	Data Structure & Algorithms	3	0	4	5	3
2	CSE-302P	IT Workshop – (Sci Lab/MATLAB)	0	0	4	2	3
3	CSE-303	Object oriented Programming	3	0	4	5	3
4	CSE-401	Discrete Mathematics	3	1	0	4	4
5	CSE-402	Computer Organization and Architecture	3	0	2	4	4
6	CSE-403	Operating Systems	3	0	4	5	4
7	CSE-404	Design and Analysis of Algorithms	3	0	2	4	4
8	CSE-502	Database Management Systems	3	0	4	5	5
9	CSE-503	Formal Language and Automata Theory	3	0	0	3	5
10	CSE-504	Software Engineering	3	0	0	3	5
11	CSE-601	Programming in Java	3	0	4	5	6
12	CSE-602	Computer Graphics	3	0	4	5	6
13	CSE-701	Artificial Intelligence	3	0	0	3	7
					Total Credits	**53**	

PROFESSIONAL ELECTIVE[PEC]

Sl. No	Course Title	Hours per week			Total Credits	Semester
		Lecture	Tutorial	Practical		
1	Elective – I	3	0	0	3	5
2	Elective-II	3	0	0	3	6
3	Elective-III	3	0	0	3	6
4	Elective-IV	3	0	0	3	7
5	Elective-V	3	0	0	3	7
6	Elective-VI	3	0	0	3	8
				Total Credits	**18**	

OPEN ELECTIVE COURSES [OEC]

Sl. No	Course Title	Hours per week			Total Credits	Semester
		Lecture	Tutorial	Practical		
1	Open Elective – I	3	0	0	3	6
2	Open-Elective-II	3	0	0	3	7
3	Open-Elective-III	3	0	0	3	8
4	Open-Elective-IV	3	0	0	3	8
				Total Credits:	**12**	

LIST OF PROFESSIONAL ELECTIVES

ELECTIVE- I

ECE-404	Signals & Systems
ECE-601	Digital Signal Processing
CSE-505	Graph Theory
CSE-506	Signals and Networks

ELECTIVE- II

CSE-603	Computer Networks
CSE-604	Computational Geometry
CSE-605	Neural Networks and Deep Learning
ECEL-03	Information Theory and Coding

ELECTIVE- III

CSE-607	Compiler Design
ECEL-18	Embedded Systems
CSE-608	Cloud Computing
CSE-609	Soft Computing

ELECTIVE- IV

CSE-702	Distributed Systems
CSE-703	Ad-Hoc and Sensor Networks
CSE-704	Internet-of-Things
CSE-705	Parallel and Distributed Algorithms

ELECTIVE- V

CSE-706	Speech and Natural Language Processing
CSE-707	Real Time Systems
CSE-708	Machine Learning
CSE-709	Computer Peripheral and Interface

ELECTIVE- VI

CSE-801	Image Processing
CSE-802	Data Mining
CSE-803	VLSI System Design
CSE-804	Data Analytics

LIST OF OPEN ELECTIVES

OPEN ELECTIVE- I

CSE-611	System Programming
CSE-612	Introduction to Philosophical Thoughts
CSE-613	Multimedia Technology

OPEN ELECTIVE- II

CSE-710	Cyber Law and Ethics
CSE-711	Soft Skills and Interpersonal Communication
CSE-712	Management Information System

OPEN ELECTIVE- III

CSE-805	Linux Administration and Shell Programming
CSE-806	History of Science and Engineering
CSE-807	Comparative Study ofLiterature

OPEN ELECTIVE- IV

CSE-808	Cryptography and Network Security
CSE-809	Economic Policies in India
CSE-810	Software Project Management

4-YEAR CURRICULUM STRUCTURE

UNDERGRADUATE DEGREE IN ENGINEERING & TECHNOLOGY

Branch / Course: Computer Science and Engineering

Total Credits (4-Year Course): 159

It is a Graduate (UG) Programme of 4 years duration (8 semesters).

Semester I (First year] Curriculum

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
PH-101A	Basic Science Course	Physics-I (Semiconductor, Waves and Optics)	3	1	0	40	60	100	4
PH-101A(P)	Basic Science Course	Physics-I (Semiconductor, Waves and Optics) LABORATORY	0	0	3	30	20	50	1.5
AMCSE-101	Basic Science Course	Mathematics-I (Calculus & Linear Algebra)	3	1	0	40	60	100	4
BEE-101	Engineering Science Course	Basic Electrical Engineering	3	1	0	40	60	100	4
BEE-101P	Engineering Science Course	Basic Electrical Engineering Laboratory	0	0	2	30	20	50	1
ME-101	Engineering Science Courses	Engineering Graphics & Design	1	0	4	60	40	100	3
TOTAL			10	3	9	240	260	500	17.5

Semester II (First year) Curriculum

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
CH-201	Basic Science Course	Chemistry-I	3	1	0	40	60	100	4
CH-201P	Basic Science Course	Chemistry-I Lab	0	0	3	30	20	50	1.5
AMCSE-201	Basic Science Course	Mathematics-II (Probability and Statistics)	3	1	0	40	60	100	4
CSE-201	Engineering Science Course	Programmingfor ProblemSolving	3	0	0	40	60	100	3
CSE-201P	Engineering Science Course	Programming for Problem Solving Lab	0	0	4	30	20	50	2
ME-201P	Engineering Science Courses	Workshop / Manufacturing Practices	1	0	4	60	40	100	3
HSMC-201	Humanities and Social Sciences including Management courses	English	2	0	0	40	60	100	2
HSMC-201P	Humanities and Social Sciences including Management courses	English (Lab)	0	0	2	30	20	50	1
MC	Mandatory Courses	Environmental Sciences	3	0	0	-	-	-	0
	TOTAL		12	2	13	310	340	650	20.5

Semester III (Second year] Curriculum

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
ECE-302	Engineering Science Course	Digital System Design	3	0	0	40	60	100	3
CSE-301	Professional Core Courses	Data Structure & Algorithms	3	0	0	40	60	100	3
CSE-302P	Professional Core Courses	IT Workshop (Sci Lab/MATLAB)	0	0	4	30	20	50	2
CSE-303	Professional Core Courses	Object Oriented Programming	3	0	0	40	60	100	3
AMCSE-301	Basic Science Course	Mathematics-III (Differential Calculus)	3	0	0	40	60	100	3
HSMC-301	Humanities & Social Sciences Including Management Courses	Humanities-I (Philosophy)	3	0	0	40	60	100	3
ECE-302P	Engineering Science Course	Digital System Design Lab	0	0	2	30	20	50	1
CSE-301P	Professional Core Courses	Data Structure & Algorithms Lab	0	0	4	30	20	50	2
CSE-303P	Professional Core Courses	Object Oriented Programming lab.	0	0	4	30	20	50	2
Total			**15**	**0**	**14**	**320**	**380**	**700**	**22**

Semester IV (Second year] Curriculum

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
CSE-401	Professional Core Courses	Discrete Mathematics	3	1	0	40	60	100	4
CSE-402	Professional Core Courses	Computer Organization & Architecture	3	0	0	40	60	100	3
CSE-403	Professional Core Courses	Operating Systems	3	0	0	40	60	100	3
CSE-404	Professional Core Courses	Design & Analysis of Algorithms	3	0	0	40	60	100	3
HSMC-401	Humanities & Social Sciences including Management Courses	Management-I (Organizational Behaviour/ Finance & Accounting)	3	0	0	40	60	100	3
CSE-402P	Professional Core Courses	Computer Organization & Architecture Lab	0	0	2	30	20	50	1
CSE-403P	Professional Core Courses	Operating Systems Lab	0	0	4	30	20	50	2
CSE-404P	Professional Core Courses	Design & Analysis of Algorithms Lab	0	0	2	30	20	50	1
Total			**15**	**1**	**8**	**290**	**360**	**650**	**20**

Semester V (Third year] Curriculum

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
CSE-501	Engineering Science Course	Web and Internet Technology	3	0	0	40	60	100	3
CSE-502	Professional Core Courses	Database Management Systems	3	0	0	40	60	100	3
CSE-503	Professional Core Courses	Formal Language & Automata Theory	3	0	0	40	60	100	3
CSE-504	Professional Core Courses	Software Engineering	3	0	0	40	60	100	3
HSMC-501	Humanities & Social Sciences including Management Courses	Humanities-II (Principles Of Management And Critical Thinking)	3	0	0	40	60	100	3
	Professional Elective	Elective-I	3	0	0	40	60	100	3
MC	Mandatory Courses	Constitution of India/ Essence of Indian Traditional Knowledge	3	0	0	-	-	-	0
CSE-501P	Engineering Science Course	Web and Internet Technology Lab	0	0	4	30	20	50	2
CSE-502P	Professional Core Courses	Database Management Systems Lab	0	0	4	30	20	50	2
Total			**18**	**0**	**8**	**300**	**400**	**700**	**22**

Semester VI (Third year] Curriculum

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
C SE-601	Professional Core Courses	Programming in Java	3	0	0	40	60	100	3
CSE-602	Professional Core Courses	Computer Graphics	3	0	0	40	60	100	3
	Professional Elective Courses	Elective-II	3	0	0	40	60	100	3
	Professional Elective Courses	Elective-III	3	0	0	40	60	100	3
	Open Elective Courses	Open Elective-I	3	0	0	40	60	100	3
PROJCSE-601	Project	Project-1	0	0	6	60	40	100	3
CSE-601P	Professional Core Courses	Programming in Java Lab	0	0	4	30	20	50	2
CSE-602P	Professional Core Courses	Computer Graphics Lab	0	0	4	30	20	50	2
Total			**15**	**0**	**14**	**320**	**380**	**700**	**22**

* The students will take 6-8 weeks summer training in Industry after Semester-6th.

Semester VII (Fourth year] Curriculum

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
CSE-701	Professional Core Courses	Artificial Intelligence	3	0	0	40	60	100	3
	Professional Elective Courses	Elective-IV	3	0	0	40	60	100	3
	Professional Elective Courses	Elective-V	3	0	0	40	60	100	3
	Open Elective Courses	Open Elective-II	3	0	0	40	60	100	3
PROJCSE-701	Project	Project-II	0	0	12	100	50	150	6
ITCSE- 701	Professional Training	Industrial Training	-	-	-	60	40	100	2
Total			**12**	**0**	**12**	**320**	**330**	**650**	**20**

Sebmester VIII (Fourth year] Curriculum

[Summer Industry Internship]

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
	Professional Elective Courses	Elective-VI	3	0	0	40	60	100	3
	Open Elective Courses	Open Elective-III	3	0	0	40	60	100	3
	Open Elective Courses	Open Elective-IV	3	0	0	40	60	100	3
PROJCSE-801	Project	Project-III	0	0	12	100	50	150	6
Total			**9**	**0**	**12**	**220**	**230**	**450**	**15**

B.Tech C.S.E
1st SEMESTER

L	T	P
3	1	0

PH-101 A: Physics-I (Semiconductor, Waves and Optics)

Course Objectives	- Learn the basics of wave motion. - Know about the behavior of light due to its wave nature. - Identify and understand different phenomena due to the interaction of light with light and matter. - Know about the semiconductor materials and laser content.
Course Outcomes	- Enable the students to analyze different phenomena due to the interaction of light with light and matter. - Train the students to use different optical instruments. - Develop the ability to apply it in solving simple problems in Quantum Mechanics (QM), structure of atoms, Laser, and electronic material. - Describe the properties of materials and application of semiconductor electronics

DETAILED CONTENT

Module 1: Faraday's law

Faraday's law in terms of EMF produced by changing magnetic flux; equivalence of Faraday's law and motional EMF; Lenz's law; Electromagnetic breaking and its applications; Differential form of Faraday's law expressing curl of electric field in terms of time-derivative of magnetic field and calculating electric field due to changing magnetic fields in quasi-static approximation; energy stored in a magnetic field.

Module2: Electronic material & Semiconductor

Free electron theory of metals, Density of states in 1D,2D and 3D, Bloch's theorem for particles in a periodic potential, Energy band diagram, kroning penny model, Energy band in solids, E-k diagr, Direct and indirect bandgap, Types of electronic material,metal, semiconductor,and insulators, occupation probability,Fermi level, Effective mass.

Intrinsic and extrinsic semiconductor, Dependence of fermi level on carrier concentration and temperature (equilibrium carrier statistics), carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction.

Module 3: Wave nature of particles and the Schrodinger equation

Introduction to Quantum mechanics, Wave nature of Particles, Time-dependent and timeindependent Schrodinger equation for wavefunction, Born interpretation, probability current,Expectation values, Free-particle wavefunction and wave-packets, Uncertainty principle.

Module 4: Wave optics

Huygens' principle, superposition of waves and interference of light by wave front splitting and amplitude splitting; Young's double slit experiment, Newton's rings, Michelson interferometer, Mach-Zehnder

interferometer. Farunhofer diffraction from a single slit and a circular aperture, the Rayleigh criterion for limit of resolution and its application to vision; Diffraction gratings and their resolving power.

Module 5: Lasers

Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: gas lasers (He-Ne, CO_2), solid-state lasers(ruby, Neodymium), dye lasers; Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, applications of lasers in science, engineering and medicine.

Suggested Reference Books
1. Engineering Mechanics, 2nd ed. — MK Harbola
2. Introduction to Mechanics — MK Verma
3. Mechanics — JP Den Hartog
4. Engineering Mechanics - Dynamics, 7th ed. - JL Meri
5. A. Ghatak, Optics
6. O. Svelto, Principles of Laser
7. David Griffiths, Introduction to Electrodynamics

L	T	P
0	0	3

PH-101A (P): Physics-I (Semiconductor, Waves and Optics)Laboratory

List of Practical's

1) To determine the V-I characteristics of Solar cell.

2) To determine the wavelength of He-Ne Laser by using diffraction grating.

3) To determine the value of Plank's constant (h) using by stopping potential of different filters.

4) To study laser interference using Michelson's Interferometer.
5) To determine the V-I characteristics of PN junction diode.

6) To analyze the suitability of a given Zener diode as voltage regulator.

7) To determine the wavelength of sodium light by Newton's rings method.

8) To find energy band gap of the semiconductor material by using the four probe method.

9) To find out the intensity response of a LED.

L	T	P
3	1	0

AMCSE-101: Mathematics –I (Calculus & Linear Algebra)

Course Objectives	The objective of this course is to familiarize the prospective engineers with technique in basic calculus and linear algebra. It aim to equip the students with standard concept and tools at an intermediate to advanced level that will serve them towards tacking more advanced level of mathematics and application that they would find useful in their discipline.
Course Outcomes	The students will be able to:- • To apply differential and integral calculus to motion and curvature and to improper integral. • Apart from various application they will have a basic understanding of beta and gamma function. • Find essential tools of matrix and linear algebra including linear transformation, • To solve linear transformation problem, rank and kernel of a linear map.

DETAILED CONTENT

Module 1: Calculus: Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes ofrevolutions.

Module 2: Calculus:

Rolle's theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; Indeterminate forms and L'Hospital's rule; Maxima and minima.

Module 3: Matrices

Matrices, vectors: addition and scalar multiplication, matrix multiplication; Linear systems of equations, linear Independence, rank of a matrix, determinants, Cramer's Rule, inverse of a matrix, Gauss elimination and Gauss-Jordan elimination.

Module 4: Vector spaces

Vector Space, linear dependence of vectors, basis, dimension; Linear transformations (maps), range and kernel of a linear map, rank and nullity, Inverse of a linear transformation, rank-nullity theorem, composition of linear maps, Matrix associated with a linear map.

Module 5: Vector spaces

Eigenvalues, eigenvectors, symmetric, skew-symmetric, and orthogonal Matrices, eigenbases.Diagonalization; Inner product spaces, Gram-Schmidt orthogonalization.

Textbooks/References:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
4. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
5. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.

V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East-West press, Reprint 2005.

L	T	P
3	1	0

BEE- 101: Basic Electrical Engineering

Course Objectives	- Impart a basic knowledge of electrical quantities such as current, voltage, power, energy and frequency to understand the impact of technology in a global and societal context. - Provide working knowledge for the analysis of basic DC and AC circuits used in electrical and electronic devices. - To explain the working principle, construction, applications of DC machines, AC machines & measuring instruments. - Highlight the importance of transformers in transmission and distribution of electric power.
Course Outcomes	At the end of the course, the student will be able to - To understand and analyze basic electric and magnetic circuits. - To study the working principles of electrical machines. - Identify the type of electrical machine used for that particular application. - To introduce the components of low voltage electrical installations.

DETAILED CONTENTS

Module 1 : DC Circuits (8 hours)

Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current andvoltage laws, analysis of simple circuits with dc excitation.Superposition, Thevenin andNorton Theorems.Time-domain analysis of first-order RL and RC circuits.

Module 2: AC Circuits (8 hours)

Representation of sinusoidal waveforms, peak and rms values, phasor representation, realpower, reactive power, apparent power, power factor. Analysis of single-phase ac circuitsconsisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance.Threephase balanced circuits, voltage and current relations in star and delta connections.

Module 3: Magnetic fields and magnetic circuits (6 hours)

Review of magnetic circuits - MMF, flux, reluctance, inductance; review of Ampere Law and BiotSavart Law; Visualization of magnetic fields produced by a bar magnet and a current carrying coil - through air and through a combination of iron and air; influence of highly permeable materials on the magnetic flux lines.BH characteristics,

Module4:Transformers&Electrical Machines (13 hours)

Transformers:Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

Electrical Machines: Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators.

Module 5: Electrical Installations (6 hours)

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types ofWires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries.Elementary calculations for energy consumption, power factor improvement and batterybackup.

Text Books

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill,2010.

2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.

Reference Books

1. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press,2011.

2. AbhijitChakrabarti, SudiptaNatha&Chandan Kumar Chand, "Basic Electrical Engineering"Tata McGraw Hill, 2009.

L	T	P
0	0	2

BEE- 101P: Basic Electrical Engineering Laboratory

LIST OF EXPERIMENTS

1. Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.
2. Measuring the steady-state and transient time-response of R-L, R-C, and R-L-C circuits to a step change in voltage (transient may be observed on a storageoscilloscope). Sinusoidal steady state response of R-L, and R-C circuits – impedance calculation and verification. Observation of phase differences between current and voltage. Resonance in R-L-C circuits.

3. Verification of Kirchhoff's Current Law.
4. Verification of Kirchhoff's Voltage Law.
5. Study and verification of the Norton's theorem.
6. Study and verification of the Superposition theorem.
7. Study and verification of the Thevnin's theorem.
8. Study of the polarity test on single phase transformer.
9. Study of transformation ratio and turns ratio of single phase transformer.
10. Study of single phase induction motor.
11. .Study of running and reversing of single phase induction motor.
12. Demonstration of cut-out sections of machines: dc machine (commutator-brush arrangement), induction machine (squirrel cage rotor), synchronous machine (fieldwinging - slip ring arrangement) and single-phase induction machine.

Note: Students are expected to perform about 10 experiments from the following list.

L	T	P
1	0	4

ME- 101: Engineering Graphics & Design

Course Objectives	• Introduction to engineering design and its place in society • Exposure to the visual aspects of engineering design • Exposure to engineering graphics standards • Exposure to solid modeling • Exposure to computer-aided geometric design • Exposure to creating working drawings • Exposure to engineering communication
Course Outcomes	• To prepare you to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability • To prepare you to communicate effectively • To prepare you to use the techniques, skills, and modern engineering tools necessary for engineering practice

DETAILED CONTENT

Traditional Engineering Graphics:
Principles of Engineering Graphics; Orthographic Projection; Descriptive Geometry;
Drawing Principles; Isometric Projection; Surface Development; Perspective; Reading a
Drawing; Sectional Views; Dimensioning & Tolerances; True Length, Angle; intersection,
Shortest Distance.
Computer Graphics:
Engineering Graphics Software; -Spatial Transformations; Orthographic Projections; Model Viewing;
Co-ordinate Systems; Multi-view Projection; Exploded Assembly; Model Viewing; Animation;
Spatial Manipulation; Surface Modelling; Solid Modelling; Introduction to Building Information
Modelling (BIM)

(Except the basic essential concepts, most of the teaching part can happen concurrently
in the laboratory)

Module 1: Introduction to Engineering Drawing &Orthographic Projections
Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering,
Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid,
Hypocycloid and Involute; Scales – Plain, Diagonal and Vernier Scales;
Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both
planes; Projections of planes inclined Planes - Auxiliary Planes;

Module 2: Projections of Regular Solids , Sections and Sectional Views of Right Angular Solids
Those inclined to both the Planes- Auxiliary Views; Draw simple annotation, dimensioning and scale.
Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc. Prism,
Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids -

Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (foundation to slab only)

Module 3: Isometric Projections, Overview of Computer Graphics

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions; listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids

Module 4: Customization & CAD Drawing, Annotations, layering & other functions

consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerance; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles; Applying dimensions to objects, applying annotations to drawings; Setting up and use of layers,layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques; Drawing sectional views of composite right regular geometric solids and project the true shape of the sectioned surface; Drawing annotation, Computer-aided design (CAD) software modeling of parts and assemblies. Parametric and non-parametric solid, surface, and wireframe models.Part editing and two-dimensional documentation of models.Planar projection theory, including sketching of perspective, isometric, multiview, auxiliary, and section views. Spatial visualization exercises. Dimensioning guidelines, tolerancing techniques; dimensioning and scale multi views of dwelling;

Module 5: Demonstration of a simple team design project that illustrates

Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blueprint form and as 3D wire-frame and shaded solids; meshed topologies for engineering analysis and tool-path generation for component manufacture; geometric dimensioning and tolerance; Use of solid-modeling software for creating associative models at the component and assembly levels; floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc. Applying colour coding according to building drawing practice; Drawing sectional elevation showing foundation to ceiling; Introduction to Building Information Modelling (BIM).

Suggested Text/Reference Books:

(i) Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
(ii) Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
(iii)   Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
(iv)   Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers

(Corresponding set of) CAD Software Theory and User Manuals Course Outcomes

B.Tech C.S.E
2nd SEMESTER

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CH-201: Chemistry-I

Course Objectives	• This syllabus aims at bridging the concepts and theory of chemistry with examples from fields of practical application, thus reinforcing the connection between science and engineering. • It deals with the basic principles of various branches of chemistry which are fundamental tools necessary for an accomplished engineer.
Course Outcomes	On completion of the course, the student will be able to: • The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications • Quantum theory is more than 100 years old and to understand phenomena at nanometer levels; one has to base the description of all chemical processes at molecular levels. The course will enable the student to: • Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. • Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques. • Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity. • List major chemical reactions that are used in the synthesis of molecules

DETAILED CONTENT

Module 1:Atomic and molecular structure

Schrodinger equation. Particle in a box solutions and their applications for conjugated molecules and nanoparticles. Forms of the hydrogen atom wave functions and the plots of these functions to explore their spatial variations.Molecular orbitals of diatomic molecules and plots of the multicenter orbitals.Equations for atomic and molecular orbitals. Energy level diagrams of diatomics. Pimolecular orbitals of butadiene and benzene and aromaticity.Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties.Band structure of solids and the role of doping on band structures.

Module 2: Spectroscopic techniques and applications

Principles of spectroscopy and selection rules.Electronic spectroscopy.Fluorescence and its applications in medicine.Vibrational and rotational spectroscopy of diatomic molecules.Applications.Nuclear magnetic resonance and magnetic resonance imaging, surface characterization techniques.Diffraction and scattering.

Intermolecular forces and potential energy surfaces

Ionic, dipolar and van Der Waals interactions.Equations of state of real gases and critical phenomena. Potential energy surfaces of H3, H2F and HCN and trajectories on these surfaces.

Module 3: Use of free energy in chemical equilibria

Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies.Free energy and emf.Cell potentials, the Nernst equation and applications.Acid base, oxidation reduction and solubility equilibria.Waterchemistry.Corrosion.Use of free energy considerations in metallurgy through Ellingham diagrams.

Module 4: Periodic properties

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard soft acids and bases, molecular geometries.

Module 5: Stereochemistry

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis. Isomerism in transitional metal compounds.

Module 6: Organic reactions and synthesis of a drug molecule

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings.Synthesis of a commonly used drug molecule.

Text/Reference Books:

1. University chemistry, by B. H. Mahan
2. Chemistry: Principles and Applications, byM. J. Sienko andR. A. Plane
3. Fundamentals of Molecular Spectroscopy, by C. N. Banwell
4. Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S.Krishnan
5. Physical Chemistry, by P. W. Atkins

6. Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore, 5th Edition
http://bcs.whfreeman.com/vollhardtschore5e/default.asp

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AMCSE-201: Mathematics-II (Probability and Statistics)

Course Objectives	The objective of this course is to familiarizes the students with statistical techniques. It aims to equip the students with standard concept and tools at an intermediate to advanced level that will serve them towards tackling various problem in the discipline.
Course Outcomes	The student will be able to:- • To understand the basic concept of probability and random variable. • To solve the problem based on discreate and continuous probability distribution. • To get basic idea of Statistics including measures of central tendency, correlation and regression. • To find the solution Binomial, Poisson and normal distribution. Also evaluation of statistical parameter for their distribution.

DETAILED CONTENT

Module 1: Basic Probability: Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables, Moments, Variance of a sum, Correlation coefficient, Chebyshev's Inequality.

Module 2:Continuous Probability Distributions: Continuous random varibales and their properties, distribution functions and densities, normal, exponential and gamma densities.

Module 3:Bivariate Distributions: Bivariate distributions and their properties, distribution of sums and quotients, conditional densities, Bayes' rule.

Module 4: Basic Statistics: Measures of Central tendency: Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression - Rank correlation

Module 5: Applied Statistics: Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves. Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.
Small samples: Test for single mean, difference of means and correlation coefficients, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.

Textbooks/References:
1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).
3. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
4. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.

5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.

6. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.

7. Veerarajan T., Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi, 2010.

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CSE- 201: Programming For Problem Solving

Course Objectives	• To learn the fundamentals of computers.
	• To understand the various steps in program development.
	• To learn the usage of structured programming approach in solving problems.
	• To impart basic knowledge about simple algorithms for arithmetic and logical problems.
Course Outcomes	The student will learn
	• To write algorithms and to draw flowcharts for solving problems.
	• To convert the algorithms/flowcharts to C programs.
	• To code and test a given logic in C programming language.
	• To use arrays, pointers, strings and structures to write C programs.
	• Searching and Sorting problems.

DETAILED CONTENT

Module 1: Introduction to Programming

Introduction to components of a computer system (disks, memory, processor, where a program is
stored and executed, operating system, compilers etc.) Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.Arithmetic expressions and precedence,Conditional Branching and Loops Writing and evaluation of conditionals and consequent branching,Iteration and loops

Module 2: Arrays , Basics Algorithms
Arrays (1-D, 2-D), Character arrays and Strings, Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required)

Module 3: Function & Recursion
Functions (including using built in libraries), Parameter passing in functions, call by value,Passing arrays to functions: idea of call by reference.Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.

Module 4: Structure, Pointers
Structures, Defining structures and Array of Structures, Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

Module 5:
File handling (only if time is available, otherwise should be done as part of the lab)

Textbooks/References:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill
3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

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CSE- 201P: Programming For Problem Solving Lab

Course Objectives	• Understand the basic concept of C Programming, Arrays, Strings, Functions, Pointers,and Structures. • Acquire knowledge about the basic concept of writing a program. • Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language. • Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions. • Role of Functions , recursion.
Course Outcomes	• Acquire knowledge about the basic concept of writing a program. • Understand the Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language. • Learn how to use of conditional expressions and looping statements to solve problems associated with conditions and repetitions. • Understand the Role of Functions involving the idea of modularity. • Understand the Concept of Array and pointers dealing with memory management. • Learn Structures and unions through which derived data types can be formed.

LIST OF EXPERIMENTS

Tutorial 1: Problem solving using computers:

Lab1: Familiarization with programming environment

Tutorial 2: Variable types and type conversions:
Lab 2: Simple computational problems using arithmetic expressions

Tutorial 3: Branching and logical expressions:
Lab 3: Problems involving if-then-else structures

Tutorial 4: Loops, while and for loops:
Lab 4: Iterative problems e.g., sum of series

Tutorial 5: 1D Arrays: searching, sorting:
Lab 5: 1D Array manipulation

Tutorial 6: 2D arrays and Strings:
Lab 6: Matrix problems, String operations

Tutorial 7: Functions, call by value:
Lab 7: Simple functions

Tutorial 8 &9: Numerical methods (Root finding, numerical differentiation, numerical integration):
Lab 8 and 9: Programming for solving Numerical methods problems

Tutorial 10: Recursion, structure of recursive calls:
Lab 10: Recursive functions

Tutorial 11: Pointers, structures and dynamic memory allocation:
Lab 11: Pointers and structures

Tutorial 12: File handling:
Lab 12: File operations

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ME-201P: Workshop/Manufacturing Practices

Course Objectives	• To expose the students to the principles of different manufacturing techniques and learn advanced operations of machining. • To understand Procedure or methodologies for conducting the casting and welding processes. • To understand working of various machine tools. • To understand innovative conceptual idea about latest manufacturing processes and their industrial applications.
Course Outcomes	On completion of this course, students will be • Able to apply knowledge of manufacturing processes and the skills to develop and manipulate the operating parameters for a given process. • Able to understand processing of plastic and ceramic materials. • Ability to understand the latest technologies in casting and welding processes will get increased. • Students will be able to come up with innovative conceptual idea about latest manufacturing processes and their industrial applications.

DETAILED CONTENTS

1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods (3 lectures)
2. CNC machining, Additive manufacturing (1 lecture)
3. Fitting operations & power tools (1 lecture)
4. Electrical &Electronics (1 lecture)
5. Carpentry (1 lecture)
6. Plastic mounding, glass cutting (1 lecture)
7. Metal casting (1 lecture)
8. Welding (arc welding & gas welding), brazing (1 lecture)

(ii)   Workshop Practice:(60 hours)[L : 0; T:0 ; P : 4 (2 credits)]
1. Machine shop (10 hours)

2. Fitting shop (8 hours)
3. Carpentry (6 hours)
4. Electrical & Electronics(8 hours)
5. Welding shop (8 hours (Arc welding 4 hrs + gas welding 4 hrs)
6. Casting (8 hours)
7. Smithy (6 hours)
8. Plastic moulding& Glass Cutting (6 hours)

Suggested Text/Reference Books:

(i) Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., " Elements of Workshop Technology" , Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.

(ii) Kalpakjian S. And Steven S. Schmid, " Manufacturing Engineering andTechnology" , 4th edition, Pearson Education India Edition, 2002.

(iii) Gowri P. Hariharan and A. Suresh Babu," Manufacturing Technology – I" Pearson Education, 2008.

Roy A. Lindberg, " Processes and Materials of Manufacture", 4th edition, Prentice Hall India, 1998.

(iv) Rao P.N., " Manufacturing Technology" , Vol. I and Vol. II, Tata McGrawHill House, 2017.

L	T	P
2	0	0

HSMC-201: English

Course Objectives	• To enable the learner to communicate effectively and appropriately in real life situation. • To use English effectively for study purpose across the curriculum. • To develop interest in and appreciation of Literature. • To develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking, Writing,
Course Outcomes	After the completion of the course students will be able to: • Develop the students' abilities in grammar, oral skills, reading, writing and study skills. • Students will heighten their awareness of correct usage of English grammar in writing and speaking. • Students will improve their speaking ability in English both in terms of fluency and comprehensibility. • Students will give oral presentations and receive feedback on their performance. • Students will increase their reading speed and comprehension of academic articles. • Students will improve their reading fluency skills through extensive reading. • Students will enlarge their vocabulary by keeping a vocabulary journal. • Students will strengthen their ability to write academic papers, essays andsummaries using the process approach.

DETAILED CONTENT

Module 1: Vocabulary Building

> ➢ The concept of Word Formation

> ➢ Root words from foreign languages and their use in English

> ➢ Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives.

> ➢ Synonyms, antonyms, and standard abbreviations.

Module 2: Basic Writing Skills

> ➢ Sentence Structures

> ➢ Use of phrases and clauses in sentences

> ➢ Importance of proper punctuation

> ➢ Creating coherence

➢ Organizing principles of paragraphs in documents

➢ Techniques for writing precisely

Module 3: Identifying Common Errors in Writing

➢ Subject-verb agreement

➢ Noun-pronoun agreement

➢ Misplaced modifiers

➢ Articles

➢ Prepositions

➢ Redundancies

➢ Clichés

Module 4: Nature and Style of sensible Writing

➢ Describing

➢ Defining

➢ Classifying

➢ Providing examples or evidence

➢ Writing introduction and conclusion

Module 5: Writing Practices

➢ Comprehension

➢ Précis Writing

➢ Essay Writing

Module 6: Oral Communication

(This unit involves interactive practice sessions in Language Lab)

➢ Listening Comprehension

➢ Pronunciation, Intonation, Stress and Rhythm

➢ Common Everyday Situations: Conversations and Dialogues

➢ Communication at Workplace

➢ Interviews

➢ Formal Presentations

Suggested Readings:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007

3. On Writing Well. William Zinsser. Harper Resource Book. 2001

4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.

5. Communication Skills. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.

6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press.

L	T	P
0	0	2

HSMC-201P: English Lab

LIST OF PRACTICALS

Interactive practice sessions in Language Lab on Oral Communication

Listening Comprehension

Self-Introduction, Group Discussion and Role Play

Common Everyday Situations: Conversations and Dialogues

Communication at Workplace

Interviews

Formal Presentations

Suggested Readings:
(i) Practical English Usage. Michael Swan. OUP. 1995.
(ii) Communication Skills. Sanjay Kumar and Pushp Lata.Oxford UniversityPress. 2011.
(iii) Exercises in Spoken English. Parts.I-III. CIEFL, Hyderabad. Oxford University Press

L	T	P
3	0	0

MC: Environmental Sciences

Course Objectives	- To identify, formulate and solve environmental problems by utilizing the concept of environmental studies. - To avoid environmental pollution & Global Problems. - To understand human activities which are causing environmental degradation and the measures to be taken to avoid this problem. - To create awareness among people about protection of wild life & forests. - Conservation of natural resources, ecological balance and biodiversity to achieve sustainable development. - Understanding of environmental policies and regulations.
Course Outcomes	The student would be able to - Get the information about ecosystem and also about its functions like Food chain, Ecological pyramids etc., - Get the knowledge about the different types of resources like land, water, mineral and energy and also about the effects of environment by the usage of these resources. - Gain the knowledge about the ecosystem diversity, its values and also about the importance of the endemic species and different techniques involved in its conservation - Gain the knowledge about the different types of pollutions and their control technologies,Waste water treatment, Bio medical waste management etc., - Get the complete information about EIA- Environmental Impact Assessment,Sustainable developmental activities, environmental policies and regulations, awareness amongpeople about protection of wild life, forest and other natural resources.

DETAILED CONTENT

Module 1: The Multidisciplinary nature of environmental studies
Definition, scope and importance, Need for public awareness.

Module 2: Natural Resources Renewable and non-renewable resources:
  a) Natural resources and associated problems
- ➢ Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction, mining, dams and their effects on forests and tribal people.
- ➢ Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's 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 over grazing, effects of

modern agriculture, fertilizers- pesticides problems, water logging, salinity, case studies.

➢ Energy Resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources, case studies Land Resources: Land as a resource, land degradation, man induces landslides, soil erosion, and desertification.

b) Role of individual in conservation of natural resources.

c) Equitable use of resources for sustainable life styles.

Module 3: Eco Systems

➢ Concept of an eco-system
➢ Structure and function of an eco-system.
➢ Producers, consumers, decomposers.
➢ Energy flow in the eco systems.
➢ Ecological succession.
➢ Food chains, food webs and ecological pyramids.
➢ Introduction, types, characteristic features, structure and function of the following eco systems
➢ Forest ecosystem
➢ Grass land ecosystem
➢ Desert ecosystem.
➢ Aquatic eco systems (ponds, streams, lakes, rivers, oceans, estuaries)

Module 4: Biodiversity and it's Conservation

➢ Introduction-Definition: genetics, species and ecosystem diversity.
➢ Biogeographically classification of India.
➢ Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.
➢ Biodiversity at global, national and local level.
➢ India as a mega diversity nation.
➢ Hot-spots of biodiversity.
➢ Threats to biodiversity: habitats loss, poaching of wild life, man wildlife, conflicts.
➢ Endangered and endemic spaces of India.
➢ Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

Module 5: Environmental Pollution

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 urban and industrial wastes
Role of an individual in prevention of pollution
Pollution case studies
Disaster management: Floods, earth quake, cyclone and land slides

Module 6: Social issues and the Environment

➢ Form unsustainable to sustainable development

- ➢ Urban problems related to energy
- ➢ Water conservation, rain water harvesting, water shed management
- ➢ Resettlement and rehabilitation of people; its problems and concerns, case studies
- ➢ Environmental ethics: issues and possible solutions
- ➢ Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.
- ➢ Wasteland reclamation
- ➢ Consumerism and waste products
- ➢ Environment protection Act
- ➢ Air (prevention and control of pollution) Act
- ➢ Water (prevention and control of pollution) Act
- ➢ Wildlife protection act
- ➢ Forest conservation act
- ➢ Issues involved in enforcement of environmental legislations
- ➢ Public awareness

Module 7: Human population and the environment
- ➢ Population growth and variation among nations
- ➢ Population explosion- family welfare program
- ➢ 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

Module 8: Field work
Visit to a local area to document environment assets river / forest / grassland / hill / mountain. Visit to a local polluted site-urban/rural/industrial/agricultural. Study of common plants, insects, birds. Study of simple ecosystems-pond, river, hills lopes, etc (field work equal to 5 lecture works)

Text Books:
- ➢ Textbook of Environmental studies, Erach Bharucha, UGC
- ➢ Fundamental concepts in Environmental Studies, D D Mishra, S Chand & Co Ltd

Other Suggested Readings:

- ➢ Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd.Bikaner.
- ➢ BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email:mapin@icenet.net(R)
- ➢ Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc.480p
- ➢ Clark R.S., Marine Pollution, Clanderson Press Oxford(TB)
- ➢ Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001,Environmental Encyclopedia, Jaico Publ. House, Mumabai,1196p

- Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay(R)
- Heywood, V.H &Waston, R.T. 1995. Global Biodiversity Assessment.Cambridge Univ. Press1140p.
- Mhaskar A.K., Matter Hazardous, Techno-Science Publication(TB)
- Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co.(TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA,574p
- Townsend C., Harper J, and Michael Begon, Essentials of Ecology,Blackwell Science(TB)
- Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliancesand Stadards, Vol I and II, Enviro Media(R)
- Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication(TB)
- Wanger K.D., 1998 Environmental Management. W.B. Saunders Co. Philadelphia, USA499p

B.Tech C.S.E

3rd SEMESTER

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ECE- 302: Digital System Design

Course Objectives	- To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits. - To impart how to design digital circuits. - This is course deals with fundamental concepts of digital electronics necessary many other courses, like embedded systems, VLSI and computer architecture, etc. to be studied in coming semesters.
Course Outcomes	At the end of this course students will demonstrate the ability to: - Design and analyze combinational logic circuits - Design & analyze modular combinational circuits with MUX/DEMUX, Decoder, Encoder - Design & analyze synchronous sequential logic circuits - Use HDL tools for digital logic design and simulation.

DETAILED CONTENT

Module 1.Boolean Algebra:
Review of Boolean Algebra and DeMorgan'sTheorem, SOP & POS forms, Canonical forms, Karnaugh maps up to 6 variables,Binary codes, CodeConversion.

Module 2.Combinational Logic Design:
MSI devices like Comparators, Multiplexers, Encoder, Decoder, Driver & Multiplexed Display,Half andFull Adders, Subtractors, Serial and Parallel Adders, BCD Adder, Barrel shifter andALU.

Module 3. Sequential Logic Design: Building blocks like S-R, JK and Master-Slave JK FF, Edge triggeredFF, Rippleand Synchronous counters, Shift registers, Finite state machines, Design ofsynchronous FSM,Algorithmic State Machines charts. Designing synchronous circuits like Pulsetrain generator, Pseudo-Random Binary Sequence generator, Clock generation.

Module 4. Logic Families and Semiconductor Memories:
TTL NAND gate, Specifications, Noise margin,Propagation delay, fan-in, fan-out, Tristate TTL, ECL, CMOS families and their interfacing,Memory elements, Conceptof Programmable logic devices like FPGA.Logic implementationusing Programmable Devices.

Module 5. VLSI Design flow:
Design entry: Schematic, FSM & HDL, different modeling styles in VHDL,Data typesand objects, Dataflow, Behavioral and Structural Modeling, Synthesis and SimulationVHDL constructs and codes for combinational and sequential circuits.

Text Books
1. R.P. Jain, "Modern digital Electronics", Tata McGraw Hill, 4th edition, 2009.
2. Douglas Perry, "VHDL", Tata McGraw Hill, 4th edition, 2002.
3. W.H. Gothmann, "Digital Electronics- An introduction to theory and practice", 2ndedition ,2006.

Reference Books

1. D.V. Hall, "Digital Circuits and Systems", Tata McGraw Hill, 1989
2. Charles Roth, "Digital System Design using VHDL", Tata McGraw Hill 2nd edition2012.

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CSE- 301: Data Structure & Algorithms

Course Objectives	- To introduce the basic concept of data structures and to emphasize the importance of data structures in developing and implementing efficient algorithms. - To understand importance of data structures in context of writing efficient programs. - To develop skills to apply appropriate data structures in problem solving.
Course Outcomes	- Learn the basic types for data structure, implementation and application. - Know the strength and weakness of different data structures. - Use the appropriate data structure in context of solution of given problem. - Develop programming skills which require to solve given problem - Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms - Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs.

DETAILED CONTENT

Module 1: Introduction

Basic Terminologies: Elementary Data Organizations, Data Structure Operations: insertion, deletion, traversal etc.; Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off.
Searching: Linear Search and Binary Search Techniques and their complexity analysis.

Module 2: Stacks and Queues

ADT Stack and its operations: Algorithms and their complexity analysis, Applications of Stacks: Expression Conversion and evaluation – corresponding algorithms and complexity analysis. ADT queue, Types of Queue: Simple Queue, Circular Queue, Priority Queue; Operations on each types of Queues: Algorithms and their analysis.

Module 3: **Linked Lists**

Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; Linked representation of Stack and Queue, Header nodes, doubly linked list: operations on it and algorithmic analysis; Circular Linked Lists: All operations their algorithms and the complexityanalysis.

Trees: Basic Tree Terminologies, Different types of Trees: Binary Tree, Threaded Binary Tree, Binary Search Tree, AVL Tree; Tree operations on each of the trees and their algorithms with complexity analysis, Applications of Binary Trees. B Tree, B+ Tree: definitions, algorithms andanalysis.

Module 4: Sorting and Hashing

Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort; Performance and Comparison among all the methods,Hashing.

Module5: Graph

Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis.

Suggested Books:
1. "Classic Data Structures", Samanta and Debasis, 2nd edition, PHIpublishers.
2. "Fundamentals of Data Structures", Illustrated Edition by Ellis Horowitz, SartajSahni, Computer SciencePress.
3. "Data Structures with C (Schaum's Outline Series)", Seymour Lipschutz, 1st edition,McGraw HillEducation.

Reference Books:
1. Algorithms, Data Structures, and Problem Solving with C++", Illustrated Edition by Mark Allen Weiss, Addison-Wesley PublishingCompany.
2. "How to Solve it by Computer", 2nd Impression by R. G. Dromey, Pearson Education.

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CSE- 302P: ITWorkshop (Sci Lab/MATLAB)

Course Objectives	• Familiarization of the syntax, semantics, data-types and library functions of numerical computing languages such as MATLAB and/or SCILAB. • To learn about the applications for implementation/simulation and visualization of basic mathematical functions relevant toelectronics applications.
Course Outcomes	The students should be able to • Understand the need for simulation/implementation for the verification of mathematical functions. • Understand the main features of the MATLAB/SCILAB program development environment to enable their usage in the higher learning. • Implement simple mathematical functions/equations in numerical computing environment such as MATLAB/SCILAB. • Interpret and visualize simple mathematical functions and operations thereon using plots/display. • Analyze the program for correctness and determine/estimate/predict the output and verifyit under simulation environment using MATLAB/SCILAB tools.

LIST OF EXPERIMENTs

Task1: Explain the main windows in MATLAB desktop.

Task2: Enter the following matrix:

    A = 1 3 4 2
        2 0 1 6
        4 1 2 7

(a) Get the matrix size.

(b) Get the matrix transpose.

Task3: We have the following two matrices:

    B = [2 2 3; 4 0 6; 8 1 5]
    C = [1 1 2; 6 3 5; 1 9 1]

Calculate: **(a)** D = B - C **(b)** E = B + C **(c)** F= E+2 **(d)** G=B*C **(e)** H= B.*C

Task4: If A1 = [2 7 6 8 9 10] and B1 = [6 4 3 2 3 4],

get**(a)** C1 = A1.*B1 **(b)** D1 = A1./B1

Task5: Enter the following matrix:

    A = 1 3 4 2
        2 0 1 6
        4 1 2 7

       0 3 6 4

(a) Get the diagonal of the matrix A.

(b) Get the sum of each column in the matrix A.

(c) Get the sum of each row in the matrix A.

(d) Get the sum of all elements in the matrix A.

(e) Add 2 to the element in the 2nd row and 3rd column.

Task6: Enter the following complex number:

       z = 2-j3

(a) Get the real and the imaginary parts of z

(b) Get the magnitude and the phase angle of z.

(c) If y = 3+j5, calculate y+z, y-z and y*z.

Task7: If w = [1+j 5-2*j; 3+2*j 4+3*j]

(a) Get the conjugate transpose.

(b) Get the point transpose.

(c) Type the elements of 2nd row only.

Task8: If R = 10 Ohms and the current is increased from 0 to 10 A with increments of 2 A, write a MATLAB m-file program to generate a table of current, voltage and power dissipation.

Task9: (a) Define a matrix A with 5 rows and 6 columns.

(b) Define a column vector B from the elements in all of the rows of column 3 in matrix A.

(c) Define a row vector C from the elements in all of the columns of row 2 in matrix A.

(d) Define a matrix E from the elements in rows 2 through 4 and all the columns in matrix A.

(e) Create a matrix F from the elements in rows 1 through 3 and columns 2 through 4 in matrix A.

Task10: Write an m-file which shows use of plot, xlabel, ylabel, title, and axis commands.

Task11: Create a linearly spaced vector of 1000 samples and show the difference between plot, semilogy, semilogx, logog commands.

Task12: Write an m-file to create bar plot(horizontal and vertical) and pie plot.

Task13: The following were the daily maximum temperatures (in F): 58 73 73 53 50 48 56 73 73 66 69 63 74 82 84 91 93 89 91 80 59 69 56 64 63 66 64 74 63 69. Use relational and logical operations to determine the following:

(a) The number of days the temperature was above 75.

(b) The number of days the temperature was between 65 and 80.

(c) The days of the month that the temperature was between 50 and 60.

Task14: For the polynomial $f(x)= x^5-12.1x^4+40.59x^3-17.015x^2-71.95x+35.88$

(a) Calculate f(9).

(b) Plot the polynomial for -1.5≤x≤6.7.

(c) Calculate roots of f(x).

Task15: If we have the following roots of the polynomial, r = 6.5 4 2.3 -1.2 0.5 find the polynomial?

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CSE- 303: Object Oriented Programming

Course Objectives	• To learn the basics concept used in OOP. • To describe the various benefits provided by OOP. • To explain the programming applications of OOP.
Course Outcomes	• Able to create simple programs using classes and objects in C++. • Implement Object Oriented Programming Concepts in C++. • Develop applications using stream I/O and file I/O. • Implement simple graphical user interfaces. • Implement Object Oriented Programs using templates and exceptional handling concepts.

DETAILED CONTENT

Module 1: Introduction

Overview of C++, Sample C++ program, Different data types, operators, expressions, and statements, arrays and strings, pointers & function components, recursive functions, user - defined types, function overloading, inline functions, Classes & Objects – I: classes, Scope resolution operator, passing objects as arguments, returning objects, and object assignment.

Module 2: Classes & Objects –II

Constructors, Destructors, friend functions, Parameterized constructors, Static data members, Functions, Arrays of objects, Pointers to objects, this pointer, and reference parameter, Dynamic allocation of objects, Copy constructors, Operator overloading using friend functions, overloading.

Module 3: Inheritance

Base Class, Inheritance and protected members, Protected base class inheritance, Inheriting multiple base classes, Constructors, Destructors and Inheritance, Passing parameters to base class constructors, Granting access, Virtual base classes.

Module 4: Virtual functions, Polymorphism

Virtual function, calling a Virtual function through a base class reference, Virtual attribute is inherited, Virtual functions are hierarchical, pure virtual functions, Abstract classes, Using virtual functions, Early and late binding.

Module5: Exception Handling

Basics of exception handling, exception handling mechanism, throwing mechanism, catching mechanism, I/O System Basics, File I/0: Exception handling fundamentals, Exception handling options. C++ stream classes, Formatted I/O, fstream and the File classes, Opening and closing a file, Reading and writing text files.

Suggested Books:

1. E. Balagurusamy, Object Oriented Programming with C++, Tata McGraw Hill.

Reference Books:

1. Stanley B.Lippmann, JoseeLajoie: C++ Primer, 4th Edition, Addison Wesley,2012.
2. Herbert Schildt: The Complete Reference C++, 4th Edition, Tata McGraw Hill,2011.

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AMCSE- 404: Mathematics-III (Differential Calculus)

Course Objectives	The objective of this course is to introduce and develop a clear understanding of the fundamental concept of differential calculus such as sequences and series, limit and continuity, differentiation, integration (double and triple), ordinary differential equations along with their applications. In particular, this course enables students to acquire skill of finding areas and volumes.
Course Outcomes	On completion of this course the student will be able to:- • To check whether the sequences and series convergent or divergent. • To find the maximum and minimum values of the function using differentiation. • To find Gradient, Curl and divergence. • To use Green, Gauss and Stock Theorem. • To solve ordinary, differential equations of 1st order as well as higher order..

DETAILED CONTENT

Module 1: Sequences and series

Convergence of sequence and series, tests for convergence, power series, Taylor's series. Series for exponential, trigonometric and logarithmic functions.

Module 2: Multivariable Calculus

Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence.

Module 3: Multivariable Calculus

Multiple Integration: double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables (Cartesian to polar). Theorems of Green, Gauss and Stokes, orthogonal curvilinear coordinates, Simple applications involving cubes, sphere and rectangular parallelepipeds.

Module 4: First order ordinary differential equations

Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

Module 5: Ordinary differential equations of higher orders

Second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and

their properties.

Textbooks/References:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
5. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
6. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
7. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley India, 2009.
8. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
9. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
10. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
11. G.F. Simmons and S.G. Krantz, Differential Equations, Tata McGraw Hill, 2007.

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HSMC- 301: Humanities –I (Philosophy)

Course Objectives	• To develop the capacity to interpret, analyze, and understand challenging texts. • Learn to formulate clear definitions, work effectively with concepts, and to organize their ideas logically.
Course Outcomes	• Students give accurate accounts of philosophical ideas relevant to the course in the context of criticizing or assessing those ideas. • Students explain difficult passages clearly, accurately, and thoroughly. • Students are able to explain the weaknesses of their own present positions, and the strengths of competing positions. • Students are able to explain why their pre-theoretical commitments have or have not changed as a result of what they have learned in the course, and if they have changed how they have done so.

DETAILED CONTENT

Module 1:
The difference between knowledge (Vidya) and Ignorance (Avidya):
a. Upanishads;
b. Six systems orthodox and Heterodox Schools of Indian Philosophy.
c. Greek Philosophy:

Module 2:
Origin of the Universe:
➢ NasidiyaSukta: "Who really knows?"
➢ Brhadaranyaka Upanishad; Chandogya Upanishad: Non-self, Self, real and unreal.
➢ Taittiriya Upanishad: SikshaValli.
➢ Plato's Symposium: Lack as the source of desire and knowledge.
➢ Socratic's method of knowledge as discovery.
➢ Language: Word as root of knowledge (Bhartrahari'sVakyapadiyam)
➢ Fourteen Knowledge basis as a sources of Vidya: Four Vedas; Six auxiliary
➢ sciences (Vedangas); Purana, Nyaya, Mimamsa and Dharma Sastras.

Module 3:
Knowledge as Power: Francis Bacon. Knowledge as both power and self-realization in Bagavad Gita.
Knowledge as oppression: M. Foucault. Discrimination between Rtam and Satyam in Indian Philosophy.

Module 4:
Knowledge as invention: Modern definition of creativity; scientific activity in the claim that science invents new things at least through technology.
Knowledge about the self, transcendental self; knowledge about society, polity and nature.

Module 5:
Knowledge about moral and ethics codes.
Tools of acquiring knowledge: Tantrayuktis, a system of inquiry (Caraka, Sushruta, Kautilya, Vyasa)

Textbooks/References:

1. Copleston, Frederick, History of Philosophy, Vol. 1.Great Britain: Continuum.

2 Hiriyanna, M. Outlines of Indian Philosophy, MotilalBanarsidass Publishers; Fifth Reprint edition (2009)

3 Sathaye, Avinash, Translation of NasadiyaSukta

4. Ralph T. H. Griffith. The Hymns of the Ṛgveda. MotilalBanarsidass: Delhi: 1973.

5. Raju, P. T. Structural Depths of Indian Thought, Albany: State University of New York Press.

6. Plato, Symposium, Hamilton Press.

7. KautilyaArtha Sastra. Penguin Books, New Delhi.

8. Bacon, Nova Orgum

9. Arnold, Edwin. The Song Celestial.

10. Foucault, Knowledge/Power.

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ECE- 302P: Digital System Design Lab

List of Experiments

1. To verify the Truth-tables of all logic gates.
2. To realize and verify the Half & full adder circuits using logic gates.
3. To realize Half& full subtractor circuits using logic gates.
4. To realize 4-bit binary-gray & gray-binary converters.
5. To realize comparator circuit for two binary numbers of 2-bit each.
6. To realize Full adder & full subtractor circuits using 8x3encoder.
7. To design Full adder & full subtractor circuits using 8x3 demultiplexer.
8. To design and verify the Truth tables of all flip-flops.
9. To design Mod-7 synchronous up-down counter.
10. To write VHDL program for combinational & sequential circuits from S. No. 2 to 7
11. To write VHDL program for universal shift-register operations.

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CSE- 301P: Data Structure & Algorithms Lab

Course Objectives	• The objective of this lab is to teach students various data structures and to explain them algorithms for performing various operations on these data structures. This lab complements the data structures course. • Students will gain practical knowledge by writing and executing programs in C using various data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables and search trees
Course Outcomes	Upon the completion of Data Structures practical course, the student will be able to: • Understand the applications of data structures. • Design and analyze the time and space efficiency of the data structure. • Identity the appropriate data structure and algorithm design method for given specified problem. • Understand and apply fundamental algorithmic problems including Tree traversals, Graph traversals.

LIST OF EXPERIMENTS

Task 1: Write a program to insert a new element at end as well as at a given position in an array.

Task 2: Write a program to delete an element from a given whose value is given or whose position is given.

Task 3: Write a program to find the location of a given element using LinearSearch.

Task 4: Write a program to find the location of a given element using BinarySearch.

Task 5: Write a program to implement push and pop operations on a stack using linear array.

Task 6: Write a program to convert an infix expression to a postfix expression using stacks.

Task 7: Write a program to evaluate a postfix expression using stacks.

Task 8: Write a recursive function for Tower of Hanoi problem.

Task 9: Write a program to implement insertion and deletion operations in a queue using linear array.

Task 10: Write a menu driven program to perform following insertion operations in a single linked list:
  ➢ Insertion atbeginning
  ➢ Insertion atend
  ➢ Insertion after a givennode
  ➢ Traversing a linkedlist

Task 11: Write a menu driven program to perform following deletion operations in a single linked list:
  ➢ Deletion at beginning
  ➢ Deletion at end
  ➢ Deletion after a given node

Task 12: Write a program to implement push and pop operations on a stack using linked list.

Task 13: Write a program to implement push and pop operations on a queue using linked list.

Task 14: Write a program to sort an array of integers in ascending order using bubble sort.

Task 15: Write a program to sort an array of integers in ascending order using selection sort.

Task 16: Write a program to sort an array of integers in ascending order using insertion sort.

Task 17: Write a program to sort an array of integers in ascending order using quick sort.

Task 18: Write a program to traverse a Binary search tree in Pre-order, In-order and Post-order.

Task 19: Write a program to traverse graphs usingBFS.

Task 20: Write a program to traverse graphs usingDFS.

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CSE- 303P: Object Oriented Programming Lab

Course Objectives	• To learn the basics concept used in OOP. • To describe the various benefits provided by OOP. • To explain the programming applications of OOP.
Course Outcomes	• Able to create simple programs using classes and objects in C++. • Implement Object Oriented Programming Concepts in C++. • Develop applications using stream I/O and file I/O. • Implement simple graphical user interfaces. • Implement Object Oriented Programs using templates and exceptional handling concepts.

LIST OF EXPERIMENTS

Task 1: Write a program that uses a class where the member functions are defined inside aclass.

Task 2: Write a program that uses a class where the member functions are defined outside aclass.

Task 3: Write a program to demonstrate the use of static datamembers.

Task 4: Write a program to demonstrate the use of const datamembers.

Task 5: Write a program to demonstrate the use of zero argument and parameterized constructors.

Task 6: Write a program to demonstrate the use of dynamic constructor.

Task 7: Write a program to demonstrate the use of explicit constructor.

Task 8: Write a program to demonstrate the use of initializer list.

Task 9: Write a program to demonstrate the overloading of increment and decrement operators.

Task 10: Write a program to demonstrate the overloading of memory management operators.

Task 11: Write a program to demonstrate the typecasting of basic type to class type.

Task 12: Write a program to demonstrate the typecasting of class type to basic type.

Task 13: Write a program to demonstrate the typecasting of class type to class type.

Task 14: Write a program to demonstrate the multiple inheritances.

Task 15: Write a program to demonstrate the runtime polymorphism.

Task 16: Write a program to demonstrate the exception handling.

Task 17: Write a program to demonstrate the use of class template.

Task 18: Write a program to demonstrate the reading and writing of mixed type of data.

B.Tech C.S.E

IV SEMESTER

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CSE- 401: Discrete Mathematics

Course Objectives	The objective of this course is to prepare the students to develop mathematical foundations to understand and create mathematically arguments require in learning mathematically and computer science courses. Also in the course basic concepts of graph theory such as- trees, graphs, vertex colouring, edge colouring etc. are introduced.
Course Outcomes	At the end of the course, the students will be able to:- • Construct mathematical arguments using logical connectives and quantifiers. • Understand how lattice and Boolean algebra are used as tools and mathematical models in the study of networks. • Learn how to work with some of the discrete structures like set, relations, functions etc. • Understand the importance of the concept coloring. • Learn how to use truth tables.

DETAILED CONTENT

Module 1:

Sets, Relation and Function: Operations and Laws of Sets, Cartesian Products, Binary Relation, Partial Ordering Relation, Equivalence Relation, Image of a Set, Sum and Product of Functions, Bijective functions, Inverse and Composite Function, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets, Cantor's diagonal argument and The Power Set theorem, Schroeder-Bernsteintheorem.

Principles of Mathematical Induction: The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Numbers, The Greatest Common Divisor: Euclidean Algorithm, The Fundamental Theorem ofArithmetic.

Module 2:

Basic counting techniques-inclusion and exclusion, pigeon-hole principle, permutation and combination.

Module 3:

Propositional Logic: Syntax, Semantics, Validity and Satisfiability, Basic Connectives and Truth Tables, Logical Equivalence: The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers. **Proof Techniques:** Some Terminology, Proof Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof ofNecessity andSufficiency.

Module 4:

Algebraic Structures and Morphism: Algebraic Structures with one Binary Operation, Semi Groups,

Monoids, Groups, Congruence Relation and Quotient Structures, Free and Cyclic Monoids and Groups, Permutation Groups, Substructures, Normal Subgroups, Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields. Boolean algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function, Disjunctive and ConjunctiveNormal Form

Module 5:

Graphs and Trees: Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Isomorphism, Eulerian and Hamiltonian Walks, Graph Colouring, Colouring maps and Planar Graphs, Colouring Vertices, Colouring Edges, List Colouring, Perfect Graph, definition properties and Example, rooted trees, trees and sorting, weighted trees and prefix codes, Bi-connected component and Articulation Points, Shortestdistances.

Suggested books:
1. Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw –Hill
2. Susanna S. Epp, Discrete Mathematics with Applications,4th edition, Wadsworth Publishing Co.Inc.
3. C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach, 3rd Edition by, Tata McGraw –Hill.

Suggested Reference books:
1. J.P. Tremblay and R. Manohar, Discrete Mathematical Structure and It's Application to Computer Science", TMG Edition,TataMcgraw-Hill
2. Norman L. Biggs, Discrete Mathematics, 2nd Edition, Oxford University Press. Schaum's Outlines Series, Seymour Lipschutz, MarcLipson,
3. Discrete Mathematics, Tata McGraw -Hill

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CSE- 402: Computer Organisation & Architecture

Course Objectives	• Discuss the basic concepts and structure of computers.
	• Understand concepts of register transfer logic and arithmetic operations.
	• Explain different types of addressing modes and memory organization.
	• Learn the different types of serial communication techniques.
	• Summarize the Instruction execution stages.
Course Outcomes	• Understand the theory and architecture of central processing unit.
	• Analyze some of the design issues in terms of speed, technology, cost, performance.
	• Design a simple CPU with applying the theory concepts.
	• Use appropriate tools to design verify and test the CPU architecture.
	• Learn the concepts of parallel processing, pipelining and interprocessor Communication.
	• Understand the architecture and functionality of central processing unit.
	• Exemplify in a better way the I/O and memory organization.
	• Define different number systems, binary addition and subtraction, 2's complementrepresentation and operations with this representation.

DETAILED CONTENT

Module 1:

Functional blocks of a computer: CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU–registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Case study – instruction sets of some commonCPUs.

Data representation: signed number representation, fixed and floatingpoint representations, character representation. Computer arithmetic – integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication – shift-and add, Booth multiplier, carry save multiplier, etc. Division restoring and non-restoring techniques, floating pointarithmetic.

Module 2:

Introduction to x86 architecture.

CPU control unit design: hardwired and micro-programmed design approaches, Case study – design of a simple hypotheticalCPU.

Memory system design: semiconductor memory technologies, memory organization.

Peripheral Devices and their characteristics: Input-output subsystems, I/O device interface, I/O transfers–program controlled, interrupt driven and DMA, privilegedand non-privileged   instructions,   software interrupts and exceptions. Programs and processes–role of interrupts in process state transitions, I/O deviceinterfaces – SCII, USB

Module 3:

Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards.
Parallel Processors: Introduction to parallel processors, Concurrent access to memory and cache coherency.

Module 4:

Memory organization: Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. Block size, mapping functions, replacement algorithms, write policies.

Suggested books:
1. "Computer Organization and Design: The Hardware/Software Interface", 5th Edition by David A. Patterson and John L. Hennessy,Elsevier.
2. "Computer Organization and Embedded Systems", 6th Edition by CarlHamacher, McGraw Hill HigherEducation.

Suggested referencebooks:
1. "Computer Architecture and Organization", 3rd Edition by John P. Hayes, WCB/McGraw-Hill
2. "Computer Organization and Architecture: Designing for Performance", 10th Edition by William Stallings, PearsonEducation.
3. "Computer System Design and Architecture", 2nd Edition by Vincent P. Heuring and Harry F. Jordan, PearsonEducation.

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CSE- 403: Operating Systems

Course Objectives	• Students will learn how Operating System is Important for Computer System. • To make aware of different types of Operating System and their services. • To learn different process scheduling algorithms and synchronization techniques to achieve better performance of a computer system. • To know virtual memory concepts. • To learn secondary memory management
Course Outcomes	• Understands the different services provided by Operating System at different level. • They learn real life applications of Operating System in every field. • Understands the use of different process scheduling algorithm and synchronization techniques to avoid deadlock. • They will learn different memory management techniques like paging, segmentation and demandpaging etc.

DETAILED CONTENT

Module 1:

Introduction: Concept of Operating Systems, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS-Layered, Monolithic, Microkernel Operating Systems, Concept of Virtual Machine. Case study on UNIX and WINDOWS Operating System.

Module 2:

Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching
Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads,
Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR; Multiprocessor scheduling: Real Time scheduling: RM and EDF.

Module 3:

Inter-process Communication: Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer\ Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem etc.

Module 4:

Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, and Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.

Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation and Compaction; Paging: Principle of operation – Page allocation – Hardware support for paging, Protection and sharing, Disadvantages of paging.

Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).

Module 5:

I/O Hardware: I/O devices, Device controllers, Direct memory access Principles of I/O Software: Goals of Interrupt handlers, Device drivers, Device independent I/O software, Secondary-Storage Structure: Disk structure, Disk scheduling algorithms

File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency and performance.

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks

Suggested books:
1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India.

Suggested reference books:
1. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing
2. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison- Wesley
3. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice-Hall of India
4. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates.

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CSE- 404: Design and Analysis of Algorithms

Course Objectives	• To develop proficiency in problem solving and programming.
	• To be able to carry out the Analysis of various Algorithms for mainly Time and Space Complexity.
	• To get a good understanding of applications of Data Structures.
Course Outcomes	• Ability to decide the appropriate data type and data structure for a given problem.
	• Ability to select the best algorithm to solve a problem by considering various problem characteristics, such as the data size, the type of operations, etc.
	• Ability to compare algorithms with respect to time and space complexity

DETAILED CONTENT

Module 1:

Introduction: Characteristics of algorithm. Analysis of algorithm: Asymptotic analysis of complexity bounds – best, average and worst-case behavior; Performance measurements of Algorithm, Time and space trade-offs, Analysis of recursive algorithms through recurrence relations: Substitution method, Recursion tree method and Masters' theorem.

Module 2:

Fundamental Algorithmic Strategies: Brute-Force, Greedy, Dynamic Programming, Branch- and-Bound and Backtracking methodologies for the design of algorithms; Illustrations of these techniques for Problem-Solving , Bin Packing, Knap Sack TSP. Heuristics – characteristics and their application domains.

Module 3:

Graph and Tree Algorithms: Traversal algorithms: Depth First Search (DFS) and Breadth First Search (BFS); Shortest path algorithms, Transitive closure, Minimum Spanning Tree, Topological sorting, Network Flow Algorithm.

Module 4:

Tractable and Intractable Problems: Computability of Algorithms, Computability classes – P, NP, NP-complete and NP-hard. Cook's theorem, Standard NP-complete problems and Reduction techniques.

Module 5:

Advanced Topics: Approximation algorithms, Randomized algorithms, Class of problems beyond NP – P

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Suggested books:
1. Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson, Ronald L Rivest and Clifford Stein, MIT Press/McGraw-Hill.
2. Fundamentals of Algorithms – E. Horowitz et al.

Suggested reference books
1. Algorithm Design, 1ST Edition, Jon Kleinberg and ÉvaTardos, Pearson.
2. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Michael T Goodrich and Roberto Tamassia, Wiley.
3. Algorithms—A Creative Approach, 3RD Edition, UdiManber, Addison-Wesley, Reading, MA.

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HSMC- 401: Management –I (Organizational Behaviour/Finance & Accounting)

Course Objectives	- To learn the basic concepts of Organizational Behaviour and its applications in contemporary organizations. - To understand how individual, groups and structure have impacts on the organizational effectiveness and efficiency. - To appreciate the theories and models of organizations in the workplace. - To creatively and innovatively engage in solving organizational challenges. - To learn and appreciate different cultures and diversity in the workplace.
Course Outcomes	- To understand the conceptual framework of the discipline of OB and its practical applications in the organizational set up. - To deeply understand the role of individual, groups and structure in achieving organizational goals effectively and efficiently. - To critically evaluate and analyze various theories and models that contributes in the overall understanding of the discipline. - To develop creative and innovative ideas that could positively shape the organizations. - To accept and embrace in working with different people from different cultural and diverse background in the workplace..

DETAILED CONTENT

Module 1:

Introduction to Organizational Behaviour: Concept of Organizational Behaviour (OB)- Importance of Organizational Behaviour2¬ Key Elements of Organizational Behaviour, Role of Managers in OB-Interpersonal Roles-Informational Roles- Decisional Roles, Foundations or Approaches to Organizational Behaviour, Challenges and Opportunities for OB
Introduction to Organization Design: Meaning of Organization Design and Structure, Basic elements of Organization Structure, Types of Organization Design.

Module 2:

Introduction to Interpersonal Behaviour: Nature and meaning of Interpersonal Behaviour, Concept of Self, Transaction Analysis (TA), Benefits and uses of Transactional Analysis, Johari Window Model
Learning: Learning and Learning Cycle, Components of Learning, Theories of Learning
Introduction to Personality: Definition and Meaning of Personality - Importance of Personality, Determinants of Personality,   Theories of Personality, Personality Traits Influencing OB

Module 3:

Introduction to Emotions: Nature and Meaning of Emotions - Characteristics of Emotions, Theories of Emotions, Emotions in the Context of OB

Motivation: Definition and Meaning, Theories of Motivation, Application of theories in Organizational Scenario

Leadership: Definition and Meaning, Theories of Leadership, Contemporary Business Leaders

Organizational Stress: Definition and Meaning, Sources of Stress, Types of Stress, Impact of Stress on Organizations, Stress Management Techniques.

Module 4:

Introduction to Organizational Communication: Meaning and Importance of Communication, Functions , process, types, Interpersonal Communication, Organizational Communication, Tips for Effective Communication

Introduction to Organization Culture: Meaning and Nature of Organization Culture - Origin of Organization Culture, Functions of Organization Culture, Types of Culture, Creating and Maintaining Organization Culture, Managing Cultural Diversity

Organizational Conflict: Definition and Meaning, Sources of Conflict, Types of Conflict, Conflict Management Approaches

Power and Politics: Power and its Two Faces, Sources of Power, Organizational Politics

Introduction to Groups and Teams: Meaning and Importance of Groups, Reasons for Group Formation, Types of Groups, Stages of Group Development, Meaning and Importance of Teams, Types of Teams, Creating an Effective Tea

Organization Change and Development: Definition and Meaning, Need for Change, Strategies to Overcome Resistance, Process of Change, Meaning and Definition of OD, OD Interventions

Suggested References:
1. Organizational Behaviour-Robbins, Judge & Sanghi, Pearson Education Publication.
2. Organizational Behaviour-McShane & Glinow, McGraw Hill Publication.

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CSE- 402P: Computer Organisation & Architecture Lab

Course Objectives	• Understanding the behavior of logic gates, adders, decoders, multiplexers and flipflops. • Understanding the behavior of ALU, RAM,STACK and PROCESSOR from workingmodules and the modules designed by the student as part of the experiment.
Course Outcomes	After the course the students are expected to be able to • Analyze the behaviour of Logic Gates with the help of HDL/ VHDL. • Implement sequential circuits and verify the results through simulation by VHDL. • 3.Design 8-bit ALU. • 4.Design 24X8 RAM. • 5.Design 24X8 STACK. • 6.Design 8-bit processo

LIST OF EXPERIMENTS

Task1: Computer Anatomy- Memory, Ports, Motherboard and add-oncards.

Task 2: Dismantling and assemblingPC.

Task 3: Introduction to 8085kit.

Task 4: Addition of two 8 bit numbers, sum 8bit.

Task 5: Subtraction of two 8 bit numbers.

Task 6: Find 1's complement of 8-bit number.

Task 7: Find 2's complement of 8-bit number.

Task 8: Shift an 8-bit no. by onebit.

Task 9: Find Largest of two 8 bit numbers.

Task 10: Find Largest among an array of ten numbers (8 bit).

Task 11: Sum of series of 8 bit numbers.

Task 12: Introduction to 8086 kit.

Task 13: Addition and subtraction of two 16 bit numbers, sum 16 bit.

Task 14: Implement of Booth's algorithm for arithmetic operations.

Task 15: Find 1's and 2's complement of 16-bit number.

Task 16: Implement simple programs using I/O based interface.

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CSE- 403P: Operating System Lab

Course Objectives	• This course will introduce the basic principles in Operating System and Providing error detection methods. • It will cover all the management modules present in the OS like process • management,Memory management, File management, Disk management, Network management,I/O management.
Course Outcomes	• Know how data is transmitted and checking of errors. • Inter process communication including shared memory, pipes and • messages Simulation of CPU Scheduling Algorithms. (FCFS, RR, SJF, Priority, Multilevel Queuing) • Simulation of Banker's Algorithm for Deadlock Avoidance, Prevention • Program for FIFO, LRU, and OPTIMAL page replacement algorithm.

LIST OF EXPERIMENTS

Task 1: Installation Process of various operating systems.

Task 2: Implementation of CPU scheduling algorithms to find turnaround time and waiting time. a) FCFS b) SJF c) Round Robin (pre-emptive) d) Priority.

Task 3: Virtualization, Installation of Virtual Machine Software and installation of Operating System on Virtual Machine.

Task 4: Commands for files & directories: cd, ls, cp, md, rm, mkdir, rmdir. Creating and viewing files using cat. File comparisons. Disk related commands: checking disk free spaces. Processes in linux, connecting processes with pipes, background processing, managing multiple processes. Background process: changing process priority, scheduling of processes at command, batch commands, kill, ps, who, sleep. Printing commands, grep, fgrep, find, sort, cal, banner, touch, file. File related commands ws, sat, cut,grep.

Task 5: Shell Programming: Basic of shell programming, various types of shell, Shell Programming in bash, conditional & looping statement, case statements, parameter passing and arguments, shell variables, shell keywords, creating shell programs for automate system tasks, report printing.

Task 6: Implementation of Bankers algorithm for the purpose of deadlock avoidance.

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CSE- 404P: Design and Analysis of Algorithms Lab

Course Objectives	- To analyze worst-case running time of algorithms and understand fundamental algorithmic problems. - To understand how asymptotic notation is used to provide a rough classification of algorithms, how a number of algorithms for fundamental problems in computer science and engineering work and compare with one another. - To introduce the methods of designing and analyzing algorithms - To study about various designing paradigms of algorithms for solving real world problems.
Course Outcomes	- To analyze the complexities of various problems in different domains. - To prove the correctness and analyze the running time of the basic algorithms for those classic problems in various domains. - To understand methods for analyzing the efficiency and correctness of algorithms (such as exchange arguments, recurrence, induction, and average case analysis) - To compare, contrast, and choose appropriate algorithmic design techniques to present an algorithm that solves a given problem. - To Identify and analyze criteria and specifications appropriate to new problems. - To develop the efficient algorithms for the new problem with suitable designing techniques. - To know the appropriate algorithmic design technique to specific problems.

LIST OF EXPERIMENTS

Task 1: Code and analyze solutions to following problem with givenstrategies:

- ➢ Knap Sack using greedyapproach
- ➢ Knap Sack using dynamicapproach

Task 2: Code and analyze to find an optimal solution to matrix chain multiplication using dynamic

Programming.

Task 3: Code and analyze to find an optimal solution to TSP using dynamic programming.

Task 4: Implementing an application of DFS suchas:

- ➢ to find the topological sort of a directed acyclicgraph
- ➢ to find a path from source to goal in amaze.

Task 5: Implement an application of BFS such as:

- ➤ to find connected components of an undirected graph
- ➤ to check whether a given graph isbipartite.

Task 6: Code and analyze to find shortest paths in a graph with positive edge weights using Dijkstra's

algorithm.

Task 7: Code and analyze to find shortest paths in a graph with arbitrary edge weights using Bellman Ford algorithm.

Task 8: Code and analyze to find shortest paths in a graph with arbitrary edge weights using Flyods'algorithm.

Task 9: Code and analyze to find the minimum spanning tree in a weighted, undirected graph using Prims'algorithm

Task 10: Code and analyze to find the minimum spanning tree in a weighted, undirected graph using Kruskals'algorithm.

Task 11: Coding any real world problem or TSP algorithm using any heuristic technique.

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CSE- 501: Web and Internet Technology

Course Objectives	The course content enables students to: • understand best technologies for solving web client/server problems • analyze and design real time web applications • use Java script for dynamic effects and to validate form input entry • Analyze to Use appropriate client-side or Server-side applications
Course Outcomes	At the end of the course students are able to: • Choose, understand, and analyze any suitable real time web application. • Integrate java and server side scripting languages to develop web applications. • To develop and deploy real time web applications in web servers and in the cloud. • Extend this knowledge to .Net platforms.

DETAILED CONTENT

Module 1:

Information Architecture: The role of Information Architect, Collaboration and communication, Organizing information, organizational challenges, Organizing web sites and Intranets, Creating cohesive organization systems, designing navigation systems, types of navigation systems, Integrated navigation elements, designing elegant navigation systems, Searching systems, Searching your web site, designing the search interface, Indexing the right stuff, To search or not to search grouping content, conceptual design, High level Architecture
Blueprint. Architectural Page Mockups, Design Sketches.

Module 2:

Dynamic HTML and Web Designing: HTML Basic concepts, Good web design, process of web publishing phases of web site development, STRUCTURE OF HTML documents, HTML elements- Core attributes, Language attributes, Core events, Block level events, Text level events, Linking basics, Linking in HTML, Images and Anchors, Anchor Attributes, Image maps, Semantic linking meta information, image preliminaries, Image download issues, Images and buttons, introduction to layout: Backgrounds, color and text, fonts, layout with tables. Advanced layout: Frames and layers, HTML and other media types.Audio support in browsers, video support, other binary formats.Style sheets, positioning with style sheets. Basic Interactivity and HTML: FORMS, form control, new and emerging form elements.

Module 3:

Java Server Pages: Basics, Integrating Scripts in JSPs, JSP Objects and Components, configuring and troubleshooting, JSP: request and response objects, retrieving the contents of an HTML format, retrieving a query string, Working with Beans, Cookies, creating and Reading

Cookies.Using Application Objects and Events.

XML: Relationship between HTML, SGML and XML, Basic XML, Valid documents, ways to use XML, XML for data files, embedding XML into HTML documents. Converting XML to HTML for Display, Displaying XML using CSS and XSL, rewriting HTML as XML, the future of XML.

Module 4:

Php Mysql Introduction: What is PHP, History, Why choose PHP

Installation: Installation overview, Configuration, Advantage of PHP over other scripting language, creating a PHP script, Handel error in PHP script.

Data Types: Variables, Strings, String functions, Numbers, Arrays, Array functions, Booleans and NULL, Type switching and casting, Constants

Control Structures: if, else, else-if, and switch statements, Logical operators, while, for, for each loops, continue and Break statements

Functions: Defining & Using functions, Returning values from a function, Setting global variables, Setting default values

Building Web Pages: Links and URLs, Using GET values, Encoding GET values, Encoding for HTML, Building forms, Setting cookies, Establishing sessions, Headers and page redirection, Including and requiring pages

My SQL Basics:

Introduction to web form , My SQL introduction, Creating a database in My SQL, Populating a My SQL database, Php My Admin, Connecting to My SQL with PHP, Accessing data in My SQL with PHP.

Text Books:
1. Web technology, Black Book by Kogent learning Inc , Dreamtech publication
2. Thomas A Powell, HTML The Complete Reference, Tata McGraw Hill Publications
3. HTML 5, Black Book, Wiley India Publication

Reference Books:
1. Joseph L.Weber," Using Java 2 platform " Prentice Hall of India Pvt Ltd, 2000
2. John R Hubbard, Programming with Java, Schaum's Outline Series, McGraw Hill International edition 1999.
3. Ian S. Graham, XHTML 1.0 Language and design sourcebook, John Wiley &sons inc. 2000.
4. Peter Rossbach, Hendrik Schreiber Java Server & services Pearson education Ltd. 2000
5. The Java developer tool kit JoshuMarketos, John Wiley and Sons, 1997.

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CSE- 502: Database Management Systems

Course Objectives	- Understand the basic concepts and the applications of database systems. - Master the basics of SQL and construct queries using SQL. - Understand the relational database design principles. - Familiar with the basic issues of transaction processing and concurrency control. - Familiar with database storage structures and access techniques
Course Outcomes	- Describe the fundamental elements of relational database management systems - Explain the basic concepts of relational data model, entity-relationship model, relationaldatabase design, relational algebra and SQL. - Design ER-models to represent simple database application scenarios - Convert the ER-model to relational tables, populate relational database and formulate SQLqueries on data. - Improve the database design by normalization.

DETAILED CONTENT

Module 1

Overview of DBMS: Basic Terminology of Database: Data and information, Problems in Manual Database, Components of DBMS: users, language, structure, data-dictionary, data manager, DBA, Characteristics of a database. File processing versus Data Management, File Oriented approach versus Database Oriented approach. SPARC 3-level architecture: A brief overview of three traditional models (hierarchical mode, network model and relational model).
Types of Database Systems, Database Languages: DDL, DML, DCL.

Module 2

Relational Database Model: Components, Properties of relational model {Codd's 12 rules
(integrity rules (concept of keys))}, Relational algebra (select, project, Rename, cross product, joins (theta-join, equi-join, natural-join, outer join)), Relational Calculus, Entity-Relationship model: Basic Constructs, ER Notation, Designing ER Diagram, Design Issues, Converting ER- Model into relational schema. Functional Dependencies, Fully Functional Dependency, Other Dependencies: Candidate FD, Primary FD, Multi-valued Dependencies, Join Dependency, Normalization (up to 5th level).

Module 3

File Organization: Sequential file, index sequential files, direct files, Hashing, B-trees, index files, Operations on Files.
Structured Query language: DDL and DML commands, Nested Queries, Integrity constraints, Views, Triggers, Joins operations, Grouping data.

Backup and Recovery: Types of Database Failures, Types of Database Recovery, Recovery Techniques: Deferred Update, Immediate Update, Shadow Paging, Checkpoints, Buffer Management.

Module 4

Query processing (Introduction, steps in Query processing, General Processing Strategies, Query Optimization), Introduction to Object-Oriented Database, C/S Database, Knowledge Based Database and Distributed Database Management System.

Transaction Processing Concepts: Introduction, Properties of Transactions, Recoverability, Serializability, Concurrency control Techniques: Two phase locking, Timestamp Ordering.

Text Books:

1. C.J. Date, " An Introduction To Data Base System", 7th ed. Pearson Publication , 2000.

2. Abraham Silberschatz, Henry F. Korth, S. Sudershan, Database System Concepts, 3rd edition, The McGraw Hill Companies, Inc., 1997

3. E. Ramez, Navathe B. Shamakant, Fundamentals of Database Systems, Fifth Edition, Pearson Education.

Reference Books:

1. Introduction to Database Management by Gillenson , Wiley India

2. Naveen Prakash ,"Introduction to Database management ", Tata McGraw Hill Publishing Company Ltd., New Delhi.

3. Advance Database Management System; Rini Chakrabarti , Shilbhdra Dasgupta ; Dream Tech Press.

4. A simplified approach to DBMS ; Prateek Bhatia; Kalyani Publication

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CSE- 503: Formal Languages and Automata Theory

Course Objectives	This course focuses on the basic theory of Computer Science and formal methods ofcomputation like automata theory, formal languages, grammars and Turing Machines. Theobjective of this course is to explore the theoretical foundations of computer science from theperspective of formal languages and classify machines by their power to recognize languages.
Course Outcomes	The student will be able to: • Understand the basic properties of formal languages and grammars. • Differentiate regular, context-free and recursively enumerable languages. • Make grammars to produce strings from a specific language. • Acquire concepts relating to the theory of computation and computational models including decidability and intractability • Understand the basic properties of formal languages and grammars.

DETAILED CONTENT

Module 1

Finite Automata and Regular Expressions:

Automata definition, constructing simple and complex automata, Limitation of finite automata. Finite State Systems, Basic Definitions Non-Deterministic finite automata (NDFA), Deterministic finite automata (DFA), Equivalence of DFA and NDFA Finite automata with E- moves, Concept of basic Machine, Properties and limitations of FSM. Moore and mealy Machines, Equivalence of Moore and Mealy machines.

Module 2

Regular Expressions, Constructing Regular Expression, Equivalence of finite automata and Regular Expressions, Regular expression conversion and vice versa.Method to constructing regular expression.

Properties of Regular Sets:

The Pumping Lemma for Regular Sets, Applications of the pumping lemma, Closure properties of regular sets, Myhill-Nerode Theorem and minimization of finite Automata, Minimization Algorithm.

Module 3

Grammars:

Definition, Context free and Context sensitive grammar, nature of context free grammar, Ambiguity regular grammar, Eliminating Ambiguity, Chomsky Normal Form (CNF), Converting to Chomsky normal Form, Parsing with Chomsky Normal form , Griebach Normal Form (GNF).

Pushdown Automata:

Introduction to Pushdown Machines, Application of Pushdown Machines.

Module 4

Turing Machines:

Basic model of Turing machine, Representation of Turing machine Constructing simple and Complex Turing Machine, Variation of Turing machine, universal Turing Machine.

Chomsky Hierarchies:

Chomsky hierarchies of grammars, unrestricted grammars, Context sensitive languages, Relation between languages of classes.

Computability and Undesirability:

Basic concepts, the post correspondence problem, Primitive Recursive Functions, Understanding the halting problem of Turing machine.

Text Books:

1. Theory Of Computation by Dr Kavi Mahesh , Wiley India publication.

2. Theory of Computer Sc.(Automata, Languages and computation):K.L.P.Mishra &N. Chandrasekaran, 2000, PHI.

3. Introduction to automata theory, language & computations Hopcroaft &O.D.Ullman, R Mothwani, Pearson publication, 2001.

Reference Books:

1   Formal Language and Automata Theory By Basavaraj S .Anami , Wiley India publication.
2   Formal language and automata theory by C.K. Nagpal Oxford University Press
3   Introduction to languages and the Theory of Computation by John C. Martin 2003, Tata McGrew Hills.

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CSE- 504: Software Engineering

Course Objectives	• Knowledge of basic SW engineering methods and practices, and their appropriate application. Describe software engineering layered technology and Process frame work.
	• A general understanding of software process models such as the waterfall and evolutionary models.
	• Understanding of software requirements and the SRS documents.
	• Understanding of the role of project management including planning, scheduling, riskmanagement, etc.
	• Describe data models, object models, context models and behavioral models, different software architectural styles, implementation issues such as modularity and coding standards,approaches to verification and validation including static analysis, and reviews.
	• Understanding of software testing approaches such as unit testing and integration testing, software measurement and software risks.

	• Understanding of software evolution and related issues such as version management.
Course Outcomes	• Basic knowledge and understanding of the analysis and design of complex systems. • Ability to apply software engineering principles and techniques. • Ability to develop, maintain and evaluate large-scale software systems. • To produce efficient, reliable, robust and cost-effective software solutions, Ability to perform independent research and analysis. • Ability to work as an effective member or leader of software engineering teams.

DETAILED CONTENT

Module 1

Software Evolution: Expanding role for computers, Software Engineering discipline, Computer based system ,Generic vs customer made software product , Distinctive characteristics of software product, The software problem , Emerging of software engineering.

Need for software engineering, Evolving role of software, software crisis, S/W engineering- a Layered Technology, Process and project, Component software processes, Software Development process models (SDLC), Comparison of different life cycle mode

Software Requirement Analysis and Specification- Value of Good SRS, Requiring process, Requirements specification, Formal system specification, Crucial process step, Classification of requirements, Requirement engineering task, Data dictionaries, E-R diagram , Data models, Functional Models, Object oriented models, Structured requirements definition, structured analysis & design technique, Software prototyping, Software requirements specification, Nature of the SRS, characteristics of a good SRS. Organization of the SRS.

Module 2

Software Architecture: Role of software architecture, Architecture view, component and connector view, Architecture style for C&C view, Documenting architecture design.

System Models: Domain analysis and modeling, data models, functional models, object oriented models.

Software Project Management: Software project, Project feasible study, project planning , project organization, Estimate of project effort(COCOMO), staffing level estimation, Staffing , Risk management, Project scheduling , Project monitoring and control.

S/W Design: Design Concepts, Function oriented and OO Design, Detailed Design, Verification.

Module 3

Software Quality Management : Quality Dimension , Process quality and product quality, quality assurance planning , Quality measurement, Software Configuration Management , software Process Improvement, ISO 9000 Quality standards, ISO approach to quality assurance systems, SEI capability maturity model, PSP.

Coding and unit Testing: Incrementally developing code , managing evolving code, unit testing, Non execution based testing, code inspection, testing process, Black box testing, white box testing, Metric,

debugging, program analysis tool, integration testing, system testing, Testing distributed implementation, testing of real time system, accepting testing some general issue associated with testing, , recovery testing, security testing, stress testing, performance testing

Module 4

Software maintenance: Planning for maintenance, Maintenance activities , reengineering, Characteristics, potential solution to maintenance problems ,s/w maintenance process models.

Software Reuse: s/w reverse engineering, S/w reuse concepts, Basic issues in reuse program. A reuse approach, Reuse at organization level.

Emerging Trends: Client server software, SOA, Software as services.

Computer aided Software Engineering: case and its scope, case environment, case support in software life cycle, architecture of case environment.

TEXT BOOKS:

1.Software Engineering: Pankaj Jalote A Precise Approach, Wiley India Publications.
2.Essentials Of Software Engineering: S.Thangasamy , Wiley India Publications.

REFERENCE BOOKS :

1.Fundamental of Software Engineering By Rajib Mall PHI Publication
2. Software Engineering-K.K. Aggarwal &Yogesh by New Age International Publishers.

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HSMC-501: Humanities –II (Principles of Management and Critical Thinking)

Course Objectives	• To help the students gain understanding of the functions and responsibilities of managers. • To provide them tools and techniques to be used in the performance of the managerial job. • To enable them to analyze and understand the environment of the organization. • To help the students to develop cognizance of the importance of management principles.
Course Outcomes	• Understand the concepts related to Business. • Demonstrate the roles, skills and functions of management. • Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions. • Understand the complexities associated with management of human resources in the organizationsand integrate the learning in handling these complexities.

DETAILED CONTENT

Module 1
Historical Perspectives of Management:
➢ The behavioural approach to management
➢ The management science approach
➢ The contingency approach
➢ The system approach

Principles of Planning
➢ Defining planning, Purposes of planning,
➢ Advantages and potential disadvantages of planning,
➢ Management by objectives, Planning tools,
➢ Strategic planning, Forecasting and budgeting

Module 2
The Management Task
➢ The Role of management,
➢ Defining management,
➢ The management process, management functions,
➢ Management goal attainment,
➢ Management and organizational resources

Fundamentals of Organizing
➢ The definition of organizing
➢ The organizing process

- The organizing subsystem
- Classical organizing theory

Module 3
Leadership and Effective Communication
- Defining leadership; leader vs. manager
- Leadership behaviours, Transformational Leadership,
- Coaching, Entrepreneurial leadership

Controlling for Productivity
- Defining production and productivity,
- Quality and productivity, Operations management,
- Operations control, Using control tools to control organizations

Module 4
Managerial Ethics and Social Responsibility
- Fundamentals of social responsibility
- Areas of corporate social responsibility,
- Social responsiveness and decision making,
- Influencing individuals performing social responsibility activities,
- A definition of ethics, Creating an ethical workplace

Making Good Business Decision
- Types of decisions, Elements of the decision situation,
- The decision making process, Decision making conditions,
- Decision making tools, Processes for making group decisions

Text Books:

1.Charles W. L. Hill and Steven McShane (2006) Principles of Management. McGraw-st Hill/Irwin; 1 Edition. ISBN-10: 0073530123, ISBN-13: 978-0073530123.
2. A practical guide to critical thinking: deciding what to do and believe, david a. hunter wiley India
3.Moore & Parker, Critical Thinking, 9th ed. (McGraw-Hill, 2008) ISBN-13: 9780073386676

Reference Books:

1.Gary Dessler (2003). Management: Principles and Practices for Tomorrow's Leaders, rd Prentice Hall; 3 Edition. ISBN-10: 0131009923, ISBN-13: 978-0131009929
2.Ellen A. Benowitz (2001). Principles of Management. Cliffs Notes. ISBN-10: 076456384X, ISBN-13: 978-0764563843
3. Griffin, Ricky W., Management seventh edition, Houghton Mifflin Company
4. Fisher, Alec. The Logic of Real Arguments (Second Edition). Cambridge: Cambridge University Press, 2004.

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(ELECTIVE-I) ECE- 404: Signals & Systems

Course Objectives	The objective of this course is to enable students
	- To apply mathematical concepts and tool in analysis of electrical signals and systems. - This course trains students for an intermediate level of fluency with signals and systems in both continuous time and discrete time. - Preparation for more advanced subjects in digital signal processing (including audio, image and video processing),communication theory and system theory.
Course Outcomes	At the end of this course students will demonstrate the ability to: - Mathematically characterize different types of signals and systems. - Analyze the behavior of linear-shift invariant systems. - Apply concepts of Fourier and Laplace Transforms to analyze continuous-time signals and systems. - Investigate discrete-time signals and systems using Discrete-Time Fourier and Z-transforms. - Investigate whether the system is stable - Sampling and reconstruction of a signal

DETAILED CONTENT

Module 1: Introduction to Signals and Systems: (3 hours)

Signals and systems as seen in everyday life, and in various branches of engineering and science. Signal properties: periodicity, absolute integrability, determinism and stochastic character. Some special signals of importance: the unit step, the unit impulse, the sinusoid, the complex exponential, some special time-limited signals; continuous and discrete time signals, continuous and discrete amplitude signals. System properties: linearity: additivity and homogeneity, shift-invariance, causality, stability, realizability. Examples.

Module 2: Behavior of continuous and discrete-time LTI systems: (8 hours)

Impulse response and step response, convolution, input-output behavior with aperiodic convergent inputs, cascade interconnections. Characterization of causality and stability of LTI systems.System representation through differential equations and difference equations.State-space representation of systems.State-Space Analysis, Multi-input, multi-output representation.State Transition Matrix and its Role. Periodic inputs to an LTI system, the notion of a frequency response and its relation to the impulse response.

Module 3: Fourier, Laplace and z- Transforms: (10 hours)

Fourier series representation of periodic signals, Waveform Symmetries, Calculation of Fourier Coefficients. Fourier Transform, convolution/multiplication and their effect in the frequency domain, magnitude and phase

response, Fourier domain duality. The DiscreteTime Fourier Transform (DTFT) and the Discrete Fourier Transform (DFT). Parseval's Theorem. Review of the Laplace Transform for continuous time signals and systems, system functions, poles and zeros of system functions and signals, Laplace domain analysis, solution to differential equations and system behavior. The z-Transform for discrete time signals and systems, system functions, poles and zeros of systems and sequences, z-domain analysis.

Module 4: Sampling and Reconstruction: (4 hours)

The Sampling Theorem and its implications.Spectra of sampled signals. Reconstruction: ideal interpolator, zero-order hold, first-order hold. Aliasing and its effects.Relation between continuous and discrete time systems. Introduction to the applications of signal and system theory: modulation for communication, filtering, feedback control systems.

Text S Books
1. A.V. Oppenheim, A.S. Willsky and I.T. Young, "Signals and Systems", Prentice Hall,1983.
2. R.F. Ziemer, W.H. Tranter and D.R. Fannin, "Signals and Systems - Continuous and Discrete", 4th edition, Prentice Hall, 1998.
3. Papoulis, "Circuits and Systems: A Modern Approach", HRW, 1980.

Reference Books
1. B.P. Lathi, "Signal Processing and Linear Systems", Oxford University Press, c1998.
2. Douglas K. Lindner, "Introduction to Signals and Systems", McGraw Hill International Edition: c1999.

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(ELECTIVE-I) ECE- 601: Digital Signal Processing

Course Objectives	• To make students familiar with the most important methods in DSP, including digital filterdesign, transform-domain processing and importance of Signal Processors. • To make students aware about the meaning and implications of the properties of systems and signals.
Course Outcomes	At the end of this course students will demonstrate the ability to: • Represent signals mathematically in continuous and discrete time and frequency domain. • Get the response of an LSI system to different signals. • Design of different types of digital filters for various applications.

DETAILED CONTENT

Module 1.Discrete Time Systems:
Discrete Time Signals:Sequences; representation of signals on orthogonal basis; Samplingandreconstruction of signals;Discrete systems attributes.

Module 2.Z-Transform:
Z-Transform, Analysis of LSIsystems, frequencyAnalysis, Inverse Systems,

Module 3. Discrete Fourier Transform:
Discrete Fourier Transform (DFT),Fast FourierTransform Algorithm, Implementation of Discrete Time Systems.

Module 4.Design of Digital Filters:
Structures for realization of discrete time system,Design of FIR Digital filters: Windowmethod,Park-McClellan's method.Design of IIR DigitalFilters: Butterworth, Chebyshev and Elliptic Approximations;Lowpass, Bandpass, Bandstop andHigh pass filters.Effect of finite register length in FIR filter design.Parametric and non-parametric spectralestimation. Introduction to multirate signalprocessing.Application of DSP.

Module 5.DSP Processor Architecture Fundamentals:
Study of ADSP and TMS series of processor architectures.

Text Books
  1. S.K.Mitra, Digital Signal Processing: A computer based approach.TMH
  2. A.V. Oppenheim and Schafer, Discrete Time Signal Processing, Prentice Hall, 1989.
  3. John G. Proakis and D.G. Manolakis, Digital Signal Processing: Principles, Algorithms

And Applications, Prentice Hall, 1997.

Reference Books

1. L.R. Rabiner and B. Gold, Theory and Application of Digital Signal Processing, PrenticeHall, 1992.
2. J.R. Johnson, Introduction to Digital Signal Processing, Prentice Hall, 1992.
3. D.J.DeFatta, J. G. Lucas andW.S.Hodgkiss, Digital Signal Processing, John Wiley&
Sons, 1988

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(ELECTIVE-I) CSE- 505: Graph Theory

Course Objectives	• To understand and apply the fundamental concepts in graph theory • To apply graph theory based tools in solving practical problems
Course Outcomes	• The students will be able to apply principles and concepts of graph theory in practical situations.

DETAILED CONTENT

Module 1

Preliminaries: Graphs, isomorphism, subgraphs, matrix representations, degree, operations on graphs, degree sequences.

Connected graphs and shortest paths: Walks, trails, paths, connected graphs, distance, cut-vertices, cut-edges, blocks, connectivity, weighted graphs, shortest path algorithms.

Trees: Characterizations, number of trees, minimum spanning trees.

Module 2

Special classes of graphs: Bipartite graphs, line graphs, chordal graphs

Eulerian graphs: Characterization, Fleury's algorithm, chinese-postman-problem

Hamilton graphs: Necessary conditions and sufficient conditions

Module 3

Independent sets, coverings, matchings: Basic equations, matchings in bipartite graphs, perfect matchings, greedy and approximation algorithms

Vertex colorings: Chromatic number and cliques, greedy coloring algorithm, coloring of chordal graphs, Brook's theorem

Module 4

Edge colorings: Gupta-Vizing theorem, Class-1 graphs and class-2 graphs, equitable edge-coloring

Planar graphs: Basic concepts, Eulers formula, polyhedrons and planar graphs, charactrizations, planarity testing, 5-color-theorem

Directed graphs: Out-degree, in-degree, connectivity, orientation, Eulerian directed graphs, Hamilton directed graphs, tournaments.

Text Books:

1. J.A. Bondy and U.S.R.Murty: Graph Theory and Applications (Freely downloadable from Bondy's website; Google-Bondy)
2. D.B.West: Introduction to Graph Theory, Prentice-Hall of India/Pearson, 2009 (latest impression)

Reference Books:
   1. J.A.Bondy and U.S.R.Murty: Graph Theory, Springer, 2008.

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(ELECTIVE-I) CSE- 506: Signals and Networks

Course Objectives	- Analyze the discrete time signals and system using different transform domain techniques. - Design and implement LTI filters for filtering different real world signals. - Develop different signal processing applications using DSP processor.
Course Outcomes	On completion of the course, - Student will be able toAnalyze the discrete time signals and system using different transform domain techniques. - Design and implement LTI filters for filtering different real world signals. - Develop different signal processing applications using DSP processor.

DETAILED CONTENT

Module 1

Objective and overview, signal and system types and classifications, step response, impulse response and convolution integral; Periodic signal analysis: Fourier series and properties;

Module 2

Aperiodic signal analysis: Fourier Transform - its properties and sinusoidal steady state analysis of systems; Elements of electrical network: dependent and independent sources, active and passive components; classical differential equations for description of transient conditions of Network; Solutions of linear time invariant networks with initial conditions;

Module 3

Unilateral and Bilateral Laplace Transforms and properties; Transient solutions of networks using Laplace Transform; Network functions: poles, zeros, transfer function, Bode plot; One and two port network parameters and functions : Z, Y and ABCD parameters, driving point and transfer impedances and admittances;

Module 4

Network Theorems and Formulation of Network equations: generalized formulation of KCL, KVL, State Variable descriptions; Thevenin, Norton, Maximum Power Transfer, Tellegen and Reciprocity Theorems;

Module 5

Graph theory: Tree, Co-tree, fundamental cut-set, fundamental loop analysis of network; Analog filter design:

Butterworth, Sallen Key, frequency transformation and scaling;

Reference Books:

1. Signals, Systems and Networks by Gyorgy Fodor.
2. Signals and Systems by P. Ramesh Babu & R. Ananda Natarajan, Scitech Publications (India)
Signals & Systems by A. V. Oppenheim, A. S. Willsky and S. H. Nawab, Prentice-Hall India

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MC: Constitution of India/Essence of Indian Traditional Knowledge

Course Objectives	• To Enable the student to understand the importance of constitution • To understand the structure of executive, legislature and judiciary • To understand philosophy of fundamental rights and duties • To understand the autonomous nature of constitutional bodies like Supreme Court and high court, controller and auditor general of India and election commission of India. • To understand the central and state relation, financial and administrative.
Course Outcomes	• Able to understand historical background of the constitutional making and its importance for building a democratic India, the structure of Indian government, the structure of state government, the local Administration, Knowledge/Understand 1&2 • Able to apply the knowledge on directive principle of state policy, the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy Application. • Able to analyze the History, features of Indian constitution, the role Governor and Chief Minister, role of state election commission, the decentralization of power between central, state and local self-government Analysis. • Able to evaluate Preamble, Fundamental Rights and Duties, Zilla Panchayat, block level organization, variouscommissions of viz SC/ST/OBC and women..

DETAILED CONTENT

Module1: History of making of the Indian Constitution (4 hours)
History, Drafting Committee, (Composition& Working)

Module 2: Philosophy of the Indian Constitution (4 hours)
Preamble, Salient Features
Module 3: Contours of Constitutional Rights & Duties (4 hours)
Fundamental Rights , Right to Equality, Right to Freedom , Right against Exploitation , Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies ,Directive Principles of State Policy, Fundamental Duties.

Module 4: Organs of Governance (4 hours)
Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications , Powers and Functions
Module 5: Local Administration (4 hours)

District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation., Pachayati raj: Introduction, PRI: Zila Pachayat., Elected officials and their roles, CEO Zila Pachayat: Position and role., Block level: Organizational Hierarchy (Different departments),Village level: Role of Elected and Appointed officials, Importance of grass root democracy

Module 6: Election Commission (4 hours)

Election Commission: Role and Functioning., Chief Election Commissioner and Election Commissioners., State Election Commission: Role and Functioning. , Institute and Bodies for the welfare of SC/ST/OBC and women.

Suggested Reading

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.
5. G.L. Ginsberg, "Printed Circuit Design", McGraw Hill, 1991.

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CSE- 501P: Web and Internet Technology Lab

Course Objectives	The course content enables students to: • Develop an ability to design and implement static and dynamic website. • Analyze to Use appropriate client-side or Server-side applications
Course Outcomes	At the end of the course students are able to: • Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's. • Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services. • Get introduced in the area of Online Game programming.

LIST OF EXPERIMENTS

1. Create your own page with your favorite hobbies.

2. Create a frameset that is divided into three sections. The frameset should have three zones.

    a. The Topmost section of the frameset should take up about just 15% of the

browser window. Name this frame title.

    b. The middle section should be 70% of the browser window. Name this frame title. c. The lower section

should be 15% of the browser window. Name this frame menu.

3. Create pages for each section. For the lowermost section, create page that loads the content

into the middle section. The topmost section should contain a page describing the web page itself.

4. Create a web page, which displays the map of your country Link, each city /state on the

image map, such that the respective HTML page of the city/state is displayed when the user selects an area.

5. Design a Web Template Using Adobe Photoshop.

6. Embed an animation in web Page using Flash.

7. Use Style sheet to modify the following:

    a. Change background to modify the following.

    b. Change font type, face and color.

    c. Align Text.

    d. Remove underlines from hyperlinks

8. Introduction and Installation of WAMP Server.

9. Write a simple program" Hello" world Using Php.

10. Introduction to the data Types Used in Php.

11. Using Control statements in Php.

12. Printing various patterns Using loops.

13. Creating and securing database using MySql.

14. Use of Php My admin in php.

15. Creating login page using php and Mysql.

16. Create Your College Website

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CSE- 502P: Database Management Systems Lab

Course Objectives	• To explain basic database concepts, applications, data models, schemas and instances. • To demonstrate the use of constraints and relational algebra operations. • Describe the basics of SQL and construct queries using SQL. • To emphasize the importance of normalization in databases. • To facilitate students in Database design • To familiarize issues of concurrency control and transaction management
Course Outcomes	At the end of the course the students are able to: • Apply the basic concepts of Database Systems and Applications. • Use the basics of SQL and construct queries using SQL in database creation and interaction. • Design a commercial relational database system (Oracle, MySQL) by writing SQL using the system. • Analyze and Select storage and recovery techniques of database system.

LIST OF EXPERIMENTS

1. Introduction to SQL and installation of SQL Server / Oracle.

2. Data Types and Create a database and write the programs to carry out the following operation:

      a. Add a record in the database.

      b. Delete a record in the database.

      c. Modify the record in the database.

      d. List all the records of database in ascending order.

      e. Alter and Drop Statements.

3. Working with Null Values, Matching a Pattern from a Table, Ordering the Result of a Query.

4. Aggregate Functions,: Grouping the Result of a Query

5. Set Operators, Nested Queries, Joins, Sequences.

6. Views, Indexes, Database Security and Privileges: Grant and Revoke Commands, Commit and Rollback Commands.

7. PL/SQL Architecture, Assignments and Expressions, Writing PL/SQL Code, Referencing Non-SQL parameters.

8. Stored Procedures and Exception Handling.

9. Triggers and Cursor Management in PL/SQL.

10. Develop a menu driven project management of database system:

11. Library information system

      a. Engineering

      b. MCA

12. Inventory control system

      1. Computer Lab

      2. College Store

      Student Information System

      3. Academic

      4. Finance

      Time Table development system

      5. CSE, IT & MCA Departments.

      6. Electrical & Mechanical Departments.

Usage of S/W:

      1. VB, ORACLE and/or DB2

      2. VB, MSACCESS

      3. VB, MS SQL SERVER 2002

Note: At least 5 or 10 more exercises to be given by the teacher concerned

B.Tech C.S.E

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CSE- 601: Programming In Java

Course Objectives	• Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc. • Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms. • Understand the principles of inheritance, packages and interfaces.
Course Outcomes	• Identify classes, objects, members of a class and relationships among them needed for a specific problem. • Write Java application programs using OOP principles and proper program structuring. • Demonstrate the concepts of polymorphism and inheritance. • Write Java programs to implement error handling techniques using exception handling.

DETAILED CONTENT

Module 1

IntroductionTo Object Oriented Programming: Data Abstraction, Encapsulation, Inheritance (Public, Protected And Private), Polymorphism, Information Hiding.

Java Elements : Data Types, Literal and Variables, Operators–Arithmetic, Bit-wise, Relational, Boolean Logical, Assignment, The '?' Operator, Operator Precedence, Control Statements–Selection (if, switch), Iteration Statements (while, do-while, for) Jump Statements (break, continue, return), Arrays (One-dimensional, Multi-Dimensional).

Module 2

Introducing Classes: Class Fundamentals, Declaring Objects, Methods, Constructors, 'This' Keyword, Over loading Methods.

Inheritance: Inheritance Basics, Protected Members, Method Overriding, Multiple Inheritance, Template Classes and Functions.

Module 3
Exception Handling: Fundamental, Exception Types, Uncaught Exceptions, Try and Catch, Dealing With Exceptions (try, throw, throws, finally).

Module 4
Java Applets: Applet Basics, the Applet Class, Applet Architecture, An Applet Skeleton, Applet Display Methods, Handling Events.

Advanced Java Programming: Multithreading–Java Thread Model, The Main Thread, Creating a Thread, Creating Multiple Threads, Thread Priorities, Synchronization, Inter-thread Communication, Multithreading.

Text Books

1. Patrick Naughten & Herbert Schildt, " The Complete Reference Java ." Tata McGraw Hill.

Reference Books

1. Gilbert, Stephan D. and William B. Hccarthy, " Object Oriented Programming In Java ",1997, The Waite Group Press.
2. Mary Compoine and Kathy Walrath," The Java Turtorial ", Addison-Wesley, 1996.
3. Horstmann, Cay S. and Gary Cornell, "Core Java 1.1: Fundamentals." Addison– Wesley,1997.

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CSE- 602: Computer Graphics

Course Objectives	• Understand the need of developing graphics application • Learn algorithmic development of graphics primitives like: line, circle, polygon etc. • Learn the representation and transformation of graphical images and pictures.
Course Outcomes	• Understand the basics of computer graphics, different graphics systems and applications of computer graphics. • Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis. • Use of geometric transformations on graphics objects and their application in composite form. • Extract scene with different clipping methods and its transformation to graphics display device. • Explore projections and visible surface detection techniques for display of 3D scene on 2D screen. • Render projected objects to naturalize the scene in 2Dview and use of illumination models for this.

DETAILED CONTENT

Module 1: Introduction to Computer Graphics
Overview of Graphics Systems, Display Devices, Hard copy Devices. Interactive Input Devices, Display Processors, The Graphical Kernel System, Output Primitives, Line drawing algorithms, Circle Generation algorithms, Character Generation. **Raster Scan Graphics -** Line Drawing Algorithms, Circle Generation, General Function Rasterization, Scan Conversion-Generation of the display, Image Compression, Polygon Filling, Fundamentals of Antialiasing.

Module 2: Two-Dimensional Geometric Transformation & Viewing
Basic Transformation, Translation, Rotation, Scaling, Other Transformation Reflection, Shear, Transformation functions, Window to viewport co-ordinate transformation, Clipping Operations, Point Clipping, Line Clipping, Polygon Clipping.
Three- Dimensional Concepts & Object Representations
Three Dimensional Display Methods, Parallel Projection, Perspective Projection, Translation, Rotation, Scaling, Composite Transformation, Three dimensional Transformation function, Polygon Surfaces, Curved Lines and surfaces, Bezier Curves and surfaces, B-Spline Curves and surfaces.

Module 3: Graphics hardware
Display technology, random scan, raster scan display processing, input devices for interaction.
Visible Lines and Visible Surfaces
Visual Realism, Hidden line and hidden surface removal: depth buffer algorithm, geometric computations, scan line coherence algorithms, area coherence algorithms, priority algorithm, shading and color models,

Modeling methods.

Module 4: Rendering

A simple illumination model, Transparency, Refraction effects in transparent materials, Simple Transparency Models, Z-Buffer Transparency, Shadows, Texture.

Text and Reference Books

1. D.F. Rogers, "Procedural Elements for Computer Graphics", McGraw Hill.
2. Hearn and Baker, "Computer Graphics", PHI.
3. S. Harrington, "Computer Graphics - A programming approach", McGraw Hill.4. D.F. Rogers, "Mathematical Elements for Computer Graphics", McGraw Hill.

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(ELECTIVE –II) CSE- 603: Computer Networks

Course Objectives	The course objectives include learning about computer network organization and implementation, obtaining a theoretical understanding of data communication and computer networks, and gaining practical experience in installation, monitoring, and troubleshooting of current LAN systems.
Course Outcomes	- Describe how computer networks are organized with the concept of layered approach. - Describe how signals are used to transfer data between nodes. Implement a simple LAN with hubs, bridges and switches. - Describe how packets in the Internet are delivered.

DETAILED CONTENT

Module 1:
Data communication Components: Representation of data and its flow Networks , Various Connection Topology, Protocols and Standards, OSI model, Transmission Media, LAN: Wired LAN, Wireless LANs, Connecting LAN and Virtual LAN, Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spreadspectrum.

Module 2:
Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction - Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols -Pure ALOHA, Slotted ALOHA, CSMA/CD,CDMA/CA

Module 3:
Network Layer: Switching, Logical addressing – IPV4, IPV6; Address mapping – ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and Unicast Routingprotocols.

Module 4:
Transport Layer: Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucketalgorithm.

Module 5:
Application Layer: Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls, Basic concepts of Cryptography

Suggested books

1. Data Communication and Networking, 4th Edition, Behrouz A. Forouzan, McGraw- Hill.
2. Data and Computer Communication, 8th Edition, William Stallings, Pearson Prentice Hall India.

Suggested reference books

1. Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New International Edition.
2. Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, Prentice Hall of India.
3. TCP/IP Illustrated, Volume 1, W. Richard Stevens, Addison-Wesley, United States of America.

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(ELECTIVE –II) CSE- 604: Computational Geometry

Course Objectives	The participants will after the course have detailed knowledge of the fundamental problems within computation geometry and general techniques for solving problems within computational geometry and practical experience with implementation issues involved in converting computation geometry algorithms into running programs.
Course Outcomes	The participants must at the end of the course be able to: • Construct algorithms for simple geometrical problems. • Implement computational geometry algorithm.

DETAILED CONTENT

Module 1:

Introduction, Visibility Problems, 2D Maxima, Line Sweep Method, Segment Intersection Problem, Line Sweep: Rectangle Union.

Convex Hull, Quick Hull, More Convex Hull Algorithms, Intersection of Half Planes and Duality, Lower Bounds.

Module 2:

Planar Point Location, Point Location and Triangulation Contd., Triangulation of Arbitrary Polygon., Voronoi Diagram : Properties.

Voronoi Diagram Construction, Delaunay Triangulation., Quick sort and Backward Analysis, Generalized RIC, Arrangements.

Module 3:

Z one Theorem and Application, Levels, Range Searching : Introduction, Orthogonal Range searching, Priority Search Trees,

Non - Orthogonal Range Searching, Half - Plane Range Query, Well Separated Partitioning, Quadtrees Epsilon –WSPD, Construction of Epsilon – WSPD

Module 4:

Epsilon - WSPD to Geometric Spanner, Epsilon-Nets & VC Dimension, Epsilon-Nets & VC Dimension contd., Geometric Set Cover, Geometric Set Cover (with Bounded VC Dimension), Shape Representation, Shape Comparison.

Text Books:
1. Franco P. Preparata and Michael Ian Shamos, Computational Geometry an Introduction.Texts and Monographs in Computer Science, Springer Verlag.
2. Joseph O'Rourke, Computational Geometry in C. Cambridge University Press 2ndEdn.

3. Mark. de Berg, Marc. van Kreveld, Mark. Overmars and Otfried Cheong, Computational Geometry- Algorithms and Applications. Springer- Verlag 3rdEdn.

References:
1. Herbert Edelsbrunner, Algorithms in Combinatorial Geometry, EATCS Monographs on Theoretical Computer Science, SpringerVerlag.
2. Joseph O' Rourke, Art Gallery Theorems. Oxford Presspublications.

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(ELECTIVE –II) CSE- 605: Neural Networks and Deep Learning

Course Objectives	Introduce major deep learning algorithms, the problem settings, and their applications to solve real world problems.
Course Outcomes	- Identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains. - Implement deep learning algorithms and solve real-world problems.

DETAILED CONTENT

Module 1:

Introduction: Various paradigms of earning problems, Perspectives and Issues in deep learning framework, review of fundamental learning techniques.

Feedforward neural network: Artificial Neural Network, activation function, multi-layer neural network.

Module 2:

Training Neural Network: Risk minimization, loss function, backpropagation, regularization, model selection, and optimization.

Conditional Random Fields: Linear chain, partition function, Markov network, Belief propagation, Training CRFs, Hidden Markov Model, Entropy.

Module 3:

Deep Learning: Deep Feed Forward network, regularizations, training deep models, dropouts, Convolutional Neural Network, Recurrent Neural Network, Deep Belief Network.

Module 4:

Probabilistic Neural Network: Hopfield Net, Boltzman machine, RBMs, Sigmoid net, Autoencoders.

Deep Learning research: Object recognition, sparse coding, computer vision, natural language processing.

Deep Learning Tools: Caffe, Theano, Torch.

Text Books
> ➢ Goodfellow, I., Bengio,Y., and Courville, A., Deep Learning, MIT Press, 2016..
> ➢ Bishop, C. ,M., Pattern Recognition and Machine Learning, Springer, 2006.

Reference Books
> ➢ Yegnanarayana, B., Artificial Neural Networks PHI Learning Pvt. Ltd, 2009.
> ➢ Golub, G.,H., and Van Loan,C.,F., Matrix Computations, JHU Press,2013.
> ➢ Satish Kumar, Neural Networks: A Classroom Approach, Tata McGraw-Hill Education, 2004.

Books on Optimization Techniques

- A. Ravindran, K. M. Ragsdell , and G. V. Reklaitis , ENGINEERING OPTIMIZATION: Methods and Applications , John Wiley & Sons, Inc. , 2016..
- Antoniou, W. S. Lu, PRACTICAL OPTIMIZATION Algorithms and Engineering Applications, Springer , 2007.

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(ELECTIVE –II) ECEL-03: Information Theory and Coding

Course Objectives	- Introduce the principles and applications of information theory. - To teach study how information is measured in terms of probability and entropy, and the relationships among conditional and joint entropies. - To teach coding schemes, including error correcting codes. - Explain how this quantitative measure of information may be used in order to build efficient solutions to multitudinous engineering problems.
Course Outcomes	At the end of the course, students will demonstrate the ability to: - Understand the concept of information and entropy - Understand Shannon's theorem for coding - Calculation of channel capacity - Apply coding techniques

DETAILED CONTENT

Module 1: Basic Concepts of Information Theory:
Basics of information theory, entropy for discrete ensembles; Shannon's noiselesscodingtheorem; Encoding of discrete sources.

Module 2:Elements of Encoding:
Markov sources; Shannon's noisy coding theorem and converse for discrete channels;Calculationof channel capacity and bounds for discrete channels; Application to continuous channels.

Module 3: Coding and Decoding Techniques:
Techniques of coding and decoding; Shannon's Binary encoding, Shannon Fano encoding,Huffman codes and uniquely detectable codes;Huffman's Minimum Redundancy codes. Coding for Reliable Digital Transmission & Storage: Introduction, types of codes,

Module 4. Linear Block and BCH Codes:
Description of Cyclic codes; encoding of cyclic codes;convolutional arithmetic codes: Encoding of convolution codes, structural properties of Convolution codes, distance properties of conventional codes,

Text Books
1. N. Abramson, Information and Coding, McGraw Hill, 1963.
2. M. Mansurpur, Introduction to Information Theory, McGraw Hill, 1987.
3. R.B. Ash, Information Theory, Prentice Hall, 1970.

Reference Books
1. Shu Lin and D.J. Costello Jr., Error Control Coding, Prentice Hall, 1983.

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(ELECTIVE –III) CSE-607: Compiler Design

Course Objectives	• To provide a thorough understanding of the internals of Compiler Design.
Course Outcomes	The students will be able to • Explain the concepts and different phases of compilation with compile time error handling. • Represent language tokens using regular expressions, context free grammar and finite automata and design lexical analyzer for a language. • Compare top down with bottom up parsers, and develop appropriate parser to produce parse tree representation of the input. • Generate intermediate code for statements in high level language. • Design syntax directed translation schemes for a given context free grammar. • Apply optimization techniques to intermediate code and generate machine code for highlevel language program.

DETAILED CONTENT

Module 1:
Introduction to Compilers
Compiler and translators need of translators, structure of a compiler, lexical analysis, syntax Analysis.
Basic Parsing Techniques
Parsers, shift-reduce parsing, predictive parsing.

Module 2:
Automatic Construction of Efficient Parsers
LR parsers, canonical collection of LR(0) items, construction canonical LR parsing tables, construction LALR and SLR parsing tables using ambiguous grammars, an automatic parser generator, implementation of LR parsing tables, Construction LALR sets of items.

Module 3:
Syntax-Directed Translation
Syntax directed translation schemes, implementation of syntax directed translation, intermediate code, postfix notation parse trees and syntax trees, three address code, quadruples and triples, translation of assignment statements, postfix translation with top down parser.
Symbol Tables: Contents of a table, data structures for symbol tables, representing scope information.

Module 4:
Error detection and recovery
Errors, lexical-phase errors, syntax-phase errors, semantic errors.

Introduction to Code optimization

The principal source of optimization, loop optimization, DAG representation of basic blocks, value numbers and algebraic laws, global data flow analysis.

Code Generation

Object programs, problems in code generation, machine model, simple code generator, register allocation and assignment, code generation from DAG''s, peephole optimization.

Text and Reference Books

1. Alfred Aho, Ravi Sethi, Jeffrey D Ullman, "Compilers Principles, Techniques and Tools", Pearson Education

2. Allen I. Holub "Compiler Design in C", Prentice Hall of India

3. C. N. Fischer and R. J. LeBlanc, "Crafting a compiler with C", Benjamin Cummings

4. J.P. Bennet, "Introduction to Compiler Techniques", Tata McGraw-Hill

5. HenkAlblas and Albert Nymeyer, "Practice and Principles of Compiler Building with C", PHI

6. Kenneth C. Louden, "Compiler Construction: Principles and Practice", Thompson Learning

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(ELECTIVE –III) ECEL-18: Embedded Systems

Course Objectives	• To have knowledge about the basic working of a microcontroller system and its programming in assembly language. • To provide experience to integrate hardware and software for microcontroller applications systems.
Course Outcomes	At the end of the course, students will demonstrate the ability to: • Suggest design approach using advanced controllers to real-life situations. • Design interfacing of the systems with other data handling / processing systems. • Appreciate engineering constraints like energy dissipation, data exchange speeds etc.

DETAILED CONTENT

Module 1.Introduction:
The concept of embedded systems design, Embedded microcontroller cores, embeddedmemories. Examples of embedded systems,

Module 2: ATMEL RISC Processors and Development Tools
Introduction, Basics of developing for embedded systems,Embedded system Initialization,Atmel RISC Processors Architecture, Memory, Reset and interrupt functions,Parallel I/O ports, Timer/Counters, Serial communication using UART, SPI, Analog Interfaces AVR RISC Assembly language instruction set.

Module 3. Technological Aspects of Embedded Systems:
Interfacing between analog and digital blocks, signal conditioning, digital signal processing. Subsystem interfacing, interfacing with external systems, user interfacing. Design tradeoffs due toprocess compatibility, thermal considerations, etc.,

Module 4. Software Aspects of Embedded Systems:
Realtime programming languages and operating systems for embedded systems.

Text Books
1. J.W. Valvano, "Embedded Microcomputer System: Real Time Interfacing", Brooks/Cole,2000.
2. Jack Ganssle, "The Art of Designing Embedded Systems", Newness, 1999.
3. V.K. Madisetti, "VLSI Digital Signal Processing", IEEE Press (NY, USA), 1995.

Reference Books
1. David Simon, "An Embedded Software Primer", Addison Wesley, 2000.
2. K.J. Ayala, "The 8051 Microcontroller: Architecture, Programming, and Applications", Penram Intl, 1996.

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(ELECTIVE –III) CSE-608: Cloud Computing

Course Objectives	• Identify the technical foundations of cloud systems architectures. • Analyze the problems and solutions to cloud application problems. • Apply principles of best practice in cloud application design and management. • Identify and define technical challenges for cloud applications and assess theirimportance
Course Outcomes	• Understand the fundamental principles of distributed computing. • Understand how the distributed computing environments known as Grids can be built from lower level services. • Understand the importance of virtualization in distributed computing and how this has enabled the development of Cloud Computing. • Analyze the performance of Cloud Computing. • Understand the concept of Cloud Security. • Learn the Concept of Cloud Infrastructure Model..

DETAILED CONTENT

Module 1:

Journey to the cloud

Business driver for cloud computing, Definition of cloud computing, Characteristics of cloud computing as per NIST, Steps involve in transitioning from classic data center to cloud computing environment, Disadvantage of cloud computing , Cloud Models.

Classic data center (CDC)

Application, DBMS, compute, storage and networking, Object based and unified storage technologies, Business continuity overview and backup, Replication technologies, CDC management.

Module 2:

Cloud as a Service : Gamut of Cloud Solutions , Principal Technologies ,Cloud Strategy , Cloud Design and Implementation Using SOA Conceptual Cloud Model , Cloud Service Defined .

Cloud Solution: Cloud Ecosystem , Cloud Business Process Management , Cloud Service Management , On-Premise Cloud Orchestration and Provisioning Engine , Computing on Demand (CoD) Cloud sourcing .

Cloud Offerings : Introduction , Information Storage, Retrieval, Archive, and Protection , Cloud Analytics , Testing Under Cloud Information Security , Virtual Desktop Infrastructure , Storage Cloud , Cloud architecture.

Module 3:

Cloud Management : Resiliency , Provisioning , Asset Management , Cloud Governance , High Availability and Disaster Recovery Charging Models, Usage Reporting, Billing, and Metering.

Cloud Virtualization Technology : Introduction , Virtualization Defined , Virtualization Benefits , Server Virtualization , Virtualization for x86 Architecture , Hypervisor Management Software, Virtual Infrastructure Requirements , Virtualized data center (VDC),

Cloud Infrastructure: Storage Virtualization , Storage Area Networks , Network-Attached Storage, Cloud Server Virtualization Networking Essential to Cloud, Virtual LAN(VLAN) and virtual SAN (VSAN)and their benefits, and considerations, Backup and recovery of virtual

machines(VMs)

Module 4:

Cloud and SOA : SOA Journey to Infrastructure , SOA and Cloud , SOA Defined , SOA and IAAS , SOA-Based Cloud Infrastructure Steps , SOA Business and IT Services Cloud Mobility : Introduction , The Business Problem , Mobile Enterprise Application Platforms Mobile Application Architecture

Cloud security and migration to cloud

Security concerns and counter measures in a VDC and cloud environment, Governance, risk, and compliance aspects in cloud, Cloud models suitable for different categories of users, Consideration for choosing applications suitable for cloud, Different phases to adopt the cloud.

Text Books:

1. Cloud Computing By DR. KUMAR SAURABH, Wiley India Pvt Ltd.

2. Cloud Computing By BARRIE SOSINSKY Wiley India Pvt Ltd

3. Cloud Computing : A practical approach by Anthony T. Velte- Tata McGraw Hill Education Private Limited (2009) ISBN: 0070683514.

Reference Books :

1. Cloud Computing For Duminies by Halper Fern, Kaufman Marica, Bloor Robin, Hurwit Judith, - Wiley India Pvt Ltd (2009) ISBN: 8126524871.

2. Grid and cluster computing by Prabhu , PHI publication.

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(ELECTIVE –III) CSE-609: Soft Computing

Course Objectives	To introduce the concepts in Soft Computing such as Artificial Neural Networks, Fuzzy logic-based systems, genetic algorithm-based systems and their hybrids.
Course Outcomes	The Students will be able to • Learn soft computing techniques and their applications. • Analyze various neural network architectures. • Define the fuzzy systems. • Understand the genetic algorithm concepts and their applications. • Identify and select a suitable Soft Computing technology to solve the problem; constructa solution and implement a Soft Computing solution..

DETAILED CONTENT

Module 1:

Neural Networks

History, overview of biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms-Supervised, Unsupervised and reinforcement Learning, ANN training Algorithms-perceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perceptron Model, Hopfield Networks, AssociativeMemories, Applications of Artificial Neural Networks.

Module 2:

Fuzzy Logic:

Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation. Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations. Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations. Fuzzy Logic: Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedges.

Module 3:

Uncertainty based Information: Information& Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, Fuzziness of Fuzzy Sets.
Introduction of Neuro-Fuzzy Systems: Architecture of Neuro Fuzzy Networks.

Module 4:

Application of Fuzzy Logic: Medicine, Economics etc.
Genetic Algorithm: An Overview, GA in problem solving, Implementation of GA.
Swarm Intelligence: Ant Colony system, PSO system.

Text Books
1. Anderson J.A., "An Introduction to Neural Networks", PHI,
2. Hertz J. Krogh, R.G. Palmer, "Introduction to the Theory of Neural Computation", Addison-Wesley,
3. G.J. Klir& B. Yuan, "Fuzzy Sets & Fuzzy Logic", PHI,

4. Melanie Mitchell , "An Introduction to Genetic Algorithm", PHI,

Reference Book
1. Freeman J.A. & D.M. Skapura, "Neural Networks: Algorithms, Applications and Programming Techniques", Addison Wesley

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(OPEN ELECTIVE-I) CSE-611: System Programming

Course Objectives	• To introduce student the fundamental model of the processing of high level language programs for execution on computer system.
	• To explain the basic operations that are performed from the time a computer is turned on until a user is able to execute programs.
	• To understand and implement Assembler, Loader, Linkers, Macros & Compilers.
	• To introduce students the process management and information management via different software tools.
Course Outcomes	By the end of the course students will be able to
	• Understand different components of system software.
	• Understand intermediate code generation in context of language designing.
	• Recognize operating system functions such as memory management as pertaining to run time storage management.

DETAILED CONTENT

Module 1:

Overview of System Software

Introduction, Software, Software Hierarchy, Systems Programming, Machine Structure, Interfaces, Address Space, Computer Languages, Tools, Life Cycle of a Source Program, Different Views on the Meaning of a Program, System Software Development, Recent Trends in Software Development, Levels of System Software.

Overview of Language Processors

Programming Languages and Language Processors, Language Processing Activities, Program Execution, Fundamental of Language Processing, Symbol Tables,Data Structures for Language Processing: Search Data structures, Allocation Data Structures.Assemblers

Module 2:

Elements of Assembly Language Programming, Design of the Assembler, Assembler Design Criteria, Types of Assemblers, Two-Pass Assemblers, One-Pass Assemblers, Single pass Assembler for Intel x86 , Algorithm of Single Pass Assembler, Multi-Pass Assemblers, Advanced Assembly Process, Variants of Assemblers Design of two pass assembler,Macro and Macro Processors

Module 3:

Introduction, Macro Definition and Call, Macro Expansion, Nested Macro Calls, Advanced Macro Facilities, Design Of a Macro Pre- processor, Design of a Macro Assembler, Functions of a Macro Processor, Basic Tasks of a Macro Processor, Design Issues of Macro Processors, Features, Macro

Processor Design Options, Two-Pass Macro Processors, One-Pass Macro Processors

Linkers and Loaders

Introduction, Relocation of Linking Concept, Design of a Linker, Self- Relocating Programs, Linking in MSDOS, Linking of Overlay Structured Programs, Dynamic Linking, Loaders, Different Loading Schemes, Sequential and Direct Loaders, Compile-and-Go Loaders, General Loader Schemes, Absolute Loaders, Relocating Loaders, Practical Relocating Loaders, Linking Loaders, Relocating Linking Loaders, Linkers v/s Loaders

Module 4:

Scanning and Parsing

Programming Language Grammars, Classification of Grammar, Ambiguity in Grammatic Specification, Scanning, Parsing, Top Down Parsing, Bottom up Parsing, Language Processor Development Tools, LEX, YACC

Compilers

Causes of Large Semantic Gap, Binding and Binding Times, Data Structure used in Compiling, Scope Rules, Memory Allocation, Compilation of Expression, Compilation of Control Structure, Code Optimization

Interpreters & Debuggers

Benefits of Interpretation, Overview of Interpretation, The Java Language Environment, Java Virtual Machine,Types of Errors, Debugging Procedures, Classification of Debuggers, Dynamic/Interactive Debugger

Reference Books:

1) System Programming by D M Dhamdhere McGraw Hill Publication

2) System Programming by Srimanta Pal OXFORD Publication

3) System Programming and Compiler Construction by R.K. Maurya & A. Godbole.

4) System Software – An Introduction to Systems Programming by Leland L. Beck, 3rd Edition,

Pearson Education Asia, 2000

5) System Software by Santanu Chattopadhyay, Prentice-Hall India,2007

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(OPEN ELECTIVE-I) CSE-612: Introduction to Philosophical Thoughts

Course Objectives	The course has been devised to introduce to the students the very basicsof philosophy – its subject matter as well as its structural framework. The students are alsoexpected to acquaint themselves with the various branches of philosophy and differentphilosophical standpoints
Course Outcomes	The students will be able to understand the subject matter andstructural framework of the discipline of Philosophy. They will have knowledge of variousbranches of philosophy and will be able to understand different philosophical standpoints.

DETAILED CONTENT

Module 1:

- ➢ What is philosophy and what is an argument?
- ➢ Philosophical Method/Logic
- ➢ Ethics
- ➢ Applied Ethics
- ➢ Debate on abortion

Module 2:

- ➢ Epistemology
- ➢ Mind Body Problem
- ➢ Debate on the mind-body problem
- ➢ Knowledge and Certainty
- ➢ Being and Reality

Module 3:

- ➢ Metaphysics- Personal Identity
- ➢ Philosophy of Religion
- ➢ Debate on the existence of God
- ➢ God and Religion
- ➢ Freedom

Module 4:

- ➢ Science and Method
- ➢ Morality and the Good Life
- ➢ Authority & the State

➢ Beauty and Art

Reference Books:

1. Western Philosophy: An Anthology. John Cottingham, ed. Second edition (2008).
2. A Rulebook for Arguments. Anthony Weston. Fourth edition.
3. The Elements of Style. William Strunk Jr. and E.B. White. Fourth edition.

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(OPEN ELECTIVE-I) CSE-613: Multimedia Technology

Course Objectives	- To identify a range of concepts, techniques and tools for creating and editing the interactive multimedia applications. - To identify the current and future issues related to multimedia technology. - To identify both theoretical and practical aspects in designing multimedia systems surrounding the emergence of multimedia technologies using contemporary hardware and software technologies.
Course Outcomes	- Describe the types of media and define multimedia system. - Describe the process of digitizing (quantization) of different analog signals (text, graphics, sound and video). - Use and apply tools for image processing, video, sound and animation. - Apply methodology to develop a multimedia system. - Apply acquired knowledge in the field of multimedia in practice and independently continue to expand knowledge in this field.

DETAILED CONTENT

Module 1:

Introduction: Multimedia and its types, Use of multimedia, Introduction to Multimedia Systems and their Characteristics, Challenges, Desirable Features, Components and Applications, Trends in Multimedia, Structure and components of Multimedia. Application Domains, Internet and Multimedia.

Technology: Architecture of a sound card, MIDI interface, protocol and data format , digitization of audio signal - sampling and coding, digital audio signal processing, architecture of a sound card, elementary concept of music, pitch and voice, staff notation and scoring, electronic music and synthesizer , Multimedia Hardware devices/Software's, Multimedia software development tools.

Module 2:

Image & Graphics: Basic concept, Digital image Representation and formats, Graphic drafting Tools, Image processing and enhancement, Color printer principles, Image scanner principle, File formats, Digital still Camera and photography.

Animation and special effects: animation principles, Survey of animation tools, Special Visual Effects wiping, morphing using Dream viewer.

Video Technology: Analog Video, Principles Broadcast standards, CCD Camera, Recording formats and standard, Digital Video, Principles, PC video and Videoconference standards, TV Cards Frame Grabber Principles, IDTV and HDTV principles, Motion Picture to Video Conversion, video performance measurement.

Module 3:

Compression and decompression: Type of compression, Need of data compression, Binary image compression schema, Color and gray schema, and still video image compression, video image compression, Audio compression.

Multimedia Document and Interchange formats: Media preparation, media composition, Hypertext, HTML, MHEG and Hypermedia, SGML, TIFF, TWAIN, Open document Architecture (ODA), Quick Time Movie film format, Open Media framework (OMFI).

Module 4:

Synchronization: Temporal Dependence in Multimedia presentation. Inter-object and Intraobject Synchronization , Time Abstraction for authoring and visualization, Reference Modle and Specification.

Hypermedia Messaging: Mobile messaging, Hypermedia message component, Hypermedia linking and embedding, creating hypermedia message, Integrated multimedia message standards, integrated document management.

Distributed Multimedia system: Component of distributed Multimedia system, Client server operation , Multimedia object servers, Multi-server network topologies , Distributed multimedia data bases, Managing distributed object.

Text Books:

1. Multimedia Systems Design, P.K.Andleigh and K.Thakrar, Prentice Hall PTR, 1996.
2. Multimedia system Ed by John f.K Buford , Addison Weslay Publication.
3. Multimedia Computing, Communications and Applications, Ralf Steinmetz and Klara Nashtedt, Prentice Hall 1995

Reference Books:

1. Multimedia and web design by Vikas Gupta , Dreamtech publication

Multimedia Technology & Applications, David Hillman, Galgotia Publications.

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CSE- 601P: Programming in Java Lab

Course Objectives	• This course introduces computer programming using the JAVA programming language with object-oriented programming principles. • Emphasis is placed on event-driven programming methods, including creating and manipulating objects, classes, graphics concepts, applet programming concepts etc., • Upon completion, students should be able to design, code and debug JAVA language programs.
Course Outcomes	• Remember the fundamentals of Java programming language • Understand the basics of Java programming, multi-threaded programs and Exception handling • Analyze and use Java in a variety of applications. • Write and debug a software application developed using the Java programming language.

LIST OF EXPERIMENTS

1. Write a program to print ―Hello World‖ on the screen.
2. Write a program that calculates how long it takes to drive from Kahsmir to Kanyakumari at 75 mile per hour (Use 3000 miles as the approximate distance between two cities).
3. Write a program that creates and initializes a four-element int array. Calculate and display the average of its values.
4. Write a program that creates a 2-d array with int values the first element should be an array containing 32. The second array should be an array containing 500 and 300 .The third element should be an array containing 39.45 and 600.Declare, allocate and initialize the array display its length and elements.
5 Write a program to swap two values using object reference. Your program should have a swap function.
6. Write an application that accepts two doubles as its command line arguments, multiple these together and display the product.
7. Write an application that accepts one command line argument; display the line of reporting if number is even or odd.
8. Write an application that accepts radius of a circle as its command line argument display the area.
9. WAP that describes a class person. It should have instance variables to record name, age and salary.
Create a person object. Set and display its instance variables.
10. Write a program that uses length property for displaying any number of command line arguments.
11. WAP that creates a class circle with instance variables for the centre and the radius. Initialize and display its variables.
12. Modify experiment 1 to have a constructor in class circle to initialize its variables.
13. Modify experiment 2 to show constructor overloading.
14. WAP to display the use of this keyword.
15. Write a program that can count the number of instances created for the class.

Week 4

16. WAP that implements method overloading.

17. WAP that shows passing object as parameter.

18. WAP that illustrates method overriding

19. Write a program to show that the value of non static variable is not visible to all the instances, and therefore cannot be used to count the number of instances.

20. WAP to illustrate simple inheritance

21. WAP illustrating a super class variable a referencing as sub class object.

22. WAP illustrating all uses of super keywords.

23. Create an abstract class shape. Let rectangle and triangle inherit this shape class. Add necessary functions.

24. Write an application that creates a package p1. Add some classes in it.

25. Write an application that uses the package p1 created in the program 21.

26. Write an application that creates an interface and implements it.

27. Write an application to illustrate Interface Inheritance.

28. Write an application that shows the usage of try, catch, throws and finally.

29. Write an application that shows how to create a user-defined exception.

26. Write an application that creates an interface and implements it.

27. Write an application to illustrate Interface Inheritance.

28. Write an application that shows the usage of try, catch, throws and finally.

29. Write an application that shows how to create a user-defined exception.

30. Write an application that executes two threads. One thread displays —An‖ every 1000 milliseconds and other displays "B" every 3000 milliseconds. Create the threads by extending the Thread class.

31. Write an application that shows thread synchronization.

32. Write an application that displays deadlock between threads.

33. Write an application that shows thread priorities.

34. Write an Applet that displays "Hello World" (Background color-black, text color-blue and your name in the status window.)

35. Write a program that displays the life cycle of an Applet.

36. Write an Applet displaying line, rectangle, rounded rectangle, filled rectangle, filled rounded rectangle, circle, ellipse, arc, filled arc and polygon, all in different colors

37. Write an Applet that displays a counter in the middle of applet.

38. Write an Applet that displays a counter in the middle of applet. The counter starts from zero and keeps on incrementing after every second.

39. Write an Applet that draws a dot at a random location in its display area every 200ms. Any existing dots are not erased. Therefore dots accumulate as the applet executes.

40.Write an Applet that illustrates how to process mouse click, enter, exit, press and release events. The background color changes when the mouse is entered, clicked, pressed, released or exited.

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CSE-602P: Computer Graphics Lab

Course Objectives	• To acquaint the learner with the basic concepts of Computer Graphics • To learn the various algorithms for generating and rendering graphical figures • To get familiar with mathematics behind the graphical transformations
Course Outcomes	• Understand the basic concepts of computer graphics. • Design scan conversion problems using C programming. • Apply clipping and filling techniques for modifying an object. • Understand the concepts of different type of geometric transformation of objects in 2D and 3D. • Understand the practical implementation of modeling, rendering, viewing of objects in 2D.

LIST OF EXPERIMENTS

1. Introduction to Computer Graphics.

2. Familiarize yourself with creating and storing digital images using scanner and digital camera (compute the size of image when stored in different formats) and convert the stored images from one format to another (BMP, GIF, JPEG, TIFF, PNG, etc.) and analyze them.

3. Implement bresenham's line algorithm. Also provide Provision to change attributes of graph primitives such as stippling (Dotted and Dashed pattern), colors.

4. Implement bresenham's circle algorithm. Also provide to change attributes of graph primitives such as stippling (Dotted and Dashed pattern) and colors.

5. Implement 2-D transformation with translation, scaling, rotation, reflection, Shearing and scaling

6. Implement tweening procedure for animation with key frames having equal or different no. of edges.

7. Write a program for 2D line drawing as Raster Graphics Display.

8. Write a program for 2D circle drawing as Raster Graphics Display.

9. Write a program for 2D polygon filling as Raster Graphics Display.

10. Write a program for line clipping.

11. Write a program for polygon clipping.

12. Implement Flood Fill Method to fill interior and exterior of a polygon.

13. Write a program for displaying 3D objects as 2D display using perspectives Transformation.

14. Write a program for rotation of a 3D object about arbitrary axis.

15. Write a program to draw different shapes and fill them with various patterns.

B.Tech C.S.E

VII SEMESTER

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CSE- 701: Artificial Intelligence

Course Objectives	• To impart knowledge about Artificial Intelligence. • To give understanding of the main abstractions and reasoning for intelligent systems. • To enable the students to understand the basic principles of Artificial Intelligence in various applications.
Course Outcomes	Upon successful completion of the course, the students will be able to • Solve basic AI based problems. • Define the concept of Artificial Intelligence. • Apply AI techniques to real-world problems to develop intelligent systems. • Select appropriately from a range of techniques when implementing intelligent systems**.

DETAILED CONTENT

Module 1:

Introduction
Introduction to AI, AI techniques, level of model, criteria for success, Turing test.
Problems, Problem Spaces &Search
Defining problem as a space, search, production system, problem characteristics, production system characteristics, issues in the design of search programs.

Module 2:

Intelligent agents
Reactive, deliberative, goal-driven, utility-driven, and learning agents Artificial Intelligence programming techniques
Problem-solving through Search
Forward and backward, state-space, blind, heuristic, problem-reduction, A, A*, AO*, minimax, alpha-beta cut off, constraint propagation; neural, stochastic, and evolutionary search algorithms, genetic algorithm, PSO.

Module 3:

Knowledge Representation and Reasoning
Ontologies, foundations of knowledge representation and reasoning, representing and reasoning about objects, relations, events, actions, time, and space; frame representation, semantic network, predicate logic, resolution, natural deduction, situation calculus, description logics, reasoning with defaults, reasoning about knowledge.

Module 4:

Representing and Reasoning with Uncertain Knowledge
Probability, connection to logic, independence, Bayes rule, bayesian networks, probabilistic inference
Machine Learning and Knowledge Acquisition

Learning from memorization, examples, explanation and exploration.Learning nearest neighbor, naive Bayes, and decision tree classifiers.

Text and Reference Books

1. Saroj Kaushik, "Artificial Intelligence", Cengage Learning India Pvt Ltd
2. N.J. Nilsson, "Principles of Artificial Intelligence", Narosa Publishing House.
3. E. Rich and Knight, "Artificial Intelligence", McGraw Hill International.
4. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", Pearson Education / Prentice Hall of India.
5. Saroj Kaushik, "Logic and Prolog Programming", New Age International Pvt Ltd

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(ELECTIVE –IV) CSE-702: Distributed Systems

Course Objectives	This course is an introduction to the design of distributed systems and algorithms that support distributed computing. It aims to provide a practical exposure into the design and functioning of existing distributed systems.
Course Outcomes	At the end of the course the students will be able to • Understand the design principles in distributed systems and the architectures for distributed systems. • Apply various distributed algorithms related to clock synchronization, concurrency control, deadlock detection, load balancing, voting etc. • Analyze fault tolerance and recovery in distributed systems and algorithms for the same. • Analyze the design and functioning of existing distributed systems and file systems. • Implement different distributed algorithms over current distributed platforms.

DETAILED CONTENT

Module 1:

Foundations

Characterization of DS, Examples of distributed systems, Resource sharing and the World Wide Web, Challenges.

System Models

Architectural models, Fundamental models.

Module 2:

Interprocess Communication

The API for the Internet protocols, characteristics of interprocess communication, Sockets, UDP datagram communication, TCP stream communication, External data representation and marshalling, Client-server communication, Group communication, IP multicast.

Module 3:

Distributed Objects and remote Invocation

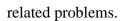Indirect Communication, Operating System Support, Distributed File Systems, Name Services.

Time and Global States

Clocks, events and process states, physical time and clocks, logical time and clocks, global states, distributed debugging.

Module 4:

Coordination and Agreement

Distributed mutual exclusion, elections, multicast communication, coordination agreement, consensus and

related problems.

Text and Reference Books

1. G. Coulouris, J. Dollimore, and T. Kindberg, "Distributed Systems: Concepts and Design", Pearson Education.

2. Taunenbaum, "Distributed Systems: Principles and Paradigms", PHI.

3. M. Singhal & N. Shivaratri, "Advanced Concepts in Operating Systems", TMH.

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(ELECTIVE –IV) CSE-703: Ad-Hoc and Sensor Networks

Course Objectives	The objective of this course is to study the fundamentals of Adhoc and Sensor Networks useful indata acquisition and IoT systems
Course Outcomes	The student will be able to: • Appreciate the importance of Adhoc and sensor networks for applications like environment monitoring, habitat monitoring, health care and data acquisition systems. • Understanding of data transmission technologies of the Adhoc and sensor devices with focus on channel access routing and security. • Appreciate the need and importance of converged networks, ubiquitous environment and 'Internet of things' in the context of Adhoc and sensor networks. • Capable of model building, new protocol design and strategies simulation of the systems that include the above..

DETAILED CONTENT

Module 1:

Introduction

Fundamentals of wireless communication technology – the electromagnetic spectrum – radio propagation mechanisms – characteristics of the wireless channel -mobile ad hoc networks (MANETS) and wireless sensor networks (WSNs): concepts and architectures. Applications of ad hoc and sensor networks. Design challenges in ad hoc and sensor networks.

Module 2:

Mac Protocols For Ad Hoc Wireless Networks

Issues in designing a MAC Protocol- Classification of MAC Protocols- Contention based protocolsContention based protocols with Reservation Mechanisms- Contention based protocols with Scheduling Mechanisms – Multi channel MAC-IEEE 802.11

Routing Protocols And Transport Layer In Ad Hoc Wireless Networks

Issues in designing a routing and Transport Layer protocol for Ad hoc networks- proactive routing, reactive routing (on-demand), hybrid routing- Classification of Transport Layer solutions-TCP over Ad hoc wireless Networks.

Module 3:

Wireless Sensor Networks (Wsns) And Mac Protocols

Single node architecture: hardware and software components of a sensor node - WSN Network architecture: typical network architectures-data relaying and aggregation strategies -MAC layer protocols: self-organizing, Hybrid TDMA/FDMA and CSMA based MAC- IEEE 802.15.4.

Module 4:

Wsn Routing, Localization & Qos

Issues in WSN routing – OLSR- Localization – Indoor and Sensor Network Localization-absolute and relative localization, triangulation-QOS in WSN-Energy Efficient Design-Synchronization-Transport Layer issues.

Text Book:

1. C. Siva Ram Murthy, and B. S. Manoj, "Ad Hoc Wireless Networks: Architectures and Protocols ", Prentice Hall Professional Technical Reference, 2008.
.

References:

1. Carlos De Morais Cordeiro, Dharma Prakash Agrawal "Ad Hoc & Sensor Networks: Theory and Applications", World Scientific Publishing Company, 2006.
2. Feng Zhao and Leonides Guibas, "Wireless Sensor Networks", Elsevier Publication - 2002.
3. Holger Karl and Andreas Willig "Protocols and Architectures for Wireless Sensor Networks",Wiley, 2005

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(ELECTIVE –IV) CSE-704: Internet-of-Things

Course Objectives	• To understand about the fundamentals of Internet of Things and its building blocks along with their characteristics • To understand the recent application domains of IoT in everyday life • To understand the protocols and standards designed for IoT and the current research on it. • To understand the other associated technologies like cloud and fog computing in the domain of IoT
Course Outcomes	• The students will be thorough about the technology behind the IoT and associated technologies • The students will be able to use the IoT technologies in practical domains of society • The students will be able to gain knowledge about the state of the art methodologies in IoT application domains.

DETAILED CONTENT

Module 1:

Introduction to IoT

Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs

Module 2:

IoT & M2M

Machine to Machine, Difference between IoT and M2M, Software define Network

Network & Communication aspects

Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination

Module 3:

Challenges in IoT

Design challenges, Development challenges, Security challenges, Other challenges

Domain specific applications of IoT

Home automation, Industry applications, Surveillance applications, Other IoT applications

Module 4:

Developing IoTs

Introduction to Python, Introduction to different IoT tools, Developing applications through IoT tools, Developing sensor based application through embedded system platform, Implementing IoT concepts with python

Reference Books:

1. Vijay Madisetti, Arshdeep Bahga, "Internet of Things: A Hands-On Approach"

2. Waltenegus Dargie,Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice"

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(ELECTIVE –IV) CSE-705: Parallel and Distributed Algorithms

Course Objectives	• Analyze and critically discuss research papers both in writing and in class • Formulate and evaluate a hypothesis by proposing, implementing and testing a project • Relate one's project to prior research via a review of related literature • Write a coherent, complete paper describing and evaluating a project • Orally present a clear and accessible summary of a research work • Understand the fundamental questions in parallel and distributed computing and analyze different solutions to these questions • Understand different parallel and distributed programming paradigms and algorithms, and gain practice in implementing and testing solutions using these.
Course Outcomes	On successful completion of this course students will be able to: • Develop and apply knowledge of parallel and distributed computing techniques and methodologies. • Apply design, development, and performance analysis of parallel and distributed applications. • Use the application of fundamental Computer Science methods and algorithms in the development of parallel applications. • Explain the design, testing, and performance analysis of a software system, and to be able to communicate that design to others.

DETAILED CONTENT

Module 1:

The Idea of Parallelism: A Parallelised version of the Sieve of Eratosthenes, PRAM Model of Parallel Computation.

Pointer Jumping and Divide & Conquer: Useful Techniques for Parallelization

PRAM Algorithms: Parallel Reduction, Prefix Sums, List Ranking, Preorder Tree Traversal, Merging Two Sorted Lists, Graph Coloring, Reducing the Number of Processors and Brent's Theorem.

Module 2:

Dichotomoy of Parallel Computing Platforms ,Cost of Communication, Programmer's view of modern multi-core processors, The role of compilers and writing efficient serial programs

Parallel Complexity: The P-Complete Class, Mapping and Scheduling, Elementary Parallel Algorithms, Sorting.

Module 3:

Parallel Programming Languages: Shared Memory Parallel Programming using OpenMP, Dictionary

Operations: Parallel Search

Graph Algorithms, Distributed Algorithms: models and complexity measures.

Module 4:

Global state and snapshot algorithms, Mutual exclusion and Clock Synchronization, Distributed Graph algorithms.

Distributed Memory Parallel Programming: Cover MPI programming basics with simple programs and most useful directives; Demonstrate Parallel Monte Carlo.

Reference Books:

1. Michael J Quinn, Parallel Computing, TMH

2. Joseph Jaja, An Introduction to Parallel Algorithms, Addison Wesley

3. Mukesh Singhal and Niranjan G. Shivaratri, Advanced Concepts in Operating Systems, TMH

4. Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, Introduction to Parallel Computing, Pearson

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(ELECTIVE –V) CSE-706: Speech and Natural Language Processing

Course Objectives	• To understand the basics of speech and language processing • Apply conventional techniques in NLP • To design a TTS and ASR system
Course Outcomes	Students will learn the following: • How to build a ASR for a given language • How to build a TTS for a given language

DETAILED CONTENT

Module 1:

Introduction- Human languages, models, ambiguity, processing paradigms; Phases in natural language processing, applications.

Text representation in computers, encoding schemes.

Linguistics resources- Introduction to corpus, elements in balanced corpus, TreeBank, PropBank, WordNet, VerbNet etc.Resource management with XML, Management of linguistic data with the help of GATE, NLTK.

Module 2:

Regular expressions, Finite State Automata, word recognition, lexicon.

Morphology, acquisition models, Finite State Transducer.

N-grams, smoothing, entropy, HMM, ME, SVM, CRF.

Part of Speech tagging- Stochastic POS tagging, HMM, Transformation based tagging (TBL),

Handling of unknown words, named entities, multi word expressions.

Module 3:

A survey on natural language grammars, lexeme, phonemes, phrases and idioms, word order, agreement, tense, aspect and mood and agreement, Context Free Grammar, spoken language syntax.

Parsing- Unification, probabilistic parsing, TreeBank.

Semantics- Meaning representation, semantic analysis, lexical semantics, WordNet

Word Sense Disambiguation- Selectional restriction, machine learning approaches, dictionary based approaches.

Module 4:

Discourse- Reference resolution, constraints on co-reference, algorithm for pronoun resolution, text coherence, discourse structure.

Applications of NLP- Spell-checking, Summarization

Information Retrieval- Vector space model, term weighting, homonymy, polysemy, synonymy, improving user queries.

Machine Translation– Overview.

Textbook:

1. Daniel Jurafsky and James H Martin. Speech and Language Processing, 2e, Pearson Education, 2009

Reference Books:

1. James A.. Natural language Understanding 2e, Pearson Education, 1994
2. Bharati A., Sangal R., Chaitanya V.. Natural language processing: a Paninian perspective,PHI, 2000.
3. Siddiqui T., Tiwary U. S.. Natural language processing and Information retrieval, OUP,2008

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(ELECTIVE –V) CSE-707: Real Time Systems

Course Objectives	• To develop an understanding of various Real Time systems Application • To obtain a broad understanding of the technologies and applications for the emerging and exciting domain of real-time systems • To get in-depth hands-on experience in designing and developing a real operational system.
Course Outcomes	On completion of this course, the students will be able to • understand concepts of Real-Time systems and modeling • recognize the characteristics of a real-time system • understand and develop document on an architectural design of a real-time system • develop and document Task scheduling, resource management, real-time operating systems and fault tolerant applications of Real-Time Systems.

DETAILED CONTENT

Module 1:

Introduction – Issues in Real Time Computing, Structure of a Real Time System, Task Classes,Performance Measures for Real Time Systems, Estimating Program Run Times.

Task Assignment and Scheduling – Classical Uniprocessor scheduling algorithms,Uniprocessor scheduling of IRIS tasks, Task assignment, Mode changes, and Fault Tolerant Scheduling.

Module 2:

Programming Languages and Tools –Desired language characteristics, Data typing, Controlstructures, Facilitating Hierarchical Decomposition, Packages, Run – time (Exception) Error handling, Overloading and Generics, Multitasking, Low level programming, Task Scheduling, Timing Specifications, Programming Environments, Run – time support.

Module 3:

Real time Databases –Basic Definition, Real time Vs General Purpose Databases, Main MemoryDatabases, Transaction priorities, Transaction Aborts, Concurrency control issues, Disk Scheduling Algorithms, Two – phase Approach to improve Predictability, Maintaining Serialization Consistency, and Databases for Hard Real Time Systems.

Module 4:

Real – Time Communication –Communications media, Network Topologies Protocols, FaultTolerant Routing. Fault Tolerance Techniques – Fault Types, Fault Detection. Fault Error containment Redundancy, Data Diversity, Reversal Checks, Integrated Failure handling.

Reliability Evaluation Techniques –Obtaining parameter values, Reliability models ForHardware

Redundancy, Software error models. Clock Synchronization – Clock, A Non-fault Tolerant Synchronization Algorithm, and Impact of faults, Fault Tolerant Synchronization in Hardware, and Fault Tolerant Synchronization in software.

REFERENCES:

C.M. Krishna, Kang G. Shin, "Real Time Systems", McGraw - Hill International Editions,1997
By Albert M. K. Cheng , "Real-time systems: scheduling, analysis, and verification" Wiley

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(ELECTIVE –V) CSE-708: Machine Learning

Course Objectives	- To understand the basic theory underlying machine learning. - To be able to formulate machine learning problems corresponding to different applications. - To understand a range of machine learning algorithms along with their strengths and weaknesses. - To be able to apply machine learning algorithms to solve problems of moderate complexity. - To apply the algorithms to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.
Course Outcomes	After completing this course, the student will be able to - Appreciate the importance of visualization in the data analytics solution. - Apply structured thinking to unstructured problems. - Understand a very broad collection of machine. - Learning algorithms and problems. - Learn algorithmic topics of machine learning and mathematically deep enough to introduce the required theory. - Develop an appreciation for what is involved in learning from data.

DETAILED CONTENT

Module 1:

Introduction to Probability Theory, Linear Algebra and Convex Optimization.

Introduction: Statistical Decision Theory - Regression, Statistical Decision Theory -Classification, Bias

Variance.Linear Regression, Multivariate Regression, Subset Selection, Shrinkage Methods, Principal ComponentRegression, Partial Least squares.

Module 2:

Linear Classification, Logistic Regression, LDAPerceptron, SVM

Neural Networks - Introduction, Early Models, Perceptron Learning, Neural Networks - Backpropagation, Neural Networks - Initialization, Training & Validation, Parameter Estimation.

Module 3:

Decision Trees, Regression Tree, Decision Trees - Stopping Criterion & Pruning, Loss functions, Decision

Trees - Categorical Attributes, Multiway Splits, Missing Values, Decision Trees – Instability.

Bootstrapping & Cross Validation, Class Evaluation Measures, ROC curve, MDL, Ensemble Methods -

Bagging, Committee Machines and Stacking, Ensemble Methods – Boosting.

Gradient Boosting, Random Forests, Multi-class Classification, Naive Bayes, Bayesian Networks.

Module 4:

Undirected Graphical Models, HMM, Variable elimination, belief propagation.Partitional Clustering,

Hierarchical Clustering, Birch Algorithm, CURE Algorithm, Density-based Clustering.Gaussian Mixture Models, Expectation Maximization.Learning Theory, Introduction to Reinforcement Learning + Optional videos (RL framework and TD Learning,Solution Methods and Applications.

Text Book:

1. Ethem Alpaydin, Introduction to Machine Learning, Second Edition
2. Understanding Machine Learning. Shai Shalev-Shwartz and Shai Ben-David. Cambridge University Press. 2017.
3. The Elements of Statistical Learning. Trevor Hastie, Robert Tibshirani and Jerome Friedman. Second Edition. 2009.
4. Foundations of Data Science. Avrim Blum, John Hopcroft and Ravindran Kannan. January 2017.
5. Pattern Recognition and Machine Learning. Christopher Bishop. Springer. 2006.

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(ELECTIVE –V) CSE-709: Computer Peripherals and Interface

Course Objectives	- Identify some of the Input/output devices. - Identify the term of input/output module. - Define the three types of Input/output techniques, viz. programmed Input/output, Interrupt driveninput/output and Direct Memory Access - Define an Input-output processor - Identify the serial and parallel interfaces,
Course Outcomes	Students will be able to - Identify the hardware components of a computer. - Identify the peripherals devices outside computer. - Identify the software's running on a computer.

DETAILED CONTENT

Module 1:

System Resources : Interrupt, DMA Channel, I/O Port Addresses and resolving and resolving the conflict of resources. I/O buses- ISA, EISA, Local bus, VESA Local bus, PCI bus, PCI Express, Accelerated graphics port bus.

Module 2:

IDE & SCSI Interfaces : IDE origin, IDE Interface ATA standards ATA1 to ATA7. ATA feature, ATA RAID and SCSI RAID, SCSI Cable and pin Connector pin outs SCSI V/s IDE Advantages and limitation.

Module 3:

Video Hardware: Video display technologies, DVI Digital signals for CRT Monitor, LCD Panels, Video adapter types, Integrated Video/ Motherboard chipset, Video RAM, Video driver and multiple Monitor, Graphic accelerators. Advanced 3D Technologies, TV Tuner and Video Capture upgrades troubleshooting Video Cards and Drivers.

Module 4:

I/O Interfaces : I/O Interfaces from USB and IEEE1394, I/O Interface from serial and Parallel to IEEE1394 and USB 961, Parallel to SCSI converter. Testing of serial and parallel port, USB Mouse/ Keyboard Interfaces.
Input/ Output Driver Software Aspects : Role of device driver DOS and UNIX/ LINUX Design & Integration of Peripheral devices to a computer system as a Case Study
Future Trends : Detailed Analysis of recent Progress in the Peripheral and Bus systems. Some aspects of cost Performance analysis while designing the system

Text/Reference Books

1. P. Pal Chandhari , "Computer Organization and design" Prentice Hall of India Pvt. Ltd, 1994.
2. Del Corso, H.Kirrman, JD Nicond "Microcomputer buses & links" Academic Press 1986.
3. Douglas V Hall "Microprocessor & Interfacing Programming & H/W" McGraw Hill International 2nd Edition 1992.
4. Scott Muller, "Upgrading and repairing PC"

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(OPEN ELECTIVE-II) CSE-710: Cyber Law and Ethics

Course Objectives	The objective of this course is
	• To study the legal issues arising from information technology (IT), and the ethical implication of IT in society.
Course Outcomes	On completion of thecourse, students should:
	• Understand privacy, intellectual property rights,contracts & licenses as well as common criminal issues.
	• Understand the legalobligations of a computer professional.
	• Understand computer ethics and theimportance of professional codes of conduct,
	• and be able to derive and justifya personal position on moral and ethical matters related to computers in society.

DETAILED CONTENT

Module I:

Introduction , Overview of Computer and Web Technology ,Need for Cyber Law ,Cyber Jurisprudence at International and Indian Level.Jurisdictional Aspects in Cyber Law , Issues of jurisdiction in cyberspace ,Types of jurisdiction The Test evolved - Minimum Contacts Theory - Sliding Scale Theory - Effects Test and International targeting , Jurisdiction under IT Act, 2000.

Module II:

Cyber Crimes& Legal Framework , Cyber Crimes against Individuals, Institution and State ,Hacking ,Digital Forgery , Cyber Stalking/Harassment , Cyber Pornography , Identity Theft & Fraud Cyber Terrorism, Cyber Defamation , Right to Privacy and Data Protection on Internet - Concept of privacy - Threat to privacy on internet - Self-regulation approach to privacy - Ingredients to decide confidentiality of information - Breach of sensitive personal information and confidentiality under IT Act and penalties for the same. - Right of Interception under IT Act , Different offences under IT Act, 2000

Module III:

Digital signature and Electronic Signatureand Data Protection - Concept of public key and private key - Certification authorities and their role - Creation and authentication of digital signature - Concept of electronic signature certificates , Electronic Governance - Concept of electronic records and electronic signatures - Rules for attribution, acknowledgement and dispatch of such records

Module IV:

E Contracting , Salient features of E-contract , Formation of E-contract and types , E-mail Contracting , Indian Approach on E-contracts .E Commerce ,E-commerce-Salient Features and advantages , Models of E-commerce like B2B, B2C , Indian Laws on E-commerce

Module V:

Intellectual Property Issues in Cyber Space , Interface with Copyright Law , Interface with Patent Law , Trademarks &Domain Names Related issues , Dispute Resolution in Cyberspace

References

1. Karnika Seth, Computers, Internet and New Technology Laws, Lexis NexisButterworthsWadhwa

Nagpur.

2. Chris Reed & John Angel, Computer Law, OUP, New York, (2007).
3. Justice Yatindra Singh,Cyber Laws, Universal Law Publishing Co, New Delhi, (2012).

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(OPEN ELECTIVE-II) CSE-711: Soft Skills and Interpersonal Communication

Course Objectives	• To encourage the all-round development of students by focusing on soft skills. • To make the engineering students aware of the importance, the role and the content of soft skills through instruction, knowledge acquisition, demonstration and practice. • To develop and nurture the soft skills of the students through individual and groupactivities. • To expose students to right attitudinal and behavioral aspects and to build the same throughactivities
Course Outcomes	On completion of the course, student will be able to– • Effectively communicate through verbal/oral communication and improve the listening skills • Write precise briefs or reports and technical documents • Actively participate in group discussion / meetings / interviews and prepare & deliver presentations • Become more effective individual through goal/target setting, self-motivation and practicing creative thinking. • Function effectively in multi-disciplinary and heterogeneous teams through the knowledgeof team work, Inter-personal relationships, conflict management and leadership quality.

DETAILED CONTENT

Module 1:
SELF ANALYSIS SWOT Analysis, Who am I, Attributes, Importance of Self Confidence, Self Esteem.

Module 2:
CREATIVITY Out of box thinking, Lateral Thinking.

Module 3:
ATTITUDE Factors influencing Attitude, Challenges and lessons from Attitude, Etiquette.

Module 4:
MOTIVATION Factors of motivation, Self talk, Intrinsic & Extrinsic Motivators.

Module 5:
GOAL SETTING Wish List, SMART Goals, Blue print for success, Short Term, Long Term, Life Time Goals.
Time Management Value of time, Diagnosing Time Management, Weekly Planner to do list, Prioritizing work.

TEXT BOOK: SOFT SKILLS, 2015, Career Development Centre, Green Pearl Publications .

REFERENCES:

1. Covey Sean, Seven Habits of Highly Effective Teens, New York, Fireside Publishers, 1998.

2. Carnegie Dale, How to win Friends and Influence People, New York: Simon & Schuster, 1998.

3. Thomas A Harris, I am ok, You are ok , New York-Harper and Row, 1972 4. Daniel Coleman, Emotional Intelligence, Bantam Book, 2006

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(OPEN ELECTIVE-II) CSE-712: Management Information System

Course Objectives	• To learn different types of information systems in an organization • To understand various MIS operating in functional areas of an organization and explain its relationship with the various activities of the organization. • To know how MIS is developed and implemented for various levels in anorganization.
Course Outcomes	• Understand information systems and their uses. • Use computerized management information systems. • In-depth analysis and decision making. • Aware of security issues related to information systems.

DETAILED CONTENT

Module 1:

The Need for Information Systems: Digital Convergence and the changing Business Environment; Information and Knowledge Economy; Contemporary approach to IS and Management challenges.

Information systems in the Enterprise: Types of Information Systems in the Organisation; TPS, DSS, MIS and ESS. Functional Perspective of IS; Enterprise systems; Strategic Uses of Information systems; Economic Organisational and Behavioural Impacts; IT impact on decision Making; Leveraging Technology in the value chain; MIS and Core competencies; Strategic Information Systems SIS.

Module 2:

Electronic Commerce and the Digital Organisation: Internet based Business Models. B2B, EDI and B2C Models. Role of Intranets.Business Hardware Software and IT Infrastructure: Evolution of IT Infrastructure; Moore's law, law of Mass Digital Storage; IT infrastructure components; Current trends in Hardware Platforms.; Enterprise Software; Groupware.

Module 3:

Business Networks and Telecommunications: Communication technologies in Business, Videoconferencing, Wireless Payments; Bandwidth and Media; Networks and their Types; Protocols. Internet networking Services.; Future of Networking Technologies; Broadband telephony, VOIP, RFID and convergenceDatabases and Data Warehouses: Traditional vs. Database approach; Database Models, relational Model, and Object Oriented Model. Relational Operations SQL; Data Modelling; Databases on the Web; Data Warehousing.

Module 4:

The Wireless Revolution: Introduction. Business Value. Wi-Max and EVDO; M- Commerce; Applications in CRM , Supply Chain and Healthcare.Enhancing decision making for the Digital firm: Decision making and Decision support systems; Business intelligence and decision support; business decision making and the

decision making process;GDSS, GIS.

Module 5:

Managing knowledge in the Digital Firm: knowledge Management system, Enterprise-wide knowledge management systems.Redesigning the Organization with Information Systems: BPR and Process Improvement;Systems Analysis, System Design; Alternative system Building Approaches; Management Opportunities Challenges and solutions.

REFERENCES:

1. Kenneth C Laudon and Jane P Laudon, Management Information Systems – Managing the Digital Firm, 9th Ed. Pearson Education Asia, New Delhi, 2007.

B.Tech C.S.E

VIII SEMESTER

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(ELECTIVE-VI) CSE-801: Image Processing

Course Objectives	The objectives of the course are:
	• Provide the student with the fundamentals of digital image processing.
	• Give the students a taste of the applications of the theories taught in the subject. This will be achieved through the project and some selected lab sessions.
	• Introduce the students to some advanced topics in digital image processing.
	• Give the students a useful skill base that would allow them to carry out further studyshould they be interested and to work in the field..
Course Outcomes	Upon successfully completing the course , the student should:
	• Have an appreciation of the fundamentals of digital image processing including the topics of filtering, transforms and morphology, and image analysis and compression.
	• Be able to implement basic image processing algorithms in MATLAB.
	• Have the skill base necessary to further explore advance the topics of digital image processing.
	• Be in a position to make a positive professional contribution in the field of digital image processing.
	• At the end of course the student should have a clear impression of the breadth and practical scope of digital image processing and have arrived at a level of understandingthat is the foundation for most of the work currently underway in this field..

DETAILED CONTENT

Module 1: Introduction to Image Processing

Image formation, image geometry perspective and other transformation, stereo imaging elements of visual perception.Digital Image-sampling and quantization serial & parallel Image processing.

Module 2: Image Restoration

Image Restoration-Constrained and unconstrained restoration Wiener filter, motion blur remover, geometric and radiometric correction Image data compression-Huffman and other codes transform compression, predictive compression two tone Image compression, block coding, run length coding, and contour coding.

Module 3: Segmentation Techniques

Segmentation Techniques-thresh holding approaches, region growing, relaxation, line and edge detection approaches, edge linking, supervised and unsupervised classification techniques, remotely sensed image analysis and applications, Shape Analysis – Gestalt principles, shape number, moment Fourier and other shape descriptors, Skelton detection, Hough trans-form, topological and texture analysis, shape matching.

Module 4: Pattern Recognition

Basics of pattern recognition, Design principles of pattern recognition system, Learning and adaptation, Pattern recognition approaches, Mathematical foundations – Linear algebra, Probability Theory, Expectation, mean and covariance, Normal distribution, multivariate normal densities, Chi squared test.

Module 5: Statistical Patten Recognition

Bayesian Decision Theory, Classifiers, Normal density and discriminant functions, Parameter estimation methods: Maximum-Likelihood estimation, Bayesian Parameter estimation, Dimension reduction methods – Principal Component Analysis (PCA), Fisher Linear discriminant analysis, Expectation-maximization (EM), Hidden Markov Models (HMM), Gaussian mixture models.

TEXT BOOKS

1. Digital Image Processing – Ganzalez and Wood, Addison Wesley, 1993.
2. Fundamental of Image Processing – Anil K.Jain, Prentice Hall of India.
3. Pattern Classification – R.O. Duda, P.E. Hart and D.G. Stork, Second Edition John Wiley, 2006

REFERENCE BOOKS

1. Digital Picture Processing – Rosenfeld and Kak, vol.I & vol.II, Academic,1982
2. Computer Vision – Ballard and Brown, Prentice Hall, 1982
3. An Introduction to Digital Image Processing – Wayne Niblack, Prentice Hall, 1986
4. Pattern Recognition and Machine Learning – C. M. Bishop, Springer, 2009.
5. Pattern Recognition – S. Theodoridis and K. Koutroumbas, 4th Edition, Academic Press,2009

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(ELECTIVE-VI) CSE-802: Data Mining

Course Objectives	• Introduction to the field of data mining (also known as knowledge discovery from data, or KDD for short). • It focuses on fundamental data mining concepts and techniques for discovering interesting patterns from data in various applications. • It emphasizes techniques for developing effective, efficient, and scalable data mining tools.
Course Outcomes	After completion of this course the student should be able to: • Understand what Is Data Mining, what kinds of data can be mined, what kinds of patterns can be mined, and what kinds of applications are targeted. • Explain major Issues in data mining. • Applymachine learning, pattern recognition, statistics, visualization, algorithm, databasetechnology and high-performance computing in data mining applications. • Identify what kinds of technologies are used for different application. • Manipulate data preprocessing, data Warehouse and OLAP technology, data cube technology;mining frequent patterns andassociation, classification, clustering, and outlier detection..

DETAILED CONTENT

Module 1:

Introduction to Data Mining: Introduction, What is Data Mining, Definition, KDD,Challenges, Data Mining Tasks, Data Preprocessing, Data Cleaning, Missing data, Dimensionality Reduction, Feature Subset Selection, Discretization and Binaryzation, Data Transformation; Measures of Similarity and Dissimilarity- Basics.

Module 2:

Association Rules: Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation; APRIOIRI Algorithm, The Partition Algorithms, FP-Growth Algorithms, Compact Representation of Frequent Item Set- Maximal Frequent Item Set, Closed Frequent Item Set.

Module 3:

Classification: Problem Definition, General Approaches to solving a classification problem ,Evaluation of Classifiers , Classification techniques, Decision Trees-Decision tree Construction , Methods for Expressing attribute test conditions, Measures for Selecting the Best Split, Algorithm for Decision tree Induction ; Naive-Bayes Classifier, Bayesian Belief Networks; K- Nearest neighbor classification-Algorithm and Characteristics.

Module 4:

Clustering: Problem Definition, Clustering Overview, Evaluation of Clustering Algorithms, Partitioning Clustering-K-Means Algorithm, K-Means Additional issues, PAM Algorithm;Hierarchical Clustering-Agglomerative Methods and divisive methods, Basic Agglomerative Hierarchical Clustering Algorithm, Specific techniques, Key Issues in Hierarchical Clustering, Strengths and Weakness; Outlier Detection.

Module 5:

Web and Text Mining: Introduction, web mining, web content mining, web structure mining, we usage mining, Text mining –unstructured text, episode rule discovery for texts, hierarchy of categories, text clustering.

TEXT BOOKS:

1. Data Mining- Concepts and Techniques- Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition, 2006.
2. Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbanch, Pearson Education.
3. Data mining Techniques and Applications, Hongbo Du Cengage India Publishing.

REFERENCES:

1. Data Mining Techniques, Arun K Pujari, 3rd Edition, Universities Press.
2. Data Mining Principles & Applications – T.V Sveresh Kumar, B.Esware Reddy, Jagadish S Kalimani, Elsevier.
3. Data Mining, Vikaram Pudi, P Radha Krishna, Oxford University Press

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(ELECTIVE-VI) CSE-803: VLSI System Design

Course Objectives	• To use modeling of the various semiconductor devices for digital VLSI circuit design. • To comprehend static and dynamic CMOS logic circuits. • To learn MOS Memory design. • To build upon the theoretical, mathematical and physical analysis of digital VLSI circuits, for proper understanding of concept, working, analysis and design. • To analyses the designed digital circuits and their verification.
Course Outcomes	Upon successful completion of the course, the students will be able to: • Classify ICs, static and dynamic VLSI design techniques. • Design any CMOS digital VLSI combinatorial and sequential circuits. • Design, analyze and verify digital logic circuits and MOS memories as well as Physical layout designing of circuits. • Model the CMOS circuits with equivalent parameters. • Build upon the theoretical & mathematical models using design principles, for proper understanding of VLSI circuits.

DETAILED CONTENT

Module 1: Introduction
Introduction to Computer-aided design tools for digital systems. Hardware description languages, Introduction to VHDL, Data objects, Classes and data types, Operators, Overloading, Logical operators. Types of delays, Entity and Architecture declaration.Introduction to behavioral, dataflow and structural models.

Module 2: VHDL Statements
Assignment statements, sequential Statements and process, Conditional statements, Case statements, Array and loops, Resolution functions, Packages & Libraries, Concurrent statements.

Module 3: Combinational Circuit Design
VHDL models and simulation of combinational circuits such as Multiplexers, Encoders, Decoders, Code converters, Comparators, Implementation of Boolean functions etc.

Module 4: Sequential Circuit Design
VHDL Models and simulation of sequential circuits, Shift registers, Counters etc.

Module 5: Design of Microcomputer
Basic components of a computer, Specifications, Architecture of a simple Microcomputer system, Implementation of a simple microcomputer system using VHDL.

Module 6: Design with CPLDs and FPGAs
Programmable logic devices: ROM, PLAs, GAL, PEEL, CPLDs and FPGA. Design and implementation using CPLDs and FPGAs

TEXT/REFERENCE BOOKS:

1. IEEE Standard VHDL Language reference Manual(1993)
2. Digital Design & Modelling with VHDL &Synthesis : KC Chang; IEEE Computer Society Press.
3. "A VHDL Primmer": Bhasker; Prentice Hall 1995
4. "Digital System Design using VHDL":Charles. H. Roth; PWS(1998)
5. "VDHL-Analysis & Modelling of Digital Systems": Navabi Z; McGraw Hill
6. VHDL-IV Edition:Perry; TMH(2002)
7. "Introduction to Digital Systems": Ercegovac. Lang & Moreno; John wiley(1999)
8. Fundamentals of Digital Logic with VHDL Design: Brown and Vranesic; TMH(2000)
9. Modern Digital Electronics-III Edition : R.P Jain; TMH(2003)

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(ELECTIVE-VI) CSE-804: Data Analytics

Course Objectives	- To optimize business decisions and create competitive advantage with Big Data analytics - To explore the fundamental concepts of big data analytics. - To learn to analyze the big data using intelligent techniques. - To understand the various search methods and visualization techniques. - To learn to use various techniques for mining data stream. - To understand the applications using Map Reduce Concepts. - To introduce programming tools PIG & HIVE in Hadoop echo system.
Course Outcomes	Students will be able to: - Work with big data platform and explore the big data analytics techniques business applications. - Design efficient algorithms for mining the data from large volumes. - Analyze the HADOOP and Map Reduce technologies associated with big data analytics. - Explore on Big Data applications Using Pig and Hive. - Understand the fundamentals of various big data analytics techniques. - Build a complete business data analytics solution.

DETAILED CONTENT

Module 1:
Descriptive Statistics: Introduction to the course Descriptive Statistics Probability Distributions
Inferential Statistics: Inferential Statistics through hypothesis tests Permutation & Randomization Test

Module 2:
Regression & ANOVA: Regression ANOVA(Analysis of Variance)
Machine Learning: Introduction and Concepts: Differentiating algorithmic and model based frameworks Regression : Ordinary Least Squares, Ridge Regression, Lasso Regression, K Nearest Neighbours Regression & Classification.

Module 3:
Supervised Learning with Regression and Classification techniques -1 : Bias-Variance Dichotomy, Model Validation Approaches, Logistic Regression, Linear Discriminant Analysis, Quadratic Discriminant Analysis, Regression and Classification Trees, Support Vector Machines.

Module 4:
Supervised Learning with Regression and Classification techniques -2: Ensemble Methods: Random Forest, Neural Networks, Deep learning.
Unsupervised Learning and Challenges for Big DataAnalytics: Clustering Associative Rule Mining

Challenges for big data anlalytics.

Module 5:

Prescriptive analytics: Creating data for analytics through designed experiments, Creating data for analytics through Active learning, Creating data for analytics through Reinforcement learning.

REFERENCES:

1. Hastie, Trevor, et al. The elements of statistical learning.Vol. 2.No. 1. New York: springer, 2009.
2. Montgomery, Douglas C., and George C. Runger.Applied statistics and probability for engineers. John Wiley & Sons, 2010

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(OPEN ELECTIVE-III) CSE-805: Linux Administration and Shell Programming

Course Objectives	- To teach principles of operating system including File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking Commands, Basic Linux commands, Scripts and filters. - To familiarize fundamentals of the Bourne again shell (bash), shell programming, pipes, input and output redirection Control structures, arithmetic in shell interrupt processing, functions, debugging shell scripts. - To impart fundamentals of file concepts kernel support for file, File structure related system calls (file API's). - To facilitate students in understanding Inter process communication. - To facilitate students in understanding semaphore and shared memory. - To facilitate students in understanding process.
Course Outcomes	- Ability to use various Linux commands that are used to manipulate system operations at admin level and a prerequisite to pursue job as a Network administrator. - Ability to write Shell Programming using Linux commands. - Ability to design and write application to manipulate internal kernel level Linux File System. - Ability to develop IPC-API's that can be used to control various processes for synchronization.

DETAILED CONTENT

Module 1:Introduction
History of Linux, Linux Overview, Linux releases, Open Linux.
Installing Linux
Hardware, Software and information requirements: opening disk for Linux portions, creating the open Linux install disks, installing Linux, Installing and configuring X-Window, installing sound drivers.

Module 2: Linux Startup and Setup
User accounts, accessing the Linux system, Linux commando, online manual, online documentation, installing software packages, remote communications, internet connection with modem, email.

Module 3: Shell
The command line special characters and file arguments, standard input/ output and redirection, pipes, redirecting and piping with standard errors, shell script, jobs.

Module 4: Linux File Structure
Linux files, file structure, listing displaying and printing files, making directories, file and directory operations.
Vi Editor
Vi editing commands, advanced VI editing commands, line editing commands, options in Vi.

Module 5: System Administration

System management, managing users, installing and managing devices, floppy disk management, file system administration, backups.

TEXT/REFERENCE BOOKS:

1. Linux- The complete Reference by Richard Peterson, Tat McGraw Hill, New Delhi
2. Linux- Install and configuration Black Book by Dee Ann Leblanc and Isaak Yates, IDG Books India Private Ltd. Delhi
3. Unleashed Linux by Tech Media Publishers.

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(OPEN ELECTIVE-III) CSE-806: History of Science and Engineering

Course Objectives	The main objective of this course is to allow the students to have a glimpse into both the history of the world and into just how we discovered everything we know about the world.
Course Outcomes	By the end of the course, you will be able to: • Identify major changes in science and technology over time; • Identify sources and methods used in historical writing and critically assess the validity of arguments in the history of science and technology. • Describe how central ideas in science and technology, such as discovery, innovation, modernity, risk, etc., have been historically and socially constructed; • Explain how understanding the historical dimensions of issues with contemporary significance can inform responsible actions in the present.

DETAILED CONTENT

Module 1: Science and Technology- The Beginning
Development in different branches of Science in Ancient India: Astronomy, Mathematics, Engineering and Medicine. Developments in metallurgy: Use of Copper, Bronze and Iron in Ancient India. Development of Geography: Geography in Ancient Indian Literature.

Module 2: Developments in Science and Technology in Medieval India
Scientific and Technological Developments in Medieval India; Influence of the Islamic world and Europe; The role of maktabs, madrasas and karkhanas set up. Developments in the fields of Mathematics, Chemistry, Astronomy and Medicine. Innovations in the field of agriculture - new crops introduced new techniques of irrigation etc.

Module 3: Developments in Science and Technology in Colonial India
Early European Scientists in Colonial India- Surveyors, Botanists, Doctors, under the Company's Service. Indian Response to new Scientific Knowledge, Science and Technology in Modern India. Development of research organizations like CSIR and DRDO; Establishment of Atomic Energy Commission; Launching of the space satellites.

Module 4: Prominent scientist of India since beginning and their achievement
Mathematics and Astronomy: Baudhayan, Aryabhtatta, Brahmgupta, Bhaskaracharya, Varahamihira, Nagarjuna. Medical Science of Ancient India (Ayurveda & Yoga): Susruta, Charak, Yoga & Patanjali. Scientists of Modern India: Srinivas Ramanujan, C.V. Raman, Jagdish Chandra Bose, Homi Jehangir Bhabha and Dr. Vikram Sarabhai.

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(OPEN ELECTIVE-III) CSE-807: Comparative Study of Literature

Course Objectives	The objective of this course is to to provide students with broad general issues linked with key areas of study within Comparative Literature.
Course Outcomes	The students will able to • Comparative Literature traces the transformations and travels of literary genres and texts across time and space. • Explore the connections of literature with history, philosophy, politics, and literary theory.

DETAILED CONTENT

Module 1:

History of Comparative Literature: (i) Theory and Method of Comparative Literature (ii) Comparative Literature and Theory (iii) Comparative Literature from Alternative Perspectives/ Contemporary Issues in Comparative Literature

Module 2:

Thematology: (i) Definition of Key Terms (ii) Myth and Reworking of Myths (iii) Theme and Interpretation/Issues in Rewritings

Module 3:

Genology: (i) Genology in the West – bases of categorisation (ii) Genology in India – bases of categorisation (iii) Modern Perspectives on Genology / Genres and Countergenres / (iv) The Peripheral and the Canonical

Module 4:

Historiography: (i) Conceptualisation of 'Time' in Non-Western and Western Culture and Literary History (ii) Issues in Periodisation / Reading History from Below (iii) Writing Cultural History in Post-colonial Countries

Module 5:

Inter-literary Studies: (i) Definition of Terms (ii) The Aesthetics of Reception (The Constance School)/ Literary Comparatistics (Dionysz Durisin) (iii) Polysystem: Relations and Inferences / Reception in the Context of Post-Colonial Countries

Suggested Books:

- Susan Bassnett, Comparative Literature: A Critical Introduction, Oxford UK and Cambridge USA, Blackwell, 1993;
- Charles Bernheimer, Comparative Literature in the Age of Multiculturalism,Baltimore, Johns Hopkins

UP, 1995;
- Amiya Dev, The Idea of Comparative Literature in India, Calcutta, Papyrus, 1984;
- Amiya Dev and Sisir Kumar Das(eds), Comparative Literature:Theory and Practice, Shimla, IIAS, 1989;
- Claudio Guillen, The Challenge of Comparative Literature, Cambridge, Harvard UP, 1993.;

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(OPEN ELECTIVE-IV) CSE-808: Cryptography and Network Security

Course Objectives	• To know about various encryption techniques. • To understand the concept of Public key cryptography. • To study about message authentication and hash functions • To impart knowledge on Network security
Course Outcomes	After successful completion of the course, the learners would be able to • Classify the symmetric encryption techniques • Illustrate various Public key cryptographic techniques • Evaluate the authentication and hash algorithms. • Discuss authentication applications • Summarize the intrusion detection and its solutions to overcome the attacks. • Basic concepts of system level security.

DETAILED CONTENT

Module 1: INTRODUCTION
Security trends - Legal, Ethical and Professional Aspects of Security, Need for Security at Multiple levels, Security Policies - Model of network security – Security attacks, services and mechanisms – OSI security architecture – Classical encryption techniques: substitution techniques, transposition techniques, steganography-Foundations of modern cryptography: perfect security – information theory – product cryptosystem – cryptanalysis.

Module 2: SYMMETRIC KEY CRYPTOGRAPHY
MATHEMATICS OF SYMMETRIC KEY CRYPTOGRAPHY: Algebraic structures - Modular arithmetic-Euclid's algorithm- Congruence and matrices - Groups, Rings, Fields- Finite fields- SYMMETRIC KEY CIPHERS: SDES – Block cipher Principles of DES – Strength of DES – Differential and linear cryptanalysis - Block cipher design principles – Block cipher mode of operation – Evaluation criteria for AES – Advanced Encryption Standard - RC4 – Key distribution.

Module 3: PUBLIC KEY CRYPTOGRAPHY
MATHEMATICS OF ASYMMETRIC KEY CRYPTOGRAPHY: Primes – Primality Testing – Factorization – Euler's totient function, Fermat's and Euler's Theorem - Chinese Remainder Theorem – Exponentiation and logarithm - ASYMMETRIC KEY CIPHERS: RSA cryptosystem – Key distribution – Key management – Diffie Hellman key exchange - ElGamal cryptosystem – Elliptic curve arithmetic-Elliptic curve cryptography.

Module 4: MESSAGE AUTHENTICATION AND INTEGRITY
Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – SHA –Digital signature and authentication protocols – DSS- Entity Authentication: Biometrics, Passwords, Challenge Response protocols- Authentication applications - Kerberos, X.509

Module5: SECURITY PRACTICE AND SYSTEM SECURITY
Electronic Mail security – PGP, S/MIME – IP security – Web Security - SYSTEM SECURITY: Intruders –

Malicious software – viruses – Firewalls.

TEXT BOOK:

1. William Stallings, Cryptography and Network Security: Principles and Practice, PHI 3rd Edition, 2006.

REFERENCES:

1. C K Shyamala, N Harini and Dr. T R Padmanabhan: Cryptography and Network Security, Wiley India Pvt.Ltd
2. BehrouzA.Foruzan, Cryptography and Network Security, Tata McGraw Hill 2007.
3. Charlie Kaufman, Radia Perlman, and Mike Speciner, Network Security: PRIVATE Communication in a PUBLIC World, Prentice Hall, ISBN 0-13-046019-2.

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(OPEN ELECTIVE-IV) CSE-809: Economic Policies in India

Course Objectives	The main objective of this course is to take care of the basic parameters of the Indian Economy.
Course Outcomes	- Students will learn how to think critically about public policy issues. - It will help in understanding how microeconomic concepts can be applied to the analysis of a variety of public policy issues. - The course will help in anticipating aggregative economics analyses and establishing thefunctional relationship between the large aggregates.

DETAILED CONTENT

Module 1:
Macroeconomic Policies and Their Impact Fiscal Policy; trade and investment policy; financial and monetary policies; labour regulation.

Module 2:
Policies and Performance in Agriculture Growth; productivity; agrarian structure and technology; capital formation; trade; pricing and procurement.

Module 3:
Policies and Performance in Industry Growth; productivity; diversification; small scale industries; public sector; competition policy; foreign investment.

Module 4:
Trends and Performance in Services

Readings:
1. Shankar Acharya, 2010, ―Macroeconomic Performance and Policies 2000-8,‖ in Shankar Acharya and Rakesh Mohan, editors, India's Economy: Performances and Challenges: Development and Participation, Oxford University Press.
2. Rakesh Mohan, 2010, ―India's Financial Sector and Monetary Policy Reforms,‖ in Shankar Acharya and Rakesh Mohan, editors, India's Economy: Performances and Challenges: Development and Participation, Oxford University Press.
3. Pulapre Balakrishnan, Ramesh Golait and Pankaj Kumar, 2008, ―Agricultural Growth in India Since 1991, RBI DEAP Study no. 27.
4. B.N. Goldar and S.C. Aggarwal, 2005, ―Trade Liberalisation and Price-Cost Margin in Indian Industries, The Developing Economics, September.
5. P. Goldberg, A. Khandelwal, N. Pavcnik and P. Topalova, 2009, ―Trade Liberalisation and New Imported

Inputs, American Economic Review, Papers and Proceedings, May.

6. Kunal Sen, 2010, ―Trade, Foreign Direct Investment and Industrial Transformation in India, ‖in Premachandra Athukorala, editor, The Rise of Asia, Routledge.

7. A. Ahsan, C. Pages and T. Roy, 2008, ―Legislation, Enforcement and Adjudication in Indian Labour Markets: Origins, Consequences and the Way Forward, in D. Mazumdar and S. Sarkar, editors, Globalization, Labour Markets and Inequality in India, Routledge.

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(OPEN ELECTIVE-IV) CSE-810: Software Project Management

Course Objectives	The students will be able to:
	• Prescribe the conventional and evolution of software.
	• Resolve the process of managing software from conventional to modern.
	• Analyze the architecture of a model based software and the process flow.
	• Describe the process automation, process management and its discriminants.
	• Review the economics for the next generation software.
Course Outcomes	At the end of the course, the student will be able to:
	• Develop the model from the conventional software product to the modern.
	• Analyze and design the software architecture.
	• Have an exposure for organizing and managing a software project.
	• Apply, analyze, design and develop the software project.
	• Design various estimation levels of cost and effort.
	• Acquire the knowledge of managing, economics for conventional, modern and future software projects.
	• Categorize various peer instruction levels.
	• Sketch various artifacts sets for better understanding of software development.

DETAILED CONTENT

Module 1: Introduction to Project Management
Project Management Concepts; define the characteristics of a project. Explain the need for project Management. Compare and contrast the roles of project managers in organizational environments. Describe the system development cycle. Explain the roles of System analysis and System.

Module 2: Software Project planning
Project activities, and work breakdown structure, produce a statement of a work (SOW) and decompose overall project goals. Develop a work breakdown structure (WBS), using established tools and techniques, to achieve stated project objectives.

Module 3: Project Management Plan
Project scheduling and tracking techniques, produce a task flow network, using established tools and techniques and analyze the contingencies, interrelationship and critical paths of the work elements. Produce a Gantt chart, using established tools and techniques, to schedule the completion of all work elements.

Module 4: Project Economics
Project costing, project estimation techniques, automated estimation tools. Develop cost estimates and budgets with cost accounts to plan project expenditures.

Module 5: Project Control and Closure

Define the concept of earned value performance measurement. Describe how project management information system (PMIS) are used to monitor, evaluate, and control planned cost and schedule performance. Project management issues with regards to new technologies.

TEXT BOOKS:
1. Mathur, "S.S Principles of Management"
2. Robbin. S.P."Organisational Behavior"
3. Prof KK Aggarwal & Yogesh Singh:Software ENGG
4. Pankaj Jalote." An integrated Approach to Software Engg" Narosa Publishing House, New Delhi Pressman "Principles of Software Engg" TMC, 5th Ed.2005