

CURRICULUM
FOR
BACHELOR OF TECHNOLOGY IN
COMPUTER SCIENCE & ENGINEERING

SRI SAI UNIVERSITY PALAMPUR

HP (INDIA)

JULY 2012

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Foreword

Sri Sai University Palampur Himachal Pradesh has been established with a purpose of empowering people. The Vision and Mission of the university are:-

- **Vision**

To provide quality education for developing all round personality of students through curricular, co-curricular and extracurricular activities to meet ever growing manpower requirements of industry and other sectors of economy as per national priorities.

- **Mission**

- a. To establish institutions for imparting quality education.
- b. To promote creative and innovative research and development.
- c. To ensure quality education by periodic review of curricula through industry- institute interaction.
- d. To make efforts for updating knowledge of faculty/ staff through quality improvement programmes (Training and retraining)
- e. To promote employability through development of requisite competency skills.
- f. To work for cause of weaker sections, physically challenged and women welfare through education and enlightenment.
- g. To make life healthier, better and modern by inculcating in students Indian values/ heritage.
- h. To bring about out a holistic development of society by educating individuals.

At present programmes in Civil Engineering, Electrical Engineering, Mechanical Engineering, Electronics & Communication Engineering and Computer Science Engineering are being run here to develop manpower having global perspective, faith in our Indian values and culture and competencies desired for profession. In order to keep curriculum relevant and up to date, the University created a position of 'Director Curriculum Development' supported by Board of Studies of different discipline. The objective of this is to make teachers and students to become active partners in design of curriculum and instruction.

Director, Curriculum Development has involved Vice Chancellor, Executive Director and senior faculty members of SSU Palampur and Engineering & Technology Colleges at Pathankot and Amritsar in the revision of curriculum . This has created awareness and importance of systematic curriculum design seminar of various programmes and role expected from all the stake holders.

This curriculum has been designed by taking into account incorporating the existing programmes as being run at SSU Palampur and referring to courses of Punjab Technical University, Jalandhar; various IITs; VIT Vellore; Jamia Milia Islamabad New Delhi; PEC University of technology, Chandigarh and innovations undertaken by NITTTR Chandigarh in curriculum design. Hope this Curriculum will bring desired results.

Dr Naresh Nagpal

Executive Director

Sri Sai Group of Institutes

Corporate office, Chandigarh.

PREFACE

Curriculum is a plan comprising of learning experiences; to be given to students for developing competencies as desired by the 'world of work' in their professional life. Curriculum for SSU programmes has been designed with active involvement of the faculty and other stake holders. This process of designing the curriculum was a unique learning experience for all those involved in the process and understands the meaning and importance of scientific and systematic design of curriculum. A group of teachers provided feedback to the coordinator to up to date Curriculum. This group also scanned employment opportunities and job skills expected from an engineering graduate for inclusion in the curriculum, so as to make it relevant. This resulted in developing in the faculty a sense of ownership due to their involvement in the process.

The steps followed in the design of Curriculum of the degree programme were:

- I. Discussions of Director, Curriculum Development with Chancellor, Vice Chancellor and Executive Director regarding their views on their Vision and Mission of the University vis a vis constraints of programme as well as expectations of Director, Curriculum Development.
- II. Orientation programme for senior faculty of SSU to educate them about a rational approach to Curriculum design and to know about their experience of implementing the existing curriculum.
- III. Interaction with the faculty from various Institutions to know their view point on their specific discipline, areas of employment, profile of an engineer and curriculum etc.
- IV. Analyze the guidelines given by AICTE. ABET and NBA for programme accreditation so as to adhere to the norms and standards for Curriculum of Engineering Degree programmes.
- V. Analysis of syllabus and test questions of engineering services examination to ensure that designed curriculum includes most of the broad areas and their levels of expectations from fresh graduates.
- VI. SSU faculty prepared Horizontal and Vertical organization of subjects of curriculum and learnt about taking decision on various components of Curriculum and their articulation and importance in terms of time. They also understood the logical and chronological placement of subjects in the whole Curriculum.
- VII. A workshop was organized at SSCET Pathankot for having understanding of the common features of the programmes; present syllabus being followed at SSU, difference between PTU Curriculum and SSU curriculum and innovation possible in implementation of curriculum.
- VIII. Feedback was collected from coordinators of SSU programmes on the aspects given in VII so as to incorporate these in Curriculum document.
- IX. Obtain opinion of experts from industry and academic on the proposed curriculum for degree programme in different discipline of Engineering.
- X. The curriculum documents were subsequently validated and finalized in consultation with SSU Faculty.

Curriculum provides requisite experiences to students through formal, nonformal and informal activities towards development of occupational, personal, social and continuing learning skills for making students employable. Focus of teachers and students is all the time to active the objective and outcome of the programme stated in the document. Students are made responsible for their learning and teachers become facilitators in this process.

During the design of the curriculum, the constraints of resources of the system in which this curriculum has to be implemented have been considered. It is hoped that with the support of enlightened administration and motivated faculty, innovative methodology will be adopted in teaching-learning process for providing desired learning experiences to the students as stated in curriculum documents.

PROF. Y. K. ANAND

DIRECTOR, CURRICULUM DEVELOPMENT

SRI SAI GROUP OF INSTITUTES

CORPORATE OFFICE

SCO 40-41, THIRD FLOOR

SECTOR 17A

CHANDIGARH-160017

1. SALIENT FEATURES OF THE PROGRAMME

1. Name of the programme : B. Tech in Computer Science Engineering
2. Duration of the programme: : 4years
3. Entry Qualification : 12+ Physics, Chemistry and Mathematics
4. Pattern of Programme : Semester system (8 Semesters)
5. Duration of the Semester : 16 weeks
6. Total hours per week: : 32 to 36 hours
7. Ecological and Environmental Awareness Camp and follow up : Second Semester (2-3) days

8. Entrepreneurship Development Camp and follow up : Fifth Semester (2-3)days

9. Industrial Training : *Workshop Practice of 4 weeks during summer vacation after second semester. It will also include Industrial exposure/tour also.
 - Industrial Training of Six weeks duration in summer vacation after fourth semester
 - Industrial Training of six months during seventh / eighth semester.

10. Student centered activity S.C.A will include : *library study/ independent study for searching and organization Information for use.
 - Library study
 - Market survey
 - Information search (industry/ in trust)
 - Seminar
 - Expert lectures
 - Camp for ecology & Environmental awareness, entrepreneurship development and personality development.

2. JOB OPPORTUNITIES

- Start as development engineers and graduate to higher career options as architects, technical leaders and managers.
- As Design Engineers, Computing/ IT Consultants, Solution Developers and Entrepreneurs.
- As System / Network Administrators and IT Managers.
- AS faculty in technical education Institutes and researcher in research organisation

3. PROGRAM OUTCOMES FOR B.TECH COURSE IN COMPUTER SCIENCE & ENGINEERING.

- To provide sound knowledge of computing principles and application in scientific and engineering domains.
- To develop students ability to analyze problems and evolve solution in selected areas of computing.
- To expose students to principle and practices of design and development of computing system.
- To enable the identification of new computing trends and understanding of emerging technologies.
- To help students gain the ability to identify, formulate and solve challenging problems in hardware and software system.
- To enable students to succeed in competitive examination like GATE & GRE etc.
- To develop confidence for self education and ability for lifelong learning.
- To develop ability to communicate effectively both verbal and written form.
- To develop capabilities of showing professional and ethical responsibilities.
- To show the understanding of impact of engineering solution on the society and also be aware of contemporary issues.
- To demonstrate knowledge of differential equation, vector calculus, complex variables, matrix theory, probability theory, physics, chemistry and electrical, & electronics engineering.

4. STUDY AND EVALUATION SCHEME (FIRST TO EIGHTH SEMESTER)

FIRST SEMESTER

Sr. No	Subject Title	STUDY SCHEME			EVALUATION SCHEME		
		Hours/ Week			Marks		
		L	T	P	INT	EXT	TOTAL
1.1	Mathematics I	3	1	--	40	60	100
1.2	Basic Electrical engineering	3	1	--	40	60	100
1.3	Physics	3	1	--	40	60	100
1.4	Fundamentals of Computer programming and IT	3	0	--	40	60	100
1.5	Basic of Mechanical Engineering	3	1	0	40	60	100
1.6	Engineering Drawings and Graphics	1	0	6	40	60	100
1.7	Physics Laboratory	--	--	2	30	20	50
1.8	Basic Electrical Engineering laboratory	--	--	2	30	20	50
1.9	Fundamentals of Computer Programming and IT laboratory	--	--	2	30	20	50
1.10	Student Centered Activity	--	--	2			
	Total	16	4	14	330	420	750

SECOND SEMESTER

Sr. No	Course Title	STUDY SCHEME			EVALUATION SCHEME		
		Hours/ Week			Marks		
		L	T	P	INT	EXT	TOTAL
2.1	Mathematics II	3	1	--	40	60	100
2.2	Chemistry	3	1	--	40	60	100
2.3	Basic Electronics Engineering	3	1	--	40	60	100
2.4	Communication Skill	3	0	--	40	60	100
2.5	Basics of civil engineering	3	1	--	40	60	100
2.6	Workshop Practice/ manufacturing Practice	1	0	6	60	40	100
2.7	Chemistry Laboratory	--	--	2	30	20	50
2.8	Communication Laboratory	--	--	2	30	20	50
2.9	Electronics Engineering Laboratory	--	--	2	30	20	50
2.10	Student Centered Activity	--	--	2			
	Total	16	4	14	350	400	750

THIRD SEMESTER

Sr. No	Subject Title	STUDY SCHEME			EVALUATION SCHEME		
		Hours/ Week			Marks		
		L	T	P	INT	EXT	TOTAL
3.1	Computer Organization & architecture	3	1	--	40	60	100
3.2	Data & File Structure	3	0	--	40	60	100
3.3	Operating System Concepts & Networking	3	0	--	40	60	100
3.4	Data Communication & Computer Network	3	1	--	40	60	100
3.5	Digital Circuits & Logic Design	3	0	--	40	60	100
3.6	Organization Behavior	3	1	--	40	60	100
3.7	Data Structure Laboratory	--	--	2	30	20	50
3.8	Operating System Laboratory	--	--	2	30	20	50
3.9	Computer Network Laboratory	--	--	2	30	20	50
3.10	Digital Circuits & Logic Design Laboratory	--	--	2	30	20	50
3.11	Workshop Training marks	--	--	-	50		50
3.12	Student Centered Activity	--	--	2			
	Total	18	3	10	410	440	850

FOURTH SEMESTER

Sr. No	Subject Title	STUDY SCHEME			EVALUATION SCHEME		
		Hours/ Week			Marks		
		L	T	P	INT	EXT	TOTAL
4.1	Microprocessor & its Peripherals	3	1	--	40	60	100
4.2	Introduction to Database Management system	3	0	--	40	60	100
4.3	Object Oriented Programming using C++ and Java	3	0	--	40	60	100
4.4	Computer Network	3	0	--	40	60	100
4.5	Operating System	3	0	--	40	60	100
4.6	Principles of Economics & Management	3	1	--	40	60	100
4.7	Microprocessor & Assembly Language programming Laboratory	--	--	2	30	20	50
4.8	Database Management Laboratory	--	--	2	30	20	50
4.9	Object Oriented Programming using C++ Laboratory	--	--	4	30	20	50
4.10	Computer Network Laboratory	--	--	2	30	20	50
4.11	Operating System Laboratory	--	--	2	30	20	50
4.12	Student Centered Activity	--	--	2			
	Total	18	2	14	390	440	850

FIFTH SEMESTER

Sr. No	Subject Title	STUDY SCHEME			EVALUATION SCHEME		
		Hours/ Week			Marks		
		L	T	P	INT	EXT	TOTAL
5.1	Internet Concept and Web Design	3	--	--	40	60	100
5.2	Principal of Business, Economics and Management	3	1	0	40	60	100
5.3	DBMS	3	1	--	40	60	100
5.4	Design and analysis of Algorithm	3	1	--	40	60	100
5.5	Computer Graphics	3	--	--	40	60	100
5.6	Computer peripheral and Interface	3	1	--	40	60	100
5.7	DBMS Laboratory	--	--	4	30	20	50
5.8	Software Lab(Algorithm)	--	--	2	30	20	50
5.9	Computer Graphics Laboratory	--	--	2	30	20	50
5.10	Internet Laboratory	--	--	2	30	20	50
5.11	Industrial Training marks	--	--	--	40	60	100
5.12	Student Centered Activity	--	--	2			
	Total	18	4	12	420	480	900

SIXTH SEMESTER

Sr. No	Subject Title	STUDY SCHEME			EVALUATION SCHEME		
		Hours/ Week			Marks		
		L	T	P	INT	EXT	TOTAL
6.1	Relational Data Base Management System II	3	1	--	40	60	100
6.2	Artificial Intelligence and Application	3	1	--	40	60	100
6.3	Asynchronous Transfer Mode	3	1	--	40	60	100
6.4	Software Engineering	3	1	--	40	60	100
6.5	Elective I	3	--	--	40	60	100
6.6	Open Elective	3	--		40	60	100
6.7	Hardware Lab (ATM)	--	--	4	30	20	50
6.8	Software Lab (RDBMS II)	--	--	4	30	20	50
6.9	Software Lab(Software Engg)	--	--	2	30	20	50
6.10	General fitness	--	--	--			100
6.11	Student centered Activity	--	--	2			
	Total	18	4	12	330	420	850

Open Elective:

- Computer and Society
- Environmental Science
- Organizational Structure

Elective I

- Computer vision
- System Hardware Design
- Real Time system
- Mobile computing
- Wireless sensor Networks
- Oracle

7 th /8 th Semester			
COURSE TITLE	Marks		
	INT	EXT	TOTAL
(a) Industrial training (sixth months)	300	200	500
(b) Software Training	150	100	250
TOTAL	450	300	750

SEVENTH/ EIGHTH SEMESTER

Sr. No	Subject Title	STUDY SCHEME			EVALUATION SCHEME		
		Hours/ Week			Marks		
		L	T	P	INT	EXT	TOTAL
8.1	Expert system	3	1	--	40	60	100
8.2	Formal Language and Automata Theory	3	1	--	40	60	100
8.3	Linux Administration and Shell Programming	3	--	--	40	60	100
8.4	Multimedia Communication system	4	1	--	40	60	100
8.5	Elective II	3	--	--	40	60	100
8.6	Elective III	3	--	--	40	60	100
8.7	Project		--	8	120	80	200
8.8	Software Project Management	3	1	--			
8.9	General fitness	--	--	--	100		100
8.10	student centered Activity	--	--	2			
	Total	22	4	8	460	440	900

Elective II

- Organizational Structure
- Overview of IT material
- System simulation and Modeling
- Emerging Technology and current IT trends
- VLSI Design
- Multimedia
- Computer Graphics
- Network Security

Elective III

- Graphical user Interface
- IT Application
- DIGITAL Signal Processing
- Advanced Microprocessor
- Symbolic Logic and Logic Processing
- Image Processing and Pattern Recognition

5. DETAILED CONTENT OF VARIOUS SUBJECTS

A. FIRST SEMESTER

1.1 MATHEMATICS-I

MODULE-I

Infinite series: Convergence and divergence of infinite series, geometric series test, comparison tests, p-test, ratio test, root test, Raabe's test, Logarithmic test, Gauss test, Alternating series, power series, radius of convergence, interval of convergence

Differential calculus: Partial derivatives, Homogeneous function, Euler theorem, chain rule, change of variables, Partial differentiation of implicit function, Taylor series of two variables, Maximum and Minimum values of function of two variables, Jacobin, Error and increment .curve tracing.

MODULE-II

Solid Geometry: Sphere, tangent plane, orthogonality, Cone, Cylinder, Quadratic surfaces.

Integral calculus: Rectification, quadrature, volume, Surface area of solid of revolution, double and triple integral, order of integration, change of variables, Application of double and triple integral. beta and gamma function.

MODULE-III

Vector calculus: Differentiation of vector, velocity, acceleration, Scalar and vector field, Gradient of scalar field and directional derivatives, Divergence, Curl of vector field, Physical significance, Integration of vector, Line , surface ,volume integral, Stokes theorem, Divergence theorem, green's theorem

Text Books

1. *Advanced Engg. Mathematics ,R.K.Jain,S.R.K.Iyengar Narosa publication*
2. *Higher Engg. Mathematics,B.S.Grewal,Khann publication*
3. *Higher Engg. Mathematics,N.P.Bali,Laxmi Publication*
4. *Advanced Engg. Mathematics,kreyszig,john wiley and sons*

1.2 BASIC ELECTRICAL ENGINEERING

Introduction: Basic electrical quantities, Electric circuit sources and circuit elements and their behavior (Active and passive).

Supply Systems: AC Supply system (Single phase, three phase–three wire, Three phase–four wire), DC supply system, Their specifications and Comparison. D.C. Networks: Mesh and Nodal Analysis, Star–Delta Transformation, Superposition theorem, Thevenin’s theorem, Norton’s theorem, Maximum power transfer theorem, Step voltage response of RL and RC series circuits.

Sinusoidal Steady-State Response of Circuits: Concept of Phasors, Phasor representation of circuit elements, Complex notation representation, Series and parallel circuits, Power and power factors, Resonance in series and parallel circuits, Balanced 3–phase voltage, Current and power relations, 3–phase power measurement.

Magnetic Circuits: Concept of Magnetic circuits, B–H curve, Calculation of Magnetic Circuits, Iron Losses.

Single–Phase Transformers: Constructional feature, EMF equation, Ideal transformer, Open and short circuit tests, Voltage regulation and efficiency.

Rotating Electrical Machines: Construction, Operating principles and Applications of DC generator, DC motor, Three phase Induction motor and Single phase induction motors.

Measuring Instruments: Voltmeter, Ammeter, Wattmeter, Energy meter.

Batteries: Storage batteries:- Types, construction, charging and discharging, capacity and efficiency **Text books:-**

1. Smith, I.M., Hiley, J. and Brown, K., *Electrical and Electronic Technology*, Dorling Kingsley.
1. Nagrath, I.J. and Kothari, D.P., *Basic Electrical Engineering*, TMH
2. Naidu, M.S. and Kamashaiah, S., *Introduction to Electrical Engineering*, TMH
3. B.L. Theraja & A.K. Theraja, S.Chand: *Electrical Technology*(Vol-1).

Reference Books:-

1.Chakrabarti, A., *Basic Electrical Engineering*, TMH

2.Del Toro, V., *Electrical Engineering Fundamentals*PHI

1. Sawhney A. K . “A Course in electrical and electronic Measurements & Instrumentation” Dhanpat Rai & co

1.3 PHYSICS

MODULE – I

LASER:-Basic concept of Laser, maser, principle of Laser action Population Conversion pumping its types its types. Types of Laser, Solid, gas and , Semiconductor and its application. Holography & its applications.

Optical Fibers:-Basic Principle of Optical fibre, characteristic of Optical fibre. Numerical aperture, graded Index, Step Index, its relation with Δ , propagation of light in Optical fibre. energy loss during propagations (dispersion), optical communication, through free space, wave guide, its applications.

MODULE – II

Special Theory of relativity: Postulates of special theory of relativity, Michelson Morley Experiment, Lorentz Transformation, Length Contraction, Time dilation, addition velocity Relativity of mass Energy equivalence.

Quantum Mechanics: Need of quantum Mechanics, De Broglie wave phase & group velocity, particle diffraction uncertainty principle, the wave equation, postulates of Quantum mechanics. Time dependent and independent schrodinger equation, Expectation values, Eigen value, eigen function, particle in a one dimensional box Finite potential well, Harmonic oscillator.

Quantum Statistics: Fermions & Bosons Symmetric & antisymmetric wave functions, Boltzmann distribution functions, Bose distribution & Fermi distributions function, Comparison of the distributions, Applications of Bose distribution function specific heat of solid Bose-Condensation, Applications of Fermi-distribution functions, Free Electron gas thermionic emission.

MODULE – III

Superconductivity & Magnetism: Basic concept of superconductor, Meissner effect, type I & II superconductors, London equation, BCS Theory, Thermodynamic properties of superconductor Josephson Effect, flux quantization squid, orbital magnetic dipole moments orbital g-factor, magnetic dipole in uniform magnetic field, Electron spin magnetic properties of solid, diamagnetic Theory of para magnetic, susceptibility, Ferro magnetic, Antiferro Magnetic & Ferrimagnetism.

Electro Magnetism: Quantization & conservation of charge, Coulomb's Law, concept of Electric flux, Electric potential conductors, Capacitors, & dielectric materials, magnetic field, Force on a moving charge in a magnetic field, force on current Element, torque on current Loop, Biot Savart Law, Ampere's Law, Electromagnetic Induction & Faradays Law, Magnetism in materials Maxwell equations, Divergence, gradient & Curl and Significance.

Text Books:-

1. *Beiser, A., Concept of Modern Physics, TMH*
2. *Griffiths, D.J., Introduction to Electrodynamics, PHI*
3. *Kittel, C., Introduction to Solid State Physics, Wiley,*
4. *Thyagarajan K & A K Ghatak, Lasers, , Macmillan India Ltd. Bangalore.*
5. *Gerd Keiser Optical Fibre Communication, TMH*
6. *Arora C.L. Practical Physics, S. Chand & Co.*

Reference Books:-

1. *Rao, C.K, Optical Fibre System, Mc Graw Hill.*
2. *Sirohi R.S., Practical Physics, R.S. Sirohi, Wiley Eastern.*
3. *Modern Physics, H.C.Ohanian, Prentice Hall.*

1.4 FUNDAMENTAL OF COMPUTER PROGRAMMING & IT

Introduction: Elements of computer processing, Hardware and software, Introduction and feature wise comparison of various Operating Systems, Including DOS, Windows and Linux, Problem solving-algorithms and flowcharts.

C Programming Basics: Basic program construction, Structure of a C program, Compilation process. Various compilers available on different OS/ environments including Turbo C, Borland C, gc, gcc, MSVC. Console I/O (printf, scanf), preprocessor directives, Comments, Data types, Type conversions, Operators - arithmetic, Relational, Logical, Conditional, Increment/decrement, Library functions, Header files.

Loops and Decision Statements: *for* loop, *while* loop, *do* loop, Various forms of *if* statement, *switch* statement, *break* statement, *continue* statement, *goto* statement, arrays and strings, Declaring an array, Initializing arrays, Accessing the array elements, Working with multidimensional arrays, Declaring and initializing string variables, Arithmetic operations on characters, String handling functions (string.h), Pointers, Pointers to pointers, Declaring and initializing pointers, Pointer expressions, Pointer increment and scale factor, Pointers and arrays, Pointers and strings.

Functions: Defining functions, Passing arguments to functions, Returning values from functions, Reference arguments, Variables and storage classes, Static functions, Pointers and functions.

Structures and Union: Declaring and initializing a structure, Accessing the members of a structure, Nested structures, Array of structures, Using structures in functions, Pointers and structures, Declaring and initializing a union.

Files: Reading and writing to text and binary files, Character I/O, String I/O, File pointers, Error handling, Redirection, Command line arguments.

Structured Programming vs. Object Oriented Programming.

Text Books

1. Kernighan Brian W. and Ritchie, Dennis M, *The C Programming language*, Dorling Kingsley(2008) 2nd ed.
2. Balagurusamy, E., *Programming in Ansi C*, TMH.

Reference Books

1. Stroustrup, Bjarne, *The C++ Programming Language*,. Addison Wesley
2. Kanetkar, Yashavant, *Let Us C*, BPB

1.5 BASICS OF MECHANICAL ENGINEERING

First Law of Thermodynamics: Essence and corollaries of the first law, analytical expressions applicable to a process and cycle, internal energy, enthalpy and specific heats, first law analysis of steady flow, applications of steady flow energy equation to engineering devices.

Applications of first law of Thermodynamics: Closed and open systems, analysis of non-flow and flow processes for an ideal gas under constant volume (Isochoric), constant pressure (Isobaric), constant temperature (Isothermal), adiabatic and polytropic conditions. Analysis of free expansion and throttling processes. Representation of these processes on P-V charts and analysis of property changes and energy exchange (work and heat) during these processes.

Second Law of Thermodynamics: Limitations of first law, various statements of second law and their equivalence, application of statements of second law to heat engine, heat pump and refrigerator. Philosophy of Carnot cycle and its consequences. Carnot theorem for heat engines and heat pump. Clausius inequality, concept and philosophy of entropy and entropy changes during various processes. Temperature – entropy chart and representation of various processes on it. Third law of thermodynamics.

Simple Stresses & Strains: Concept & types of Stresses and strains, Poisson's ratio, stresses and strain in simple and compound bars under axial loading, stress strain diagrams, Hooke's law, Elastic constants and their relationships. Temperature stress and strain in simple and compound bars under axial loading, Numerical problems.

Shear Force and Bending Moments Definitions, SF & BM diagrams for cantilevers, simply supported beams with or without over-hang and calculation of maximum BM and SF and the point of contraflexure under (i) concentrated loads, (ii) uniformly distributed loads over whole span or a part of it, (iii) combination of concentrated loads and uniformly distributed loads. Relation between the rate of loading, the shear force and the bending moments, Numerical Problems.

Bending Stresses in Beams: Bending Stresses in Beams with derivation of Bending equation and its application to beams of circular, rectangular I & T Section, Composite beams,

Torsion of Circular members: Torsion of Solid and hollow circular shafts, Combined bending and torsion, Equivalent torque, Numerical Problems.

Text Books:-

1. Nag, P.K., "Engineering Thermodynamics", Tata McGraw – Hill, New Delhi.
2. Yadav, R., Thermal Science and Engineering, Central Publishing House, Allahabad.
3. G.H.Ryder "Strength of Materials" Macmillan India.
4. Mechanics of Materials – Dr. Kirpal Singh, Standard Publishers Distributors, New Delhi.

Reference Books

1. Popoy, "Strength of Materials", PHI,
2. Sadhu Singh, "Strength of Materials", Khanna Publications.
3. Strength of Materials – A Rudimentary Approach – M.A.Jayaram, , Sapna Book House,

1.6 ENGINEERING DRAWING AND GRAPHICS

Introduction: Use of drafting tools, Lettering, Dimensions and Standards, Line Conventions.

Projection Systems: Projection Planes, Projection systems, Orthographic projections of points in first angle projection system and third angle projection system, Orthographic projections of lines on reference planes, True length of line using rotation of view method, Traces of lines, Auxiliary planes and their applications, Projections of Lamina parallel/inclined to reference planes, Projection of solids- Polyhedra, Solids of revolution, Sections of solids- Section plane parallel / inclined to reference planes, Intersection of solids.

Development of Surfaces: Development of surfaces like Prism, Pyramid, Cylinder, Cone, Sphere etc. using Parallel Line Method, Radial Line Method, Triangulation method.

Orthographic Projections: Extracting Orthographic projections from given pictorial views.

Isometric Views: Extracting Isometric projections from given Orthographic views using box method, Offset method.

Missing Lines and Missing Views: Evaluating missing lines and missing views from given orthographic views.

Computer Aided Drafting: Introduction to computer drafting tools like AutoCAD. Demonstration of commands like Line, Circle, Arc, Rectangle, MText and Dimensioning etc.

Text Books:-

- 1 Gill, P.S., *Engineering Drawing - Geometrical Drawings*, S.K. Kataria
- 2 Mohan, K.R., *Engineering Graphics*, Dhanpat Rai Publishing Company

Reference Books

- 1 French, Thomas E., Vierck, C. J. and Foster, R. J., *Fundamental of Engineering Drawing & Graphics Technology*, McGraw Hill Book Company
- 2 Bhatt, N.D. and Panchal, V.M., *Engineering Drawing: Plane and Solid Geometry*, Charotar Publishing House

1.7 PHYSICS LABORATORY

LABORATORY WORK

List of Experiments

1. To find the frequency of A.C. mains using Electric Vibrator.
2. To determine the resistivity & Hall coefficient of a Semi Conductor by four probe method at different temperature.
3. To study the variation of magnetic field of a circular coil Carrying current I & Calculate the radius of coil.
4. To study the divergence of a Laser beam.
5. To determine the wave length of Laser using diffraction grating.
6. Determine the numerical aperture of an optical fibre.
7. To determine attenuation and propagation Losses in optical fibre.
8. Making up the hologram using advanced Laser hit.
9. To find the susceptibility of ferro magnetic material ($FeCl_3$) by quince Method.
10. To study Laser interference using Michelson Morley Interferometer
11. To study the photovoltaic cell & hence to verify the inverse square law.
12. To convert a galvanometer into an ammeter of a given range.
13. To find the value of plank's constant by using a photo electric cell.
14. To find the Low resistance by Carry Foster's Bridge.

1.8 BASIC ELECTRICAL LABORTOARY

List of Experiments

1. To verify KCL and KVL.
2. TO study frequency response of series RLC circuit and determine resonance frequency and factor for various values of R,L,C
3. TO study frequency response of parallel RLC circuit and determine resonance frequency and factor for various values of R,L,C
4. To perform direct load test of transformer and plot efficiency v/s load characteristics.
5. To perform direct load test of the DC shunt generator and plot load v/s current curve.
6. To study and verify Thevenins, Norton's, superposition, Milliman's, maximum power, reciprocity theorems
7. To perform O.C and S.C test of transformer.
8. to study various types of meters
9. Measurement of power by 3 voltmeter/ 3 ammeter method.
10. Measurement of power in 3-phase system by 2-wattmeter

1.9 FUNDAMENTALS OF COMPUTER PROGRAMMING & IT LABORTAORY

LABORATORY WORK

Introduction to Hardware - CPU, Storage devices & media, VDU, I/O Devices. Basic Operating System (DOS/UNIX) commands. Simple programs to demonstrate the use of constants, Variables, printf, scanf and operators. Programs using Loops: Solution of quadratic equation, Summation of finite series, Fibonacci series, Prime numbers, Factorial. Menu driven programs using switch statement. Use of continue and break statements, Conditional operators. Passing variables to functions by values and by reference, Number conversion using array, Sorting, Merging, Arithmetic operations on matrices. String manipulation: Comparing, Copying, Reversing , Finding length, Extracting characters. Simple programs demonstrating the concept of Pointers, Passing values to functions using pointers for arrays, Structures. Creating various types of records using structures. Storing and retrieving records from a file, Copying a data file. Randomly accessing a record, Use of command line arguments.

B. SECOND SEMESTER

2.1 MATHMETICS-II

MODULE-I

Linear Algebra: Rank, Linear Independent and Dependent, system of liner equations, Eigen values and Eigen vector, Cayley Hamilton theorem, diagonalization, linear transformation, quadratic form and Reduction to canonical form. Complex matrices.

Complex Numbers: De-Movire's theorem and its application, Elementary function of complex variable, Summation of series.

MODULE-II

Function Of Complex Variable: Analytic function, Harmonic functions, Necessary and sufficient condition for the function $w= f(z)$ to be analytic, Application of analytic function in flow problem, complex integrations, Cauchy's integral theorem, Cauchy's integral formula, Cauchy's integral formula for derivatives, Power series, Taylor's and Laurent's series, Zero's & singularities of complex function, Evaluation of real integral using residues, Bilinear transformation and conformal mapping

MODULE-III

Ordinary Differential Equation: Formation of differential equation, Exact differential equation, equation of first order and higher degree equation, Clairit's equation, Linear differential equation , Bernoulli's equation, Linear differential equation with constant coefficient, Method of variation of parameter, Method of undetermined coefficient, Cauchy and Legendre equation , simultaneous differential equation, application of linear differential equation.

Partial Differential Equations And Its Applications: Formation of P.D.E , Lagrange equations, Charpit method, Higher order linear differential equation with constant coefficient.

Text books:-

1. *Simmons, G.F., Differential Equations (With Applications and Historical Notes ,TMH*
2. *Jain,.R.K, .Iyengar "Advanced Engg.Mathematics" , Narosa publication*
3. *Grewal B.S,"Higher Engg.Mathematics",,,Khanna publication*
4. *Kasana, H.S., Complex Variables: Theory and Applications, PHI*

Reference Books:-

1. *Kreyszig Erwin, Advanced Engineering Mathematics, John Wiley (2006*
2. *Ram Babu, Engineering Mathematics, Pearson Education (2009).*
3. *Higher Engg.Mathematics,N.P.Bali,Laxmi Publication*
4. *Advanced Engg.Mathematics,kreyszig,john wiley and sons*

2.2 CHEMISTRY

MODULE I

BASIC CONCEPTS AND WATER TECHNOLOGY: Atomic number, valency, molecular weight, equivalent weight, molarity, normality, how to write a molecular formula.

Water: Structure of water, water as solvent, characteristic properties of water Sources of water, Specifications for water, BOD, COD and DO, Hardness and its determination (EDTA method only), Sewage treatment, Purification of municipal water, Water softening processes – Lime – Soda process, Ion exchange method, boiler feed water, boiler problems-scale, sludge, priming and foaming, caustic mbitterment and boiler corrosion, their causes and prevention, carbonate and phosphate conditioning, colloidal conditioning, calgon treatment, Desalination of water: Reverse osmosis, electro dialysis and multiple effect evaporation. Numerical problems of hardness and Lime-Soda process (7 Hours)

CORROSION SCIENCE: Definition, cause, types and mechanism of corrosion, factors influencing corrosion protective measures against corrosion, metal finishing like electroplating of Au and Cr and electrolessplating of Ni on Al and also preparation of printed circuit board by electrolessplating. (7 Hours)

NON- METALLIC ENGINEERING MATERIALS : (i) Cement : Chemical constitution of Portland cement, functions of different constituents. Theories of the setting of cement. (ii) Abrasives : Introduction, types of abrasives and applications. (7 Hours)

MODULE II

PHOTOCHEMISTRY: Difference between thermo chemical and photochemical rxn., Lambert and beer laws , quantum yield, classification of photochemical rxn, kinetics of some photochemical rxn, Jablonski' s diagram, mechanism of photosensitization, LASER and MASER 7 Hours)

FUELS AND LUBRICANTS : Fuels: Definition, characteristics of good fuel, calorific value: gross and net calorific values and their determination by bomb calorimeter, , Classification of fuels: primary and secondary fuels (7 Hours)

Lubricants: Introduction, friction and wear, Lubricants, mechanism of Lubrications, base oils, additives, greases and emulsions Lubricants :Types of lubrication, fluid film lubrication, boundary lubrication and extreme pressure lubrication. Function of lubricants .Classification of lubricants, solid, semisolid, liquid, emulsions, synthetic lubricants. Conditions for using different types of lubricants. Properties of lubricants.

(7Hours)

MODULE III

Liquid Crystal: Classification of liquid crystals, chemical constitution and liquid crystalline behavior in PAA and MBBA, liquid crystal homologous series, molecular ordering in nematic, smectic and columnar type liquid crystals, identification of liquid crystals using optical microscopy, electro optic properties of liquid crystals, polymorphism in thermotropic liquid crystal and application of liquid crystals(7 Hours)

High Polymers: Definition, classification of polymers, types of polymerization, methods of polymerization, glass transition temp., structure of polymers, plastics, synthesis, properties and applications of few commercial thermoplastic and thermosetting polymers, techniques of plastic moulding, elastomers, adhesive, compounding of resins and plastics, conducting polymers and conduction mechanism in polyacetylene(7 Hours)

Nano-materials: Introduction to nano-materials, Graphite, fullerenes, carbon nanotubes, nanowires, nanocones, Haeckelites. Their electronic and mechanical properties .. Production methods for CNTS. .. Applications of nano materials in i) Medicine ii) Catalysis iii) Environmental Technologies iv) Electronics v) mechanics. (5 Hours)

Text Books:-

1. Shashi Chawla "Engg. Chemistry"
2. Vasant Gowarikar "Polymer Chemistry"
3. Bandyopadhyay A.K., "Nano Materials" ,New age International Publisher
4. Palanna "Engg. Chemistry" TMH

Reference Books:-

1. Misra, G.S., *Introductory Polymer Chemistry*, New Age International (1993).

2.3 BASIC ELECTRONICS ENGINEERING

Semiconductor Physics: Brief review of Band Theory, concept of conductor, semiconductor and insulator. transport phenomenon in semiconductors, concept of intrinsic and extrinsic semiconductor, Donor and acceptor Impurities, charge densities in semiconductor.

Introduction to Electronic Components and PCB manufacturing : Active and Passive elements, working of common electronic components like resistors, capacitors, inductors component testing and their application in circuits. PCB designing and assembling techniques.

Semiconductor DIODE:- PN Junction, Reverse and Forward bias conditions, Diode Characteristic and parameter, Ideal vs. Practical diode. equivalent circuits . rectification-half and full wave & filters(shunt capacitor ,series inductor & LC). Types of Diodes:- Zener Diode and its applications, photodiode,LED , Tunnel Diode, Varactor Diode, schotkey diode.

Bipolar Junction Transistor:- construction of pnp & npn transistors, transistor configurations (cb,ce,cc), input and output characterstics.

Unipolar Junction transistor:- FETS,MOSFETS and their VI characterstics

Electronic instruments- Role and importance of digital multimeter and CRO,measurement of amplitude frequency and phase using CRO.

Text books:-

1. A.P.Malvino.Electronic Principles.
2. J.D. Ryder Electronic Fundamentals and Applications.
- 3.*electronic devices and circuits by JB Gupta- Kataria and sons publications*
- 4.*Electronic Principles by "Sahdev"- Dhanpat Rai and sons Publication.*

Reference Books:-

- 1 Sawhney A. K . "A Course in electrical and electronic Measurements & Instumentation" Dhanpat Rai & co
- 2 Millman and C.C.Halkias Electronic Circuits & Devices.
- 3 J.Millman & C.C.Halkias Integrated Circuits & Devices.
- 4 N.N.Bhargava & Kulshrestha, Electronic Devices.

2.4 COMMUNICATION SKILLS

MODULE-I

The Process of Communication: Concept and process of communication; Barriers to Communication; Different Types of Communication; Written vs. Oral Communication; Different Types of Face-to-Face Interactions; Characteristics and Conventions of Conversation; Difference between Conversation and Other Speech Events;

Telephone Techniques: Warm Up; Speaking and Listening: Commonly Used Phrases in Telephone Conversations; Reading: Conference Calls; Vocabulary; Writing and Listening: Leaving a Message; Grammar and Usage- The Perfect Tenses; Pronunciation- Contracted Forms.

Job Applications and Interviews: Curriculum Vitae; Language Focus; Some Useful Words; Preparing for an Interview; Listening and speaking in the interview.

MODULE-II

Group Discussions: How to be Successful in a Group Discussion; Study Skills ; Language Focus; Speaking; Case discussions.

Managing Organisational Structure: The Role of a Manager; Leadership; Language Focus; Writing Reports; Pronunciation.

Meetings: A Successful Meeting; Speaking: One to One Meetings; Language Focus: Opening, Middle and Close; Editing; Criteria for Successful Meetings; Reporting Verbs; Memos

MODULE-III

Taking Notes and Preparing Minutes: Taking Notes- The Essential Components, Preparing Minutes- Format of Minutes, Language and Style of Minutes, Grammar.

Presentation Skills : Presentation Skills; Importance of Body Language in Presentations; pronunciation; Structure of presentation; Visual Aids; Ending the presentation; Podium Panic Pronunciation: Emphasizing the Important Words in Context

Negotiation Skills: Idiomatic Expressions; Process of Negotiations; Phrasal Verbs; Listening: Effective Negotiations; Speaking; Writing.

Technical Report Writing: Objective; Planning; Language; format of the report and guidelines for a good report writing with illustrations of good writing.

Practice Sessions: Students should be asked to prepare and present seminars during the practice session. Group discussions and case discussions should also be used and feedback given to students.

Reference Books:-

1. *The Chicago Manual of Style*, PHI
2. *Gowers, Ernest, "The Complete Words". Penguin, 1973.*
3. *IEEE Transactions on "Written and Oral Communications" has many papers of relevance*
4. *Ludlow, R., and Panton, F., "The Essence of Effective Communication", PHI*

2.5 BASIC CIVIL ENGINEERING

1. Introduction to Civil Engineering :

Introduction, branches of civil engineering, application of civil engineering in other allied fields.

2. Building Planning :

Principles of planning, orientation of buildings, introduction to Bye-Laws regarding building line, height of building, open space requirements, F.S.I., setbacks, ventilation, sanitation as per municipal corporation area requirement.

3. Components of Buildings :

- Sub-structure

Types of soil and rocks as foundation strata, concept of bearing capacity, types of foundations i.e. shallow and deep and their suitability. Shallow foundation such as wall foundation, isolated foundation, deep foundation such as pile foundation.

- Super-structure

Elements of super-structures and their functions

4. Building Design :

Introduction to types of loads, concepts of strength, stability, durability and factor of safety of building, load bearing and framed structures.

5. Building Materials :

Use and properties of the following materials :

- Concrete – ingredients and grades, plain and reinforced cement concrete and ready mix concrete, bricks, steel, aluminum, plastic, timber, roofing materials etc.

6. Surveying :

- Principles of surveying
- Classification of surveys
- Chain Surveying

Introduction to metric chain and tapes, error in chaining, nominal scale and R.F., ranging, chaining and offsetting, index plan, location sketch and recording of field book

- Chain and compass survey

Meridian, bearing and its types, system of bearing,

Types of compass : prismatic and surveyor's compass.

Calculation of included angles, correction for local attraction.

7. Levelling :

- Terms used in leveling, use of Dumpy level, temporary adjustments.

Methods of reduction of levels, types of leveling, Contours, characteristics of contours, use of contour maps.

- Introduction to Auto level and use
- Introduction and use of EDM's with special reference to Total Station.
- Measurement of area by planimeter – mechanical and digital.

8. Transportation Engineering:

- Types of roads: introduction to NH, SH, MDR, ODR, VR, Express Way
- Cross section of road – in cutting and filling
- Railway – Gauges, Cross-section of railway track.

Text Books:

1. Gupta, Sushil Kumar, DR and Juneja BM; "A Text Book of Building Construction"; Ludhiana, Katson Publishing House
2. Arora, SP and Bindra, SP; "A Text Book of Building Construction"; New Delhi Dhanpt Rai and Sons,
3. Sushil Kumar; "Building Construction"; Standard Publishers Distribution, Delhi
4. Peurifoy, RL, "Construction Planning, Equipment and Methods" Tokyo, McGraw Hill
5. Wakhlo, ON :Civil Engineering Management", New Delhi Light and Life Publishers

2.6 WORKSHOP PRACTICE/MANUFACTURING PRACTICE

1. **CARPENTRY AND PATTERN MAKING** : Various types of timber and practice boards, defects in timber, seasoning of wood; tools, wood operation and various joints; exercises involving use of important carpentry tools to practice various operations and making joints.
2. **FOUNDRY SHOP** Introduction to moulding materials; moulds; use of cores; melting furnaces; tools and equipment used in foundry shops; firing of a cupola furnace; exercises involving preparation of small sand moulds and castings.
3. **FORGING PRACTICE:** Introduction to forging tools; equipments and operations; forgability of metals; exercises on simple smithy; forging exercises.
4. **MACHINE SHOP** machines, grinders etc; cutting tools and operations; exercises involving awareness.
5. **WELDING SHOP:** Introduction to different welding methods; welding equipment; electrodes; welding joints; welding defects; exercises involving use of gas/electric arc welding.
6. **ELECTRICAL & ELECTRONICS SHOP** Introduction to electrical wiring;preparation of PCBs involving soldering applied to electrical and electronic applications; exercises preparation of PCBs involving soldering applied to electrical and electronic applications.
7. **SHEET METAL:** Shop development of surfaces of various objects; sheet metal forming and joining operations, joints, soldering and brazing; exercises involving use of sheet metal forming operations for small joints.
8. **FITTING SHOP** Introduction of fitting practice and tools used in fitting shop;exercise involving marking, cutting, fitting practice (Right Angles), male- Female mating parts practice, trapping practice.

TEXT BOOKS

1. Raghuwanshi, B.S. ; A course in Workshop technology, Vol 1 & II, Dhanpat Rai & Sons , New Delhi.
2. Jain, R.K. ; Production Technology, Khanna Publishers, New Delhi.
3. Singh, S, ; Manufacturing Practice, S.K. Kataria & Sons, New Delhi

2.7 CHEMISTRY LABORATORY

LABORATORY WORK

List of Experiments:-

1. Preparation and standardization of solutions: NaOH, HCl, H₂SO₄ and Oxalic acid
2. To determine the hardness of water sample by EDTA method. (ALL)
3. To determine the acidity of water sample.
4. To determine the amount of residual chlorine in water sample.
5. To determine the total cation conc. In natural water sample using ion exchange resin.
6. To determine COD of a effluent sample.
7. Estimation of rate of corrosion of aluminium in acidic and basic medium.
8. Calorimetric determination of Copper.
9. Verification of Beer's law
10. To determine the surface tension of a liquid using drop no. method.
11. To determine the viscosity of the given liquid by Redwood viscometer.
12. To determine the acid value of the given oil.
13. To determine flash point and fire point of a lubricating oil
14. To determine the mol. Wt. Of polystyrene by viscosity measurements.
15. To determine melting point and/or glass transition temperature of a polymer.
16. .To prepare the pure and dry sample of Urea Formaldehyde resin.
17. To prepare the copper ammonia complex
18. Preparation of nano-oxide using combustion method
19. .Estimation of moisture and ash content in a given sample of coal.

2.8 COMMUNICATION LABORATORY

Teacher should give following Assignments to students to develop skills of communicating effectively:

- communication cycle(with the help of Diagram)
- Communication Situation (List of 5 Communication situation stating the type of communication.
- Barriers that hinder a particular communication situation.(state the type of barrier, and how to overcome them)
- Developing a story or a paragraph for the given topic sentence (in a group of 5-6 students)
- Describing various equipments.
- Identifying the various sentences with their types of writing(e.g. Scientific , legal, colloquial etc.)
- Business letters
- Letters of suggestion
- Comparative Time Table of 2 students

- Description of two different person.
- Letter to the Librarian, Principal
- Report writing.

2.9 BASIC ELECTRONICS LABORATORY

List of Experiments:

1. To study the use and scope of using an oscilloscope as a measuring device in an electronic Laboratory.
2. To study the use and scope of using a multimeter (digital and analog) as a measuring device in an electronics laboratory.
3. To study the use and scope of function generator as a signal source in electronics laboratory.
4. Draw forward bias and reverse bias VI characteristics of a p-n junction diode
5. Draw the characteristics of a zener diode.
6. To study and plot waveform of half wave rectifier with and without filter circuits.
7. To study and plot waveform of full wave rectifier with and without filter circuits.
8. Study Zener diode as voltage Regulator.
9. Draw characteristics of common base configuration of p-n-p transistor.
10. Draw characteristics of common emitter configuration of an npn transistor.
11. Draw characteristics of common drain configuration of a MOSFET.

C. THIRD SEMESTER

3.1 COMPUTER ORGANISATION AND ARCHITECTURE

Basic Computer Organization Principles of Computer design - Software, hardware interaction layers in computer architecture. Central processing unit. Machine language instructions, Addressing modes, instruction types, Instruction set selection, Instruction cycle and execution cycle.

Control Unit and Arithmetic Unit: ALU, data path design, control path design, hardwired control, micro programmed control, micro programming control Vs hardwired control, RISC Vs CISC, hardware implementation of algorithms for addition, subtraction, multiplication and division.

Pipeline: Parallel processing, pipeline general consideration, arithmetic pipeline, instruction pipeline, complexities in pipeline, super scalar processing.

Memory System: Memory, memory hierarchy, main memory, associative memory, cache memory, virtual memory, architectural tools to implement these different memories.

Input Output Organization: Input & output interface, asynchronous data transfer, Modes of transfer, DMA, I/O interrupts, channels.

Secondary Storage Techniques: Secondary Storage Systems; Hard Drives Removable Drives Removable Storage Options- Zip, Jaz & Other Cartridge Drives, Recordable CDs & DVDs, CD-R vs CD-RW, Tape Backup

I/O Technology: Keyboard ; Mouse; Video Cards; Monitors ; Liquid Crystal Displays (LCD) ; Digit; Sound Cards; Printers ; Modems; Scanners; Power Supply- SMPS (Switched Mode Power Supply)

Performance evaluation - SPEC marks, Transaction Processing benchmarks.

Text Books:-

1. *Mano, Morris M., Computer System Architecture, Dorling Kindersley*
2. *Hayes, J.P., Computer Architecture and Organization, McGraw Hill*

Reference Books:-

- 1 *Patterson, David, A., Hennessy, J.L., and Arpaciduseau, A.C., Computer Architecture – A Quantitative Approach, Morgan Kaufmann Publishers*
- 2 *Stallings, W., Computer Organization and Architecture: Designing for Performance, PHI*

3.2 DATA AND FILE STRUCTURES

Analysis of Algorithms - Mathematical Background, Process of Analysis, Calculation of Storage Complexity, Calculation of Run Time Complexity.

Arrays ; Arrays and Pointers; Sparse Matrices; Polynomials; Representation of Arrays-Row Major Representation, Column Major Representation; Applications

Lists: Abstract Data Type-List; Array Implementation of Lists; Linked Lists-Implementation;Doubly Linked Lists-Implementation; Circularly Linked Lists-Implementation; Applications.

Stacks: Abstract Data Type-Stack; Implementation of Stack using Arrays and Stack using Linked Lists; Algorithmic Implementation of Multiple Stacks; Applications

Queues: Abstract Data Type-Queue; Implementation of Queue - Array and Linked List Implementation; Implementation of Multiple Queues ; Implementation of Circular Queues- Array Implementation, Linked List Implementation of a circular queue; Implementation of DEQUEUE - Array Implementation of a *Dequeue*, *L* inked List Implementation of *a dequeue*

Trees: Abstract Data Type-Tree; Implementation of Tree; Tree Traversals; Binary Trees; Implementation of Binary Tree; Binary Tree Traversals - Recursive Implementation of Binary Tree Traversals, Non Recursive Implementations of Binary Tree Traversals; Applications

Advanced Trees: Binary Search Trees- Traversing a Binary Search Trees, Insertion of a node into a Binary Search Tree, Deletion of a node from a Binary Search Tree; AVL Trees- Insertion of a node into an AVL Tree, Deletion of a node from and AVL Tree, AVL tree rotations, Applications of AVL Trees; B-Trees- Operations on B-Trees ; Applications of B-Trees.

Searching and Sorting: Linear Search; Binary Search; Internal Sorting - Insertion Sort, Bubble Sort, Quick Sort, 2-way Merge Sort, Heap Sort; Sorting on Several Keys and their applications.

Advanced Data Structures: Splay Trees - Splaying steps, Splaying Algorithm; Red-Black trees- Properties of a Red-Black tree; Insertion into a Red-Black tree; Deletion from a Red-Black tree; AA-Trees

File Structures: Terminology; File Organisation; Sequential Files – Structure, Operations, Disadvantages, Areas of use; Direct File Organisation; Indexed Sequential File Organisation

Text Books:-

1. Weiss, Mark, A., *Data Structures and Algorithm Analysis in C*, Dorling Kindersley
2. Kruse, R.L., *Data Structures and Program design in C*, Dorling Kindersley

Reference Books:-

1. Aho, Alfred V., Ullman, Jeffrey D., and Hopcroft, John E., *Data Structures and Algorithms*, Addison Wesley
2. Tenenbaum, A. M., *Data Structures Using C*, Dorling Kindersley
3. Seymour Lipschutz, *Schaum's Outline Series of Theory and problems of data structures*, TMH

3.3 OPERATING SYSTEM CONCEPTS AND NETWORKING MANAGEMENT

Introduction to Operating System : Meaning and Evolution of Operating System - Serial Processing, Batch Processing, Multiprogramming; Operating System Structure- Layered Structure Approach, Virtual Machine, Client-Server Model, Kernel Approach. Classification of Advanced Operating System - Architecture Driven Operating System, Application Driven Operating System; Characteristics of Modern Operating System - Microkernel Architecture, Multithreading, Symmetric Multiprocessing

Introduction to Networking Concepts: The Topologies; Characteristics of the OSI Layers; OSI Models and Communication between Systems; Interaction between OSI Model Layers; Protocols Types of Networks- Local Area Network (LANs), Metropolitan Networks (MANs), Wide Area Network (WANs); Medium; Data Flow; Physical Connection, Transmission Media; Connecting Devices- Repeaters, Hubs, Bridges, Routers, Gateways

Internetworking Concept, Architecture and Protocols: History of internetworking; Packet Switching; Internetworking Concepts; Internet Addresses Object-Based Programming; Configuring IP Addresses; TCP/ IP; Additional TCP/ IP – Related Protocols; Application Layer Protocols- File Transfer Protocols, Trivial File Transfer Protocol (TFTP), TELNET, Remote login, Electronic Mail (Email); World Wide Web; Domain Name System; SNMP and UDP

Linux Operating System: Features; drawbacks; and components of Linux- Memory Management Subsystems, Linux Process and Thread Management, File Management System, Device Drivers, : linux Commands ,Utilities and Editor; User to User communication; Unix System Administration – System administration, Installing Linux, booting the system, Maintaining User Accounts, File Systems and Special Files, Backups and Restoration.

Windows 2000: Windows 2000 Operating System Architecture - Peer-To-Peer Network-Domains, Network Protocols, File Services, Shared Folders, Distributed File System, Print Services; Using the Mapped Drive - Printing a Mapped Drive, Disconnecting a Mapped Drive, Viewing Directory Information, Creating a Shared Folder, Logging off a Client. Using Windows 2000 and Client- Logging on to the Network, Browsing Network Resources 1, Accessing Network Resources Using My Network Places, Mapping a Folder; Advanced Windows 2000 Networking -Windows 2000 Domains, Workgroups & Trusted Relationships- Concept of Domains, Trust Relationships, Building Domains; User Administration; Remote Access. Introduction to Windows XP Networking - TCP/IP Protocol Setting for Windows XP, To Select a Network Protocol, Virtual Private Networks and Remote Networking; Windows XP in File System; Sharing Network Resources in Windows XP- Sharing Files Folders and drives in Windows XP; Enabling Offline File Features.

Security and Management: Goals of Computer Security; Security Problem and Requirements; Threat and Vulnerabilities; User Authentication; Security System and Facilities- System Access Control, Password Management, Privileged User Management, User Account Management, Data Resource Protection, Sensitive System Protection; Cryptography ; Intrusion detection; Computer-Security Classifications. Computer Security-Hardening Operating System and Application Code, File System Security, Local Security Policies, Services, Default Accounts, Network Activity- Malicious Code, Firewall; Fault Tolerant system; BACKUP and UPS

Main Issues In Windows Security Management- Physical Security Management, Logon Security Management, Users and Groups Management, Managing Local and Global Groups, Managing User Accounts, Windows NT Domain Management; Domain Controller-the Primary Domain Controller (PDM), Backup Domain Controller (BDC); Windows Resources Management; Registry management; Printer Management;

Managing Windows 2000 Operating System; Active Directory- Logical Structure, Physical Structure; Windows 2000 DNS Management; Managing Group Policy

Text Books

1. Comer D. E. ,*"Inter Networking with TCP/IP: Principles, Protocol And Architecture"*, PHI
2. Janet Valade, *" Spring into Linux"* PE.
3. Michael Bech, Harold Bohma...*"Linux Kernel Programming"*, PE
4. Johnson M. Hart*"Windows System Programming"*PE

Reference Books

- 1 Nameth Hein , et. All*" Linux Administration Hand book"*PE

3.4 DATA COMMUNICATION AND NETWORKS

Introduction to Computer Networks: What is computer Network?, Network Goals / Motivation; Application of Networks; Point to Point or Switched Networks - Circuit Switched Networks, Packet-Switched Networks; Broadcast Networks - Packet Radio Networks, Satellite Networks, Local Area Networks; Network Protocols; Networking Model

Data Transmission : Transmission Terminology- Simplex, Half duplex & full duplex spectrum and Bandwidth, frequency; Serial & Parallel Communication; Analog and Digital Data Transmission; Bandwidth & Data Rate Throughout; Transmission Impairments - Attenuation and Distortion, Delay Distortion, Noise, Concept of Delays, How to reduce delays. Transmission Media and its Characteristics- Twisted Pair, IBM Cable, Coaxial Cable, Twin Axial Cable, Optical Fiber, Terrestrial Microwave, Satellite Microwave; Wireless Transmission – Radio, Infra red, Wireless LAN

Data Encoding & Communication Technique: Pulse Code Modulation (PCM) ; Amplitude ; Modulation; Frequency and Phase Modulation; Asynchronous Transmission; Synchronous Transmission

Multiplexing and Switching: Frequency Division Multiplexing; Synchronous Time Division Multiplexing; Statistical Time Division Multiplexing; Modems; Switching. Media Access Control and Data Link Layer

Media Access Control and Data Link Layer :Data Link Layer Fundamentals- Framing; Basics of Error Detection; Forward Error Correction; Cyclic Redundancy Check codes for Error Detection; Flow Control; Retransmission Strategies- Stop-&-Wait ARQ; Go-Back-NARQ; Selective Repeat ARQ; Pipelining; Contention-based Media Access Protocols- The advantages of Multiple-Access Sharing of Channel Resource; Pure ALOHA; Slotted ALOHA; Carrier Sense Multiple Access (CSMA); CSMA with Collision Detection (CSMA/CD); Polling-based Media Access Control Protocols- Token Ring, Token Bus; Media Access Control Protocols for High Speed Networks- FDDI-I and FDDI-H; DQDB with Bandwidth Balancing for Fair Access; Asynchronous Transfer Mode (ATM)

Network Layer: Introduction to Layer Functionality and Design Issues- Connection Oriented Vs Connectionless Services, Addressing, Concept of Congestion, Routing, Network Layer in ATM Protocols, Network Layer Design Issues; **Routing Algorithms** - Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast Routing Multicast Routing. **Congestion Control Algorithms** - General Principles of Congestion Control, Congestion Prevention Policies, Congestion Control in Virtual Circuit Subnets, Load Shedding, Jitter Control; **Internetworking & Network Layer in the Internet** – Tunneling, Internetworking Routing, Fragmentation, IP Protocol, IP Addresses, Internet Control Protocols, OSPF – The Interior Gateway Routing Protocol, BGP – The Exterior Gateway Routing Protocol, Internet Multicasting, Mobile IP, IPv6

Transport Layer and Application Layer Services: Transport Services and Mechanism-Type of Services, Quality of Services, Data Transfer, Connection Management Transport Control Mechanism, Addressing, Multiplexing, Flow Control and Buffering, Connection Establishment, Crash Recovery;

TCP/UDP- Introduction to UDP, Remote procedure Call, The Real-Time Transport Protocol, Introduction to TCP, TCP Service Model, TCP Protocol, TCP Segment Header, TCP Connection Establishment, TCP Connection Release, Modeling TCP Connection Management, TCP Transmission Policy, TCP Congestion Control, TCP Timer Management. **Network Security** - Symmetric Key Algorithms, Public Key Algorithms, Digital Signatures, Management of Public Keys, Communication Security, Web Security

Text Books:

1. Forouzan, B.A., *Data communications and networking*, TMH
2. Tannenbaum, A.S., *Computer Networks*, Pearson Education

Reference Books:

- 1 Stalling, W., *Data and Computer Communication*, Pearson Education
- 2 Antonako, J.L. and Mansfield, K.C., *An Introduction to Computer Networking*
- 3 William Stallin Maxwell, “Data And Computer Communication”,
- 4 D.E. Corner, “Inter Networking With TCP/IP: Principles, Protocol And Architecture”,

3.5 DIGITAL CIRCUIT AND LOGIC DESIGN

DIGITAL SYSTEMS: Binary Numbers, Number Base Conversions, Octal And Hexadecimal Numbers, Complements, Signed Binary Numbers, Binary Codes, Binary Storage Registers And Binary Logic.

BOOLEAN ALGEBRA AND LOGIC GATES

Basic Definitions, Axiomatic Definition Of Boolean Algebra, Basic Theorems And Properties Of Boolean Algebra , Boolean Functions, Canonical And Standard Forms, Other Logical Operations , Digital Logic Gates, Integrated Circuits.

GATE LEVEL MINIMIZATION

The Map Method, Four-Variable Map, Five-Variable Map, Product Of Sums Simplification, Don't –Care Conditions, NAND And NOR Implementation.

COMBINATIONAL LOGIC

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

SYNCHRONOUS SEQUENTIAL LOGIC

Sequential Circuits, Latches, Flip-Flops, Analysis Of Clocked Sequential Circuits, State Reduction And Assignment, Design Procedure.

REGISTERS AND COUNTERS

Registers, Shift Registers, Ripple Counters, Synchronous Counters, Other Counters,

MEMORY AND PROGRAMMABLE LOGIC

Introduction, Random-Access Memory, Memory Decoding, Error Detection And Correction, Read-Only Memory, Programmable Logic Array, Programmable Array Logic, Sequential Programmable Devices.

REGISTER TRANSFER LEVEL

Register Transfer Level Notation, Algorithmic State Machines, Design Example, Binary Multiplier, Control Logic. Design With Multiplexers

ASYNCHRONOUS SEQUENTIAL LOGIC

Introduction, Analysis Procedure, Circuits With Latches, Design Procedure, Reduction Of State And Flow Tables, Race- Free State Assignment, Hazards, Design Example.

DIGITAL INTEGRATED CIRCUITS

Introduction, Special Characteristics, Bipolar- Transistor Characteristics, RTL And DTL Circuits, Transistor-Transistor Logic, Emitter-Coupled Logic, Metal- Oxide Semiconductor, Complementary MOS, CMOS Transmission Gate Circuits, Switch- Level Modeling.

Text Books:

1. *Mano, M. Morris, Digital Design, Third Edition, Pearson Education, Singapore*

Reference Books:

1. *Floyd, Thomas L., Digital Fundamentals, PE, Singapore*
2. *Gothmann, William H., Digital Electronics, PHI*
3. *Jain, R.P., Modern Digital Electronics, TMH*
4. *B Holdsworth, Digital Logic Design, TMH*
5. *Nripendran N. Biswas, Logic Design Theory, PHI*
6. *Leach, D. P., Albert P. Malvino, Digital Principles and Applications, TMH*

3.6 ORGANIZATIONAL BEHAVIOR

Introduction to Organizational Behaviour: Today's Organizations, Challenges, Foundations of Organizational Behaviour, Individual Behaviour: Perception, Values, Attitudes Motivation theories. Employees Motivations in Organization, Management by Objectives Learning Processes, Reward and Punishment.

Foundations of Group Behaviour: Interpersonal Communication, Leadership, Emotional Intelligence. Power & Politics, Conflict Process, Negotiations, Stress and Coping, Inter-Group Relations, Team Working.

A Macro Perspective of Organizational Behaviour: Organization Structure – Key Elements, Types and Basic Models, Work Design, Organizational Change, and Learning Organizations.

Organizational Behaviour: Future Challenges Gender Diversity at the place of work, Changing world Scenario, Role of External Environment.

Achieving Competitive: Advantage Management of change, International issues in Organizational Behaviour.

Text Books:-

1. Robbins, S.P., *Organizational Behaviour*, PHI
2. Luthans F., *Organizational Behaviour*, Irwin Mc-Graw Hill.

Reference Books:-

1. Hellriegel, D., and Slocum, J.W., *Organizational Behaviour*, Southwestern Educational Publishing

3.7 DATA STRUCTURE LABORATORY

Laboratory Work

Implementation of Stacks, Queues, Linked Lists, Trees, Graphs, Sorting and Searching algorithms.

3.8 OPERATING SYSTEM LABORATORY

Laboratory Work: The laboratory work will be based on contents of course material like – Windows, Linux/Unix, installation and management of users on windows 2000.

3.9 COMPUTER NETWORK LABORATORY

1. Conversion of Analog to digital signals.
2. Conversion of digital to analog signals.
3. Conversion of Analog to Analog signals.
4. Conversion of digital to digital signals.
5. Implementation of multiplexers.
6. To study FDM modulation techniques.
7. To study TDM modulation techniques
8. To study WDM modulation techniques
9. To study various transmission media like twisted pairs, co-axial cables, optical fibers etc.

3.10 DIGITAL CIRCUITS & LOGIC DESIGN LABORATORY

Verification of the truth tables of TTL gates, e.g., 7400, 7402, 7404, 7408, 7432, 7486.

2. Design, fabrication and testing of low frequency TTL clocks using NAND gates.
3. Verification of the truth table of the Multiplexer 74150.
4. Verification of the truth table of the De-Multiplexer 74154.
5. Design and verification of the truth tables of half adder and full adder circuits using gates 7483.
6. (a) Design and test of an SR flip flop using Nor/Nand gates.
(b) Verify the truth table of a J-K flip flop. (7476)
(c) Verify the truth table of a D-flip flop (7474) and study its operation in the toggle and asynchronous modes.
7. (a) To study the operation of 2 bit and 4 bit asynchronous counters.
(b) To study the operation of 2 bit and 4 bit synchronous counters.
8. To study the operation of 2 bit and 4 bit Johnson counters.

3.11 INDUSTRIAL PRACTICE TRAINING

Training for four weeks after second semester may be arranged in the institutions or near by service organization. Student are expected to do exercise of assembly/ disassembly of computer part or system.

D. FOURTH SEMESTER

4.1 MICRO-PROCESSOR AND IT'S PERIPHERALS

Introduction To Microprocessor : Basic block diagram of microprocessor, Architecture trends of microprocessor, Classification of computers, Evolution of microprocessors, Programming Development Tools (Editor, Debugger, Assembler, etc.).

8-Bit Microprocessor (Intel 8085) : Internal Architecture of Intel 8085, Block Diagram, Registers, Internal Bus Organization, Pin Description, Control Signals.

Instruction set, classification of instructions, Addressing Modes, Timing Diagrams of 8085. Programs based on Data Transfer, Arithmetic & Logical operations, Code Conversion, Stack & Subroutines, Delay subroutines (with a register and register pair), Interrupt structure.

Peripherals And Interfacing With 8085 : 8255 Programmable Peripheral Interface, 8253 Programmable Interval Timer, 8257 DMA Controller, 8259 Programmable Interrupt Controller, 8279 Programmable Display Keyboard Controller. 8251 LED, 7 – segment display, relay, keyboard, stepper motor, ADC & DAC, Memory interfacing.

16-Bit Microprocessor (Intel 8086) : Architecture, Memory addresses space & data organization; Segment Registers & Memory Segmentation, I/O Address space; Addressing Modes. Comparison of 8086 & 8088. Basic 8086/8088 configuration; Minimum mode & Maximum Mode.

Text Books:-

1. *Microprocessor Architecture, Programming and Applications—Gaonkar, WE*
2. *Microprocessor and Programmed Logic--K.L.Short, PE*
3. *Fundamentals of Microprocessor & Microcomputers-- B. Ram, TMH.*
4. *Microprocessor and Digital System – Douglas Hall- TMH.*

Reference Books:-

1. *Intel's Data Manuals.*
2. *Microprocessor H/W Interfacing and Application – Bray – CBS*
3. *Microprocessors and Peripherals—B. Venkatramani, TMH.*
4. *The 8086/8088 family: Design, Programming, and Interfacing by – John Uffenbeck.*
5. *Ajoy Kumar Ray & Kishor M.Bhurchandi, "Advance Microprocessors & Peripherals" (Architecture, Programming & Interfacing), TMH*

4.2 INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS

Basic Concepts: Need for a Database Management System - The file based system, Limitations of file based system, The Database Approach; The Logical DBMS Architecture - Three level architecture of DBMS or logical DBMS architecture, Mappings between levels and data independence, The need for three level architecture; Physical DBMS Architecture- DML Precompiler, DDL Compiler, File Manager, Database Manager, Query Processor, Database Administrator, Data files indices and Data Dictionary, Commercial Database Architecture, Data Models

Relational and ER Models: The Relational Model- Domains, Attributes, Tuple and Relation, Super keys Candidate keys and Primary keys for the Relations; Relational Constraints- domain, Key and integrity, Dealing with Constraint Violations; Relational Algebra- Basic Set Operation, Cartesian Product, Relational Operations; Entity Relationship (ER) Model- Entities, Attributes, Relationships; E-R Diagram; Conversion of E-R Diagram to Relational Database.

Database Integrity and Normalization: Relational Database Integrity- The Keys, Referential Integrity, Entity Integrity; Redundancy and Associated Problems; Single-Valued Dependencies; Single-Valued Normalisation- The First Normal Form, The Second Normal Form, The Third Normal Form, Boyce Codd Normal Form; Desirable Properties of Decomposition - Attribute Preservation , Lossless-join Decomposition, Dependency Preservation, Lack of redundancy; Rules of Data Normalisation - Eliminate Repeating Groups, Eliminate Redundant Data, Eliminate Columns Not Dependent on Key

File Organisation in DBMS: Physical Database Design Issues; Storage of Database on Hard Disks; File Organisation and Its Types - Heap files (Unordered files), Sequential File Organisation, Indexed (Indexed Sequential) File Organisation, Hashed File Organisation; Types of Indexes; Index and Tree Structure; Multi-key File Organisation - Need for Multiple Access Paths, Multi-list File Organisation, Inverted File Organisation; Importance of File Organisation in Databases

Structured Query Language and Transaction Management: What is SQL?; Data Definition Language; Data Manipulation Language; Data Control; Database Objects: Views, Sequences, Indexes and Synonyms; Table Handling; Nested Queries. The Transactions; The Concurrent Transactions; The Locking Protocol- Serialisable Schedules, Locks, Two Phase Locking (2PL); Deadlock and its Prevention; Optimistic Concurrency Control. Recovery- Kinds of failures, Failure controlling methods, Database errors; Recovery Techniques; Security & Integrity- Relationship between Security and Integrity, Difference between Operating System and Database Security; Authorization.

Distributed and Client Server Databases: Need for Distributed Database Systems; Structure of Distributed Database; Advantages and Disadvantages of DDBMS; Design of Distributed Databases- Data Replication, Data Fragmentation; Client Server Databases- Architecture, Computing, Structure and Advantages

Application Development: Development of a Hospital Management System: Need, Creating a Database for HMS; Developing Front End Forms; Reports; Using Queries and Record set. Issues relating to Software Development, Testing and Maintenance

Text Books:-

- 1 *Elmasri, R, Navathe S.B., Fundamentals of Database Systems, Addison Wesley*
- 2 *Korth, H.F., Silberschatz, S., Sudarshan, A., Database Systems Concepts, McGraw Hill*
- 3 *Date, C.J., An Introduction to Database Systems, Dorling Kindersley*

Reference Books:-

- 1 *Garcia-Molina, Hector, Ullman, J.D. and Widom, J.D., Database Systems: The Complete Book, Dorling Kindersley*
- 2 *Desai, Bipin C., An Introduction to Database Concepts, Galgotia Publication*

4.3 OBJECT ORIENTED PROGRAMMING USING C++ AND JAVA

Introduction: Object Oriented vs. Procedural Programming ,OOP Features & Benefits, Identifying Object Classes, Class Identification Example, Sample C++ Class Definition, Enhancement of C++ over C.

Classes and Objects: Defining member functions, Members access control, Use of scope resolution operator, Inline functions, Nesting of member functions, Static data members, Static member functions, Array of objects, Friend functions.

Constructors and Destructors: Types of constructors- default, parameterized and copy constructors, Dynamic constructors. Destructors for destroying objects, new and delete operators.

Operator Overloading and Type Conversions: Overloading unary, binary operators, Operator overloading using friend functions, Rules for overloading operators, Type conversions.

Inheritance: General concepts of Inheritance, Types of derivation. Types of inheritance. Constructors in derived classes, Containership, Polymorphism with pointers, Pointers, Virtual functions and Polymorphism.

Files and Streams: Streams, Unformatted and Formatted I/O operations, Managing output with manipulators, File Streams, opening, reading, writing to file.

Templates and Exception Handling: Class templates and function templates, overloading of template functions, Basics of exception handling, Exception handling mechanisms.

Java: Primitive Data Types and Variables, Operators, Expressions and Statements, Decision and Interactive Constructs, Classes and Objects, Inheritance and Polymorphism, Packages and Interfaces, Exception handling, I/O in Java, Strings and Characters, Exploring Java I/O, Introduction to Applets, Graphics and User Interfaces, Networking Features and Java Servlets.

Text Books

- 1 *Balaguruswamy, E., Objected Oriented Programming with C++, Tata McGraw Hill.*
- 2 *Cornell, Gary, and Horstmann, Cay, S., Core Java 2 Vol I- Fundamentals PHI*
- 3 *Cornell, Gary, and Horstmann, Cay, S., Core Java 2 Vol II- Advanced features , PHI*

Reference Books

- 1 *Deitel, H.M. and Deitel,P.J., C++ How to Program, PHI*
- 2 *D. Ravichandran, Programming with C++, TMH*

4.4

COMPUTER NETWORKS

Basic Concepts: Components of data communication, distributed processing, standards and organizations. Line configuration, topology, transmission mode, and categories of networks. OSI and TCP/IP Models: Layers and their functions, comparison of models. Digital Transmission: Interfaces and Modems: DTE-DCE Interface, modems, cable modems. Transmission Media: Guided and unguided, Attenuation, distortion, noise, throughput, propagation speed and time, wavelength, Shannon Capacity, comparison of media.

Telephony: Multiplexing, error detection and correction: Many to one, one to many, WDM,

TDM, FDM, circuit switching, packet switching and message switching.

Data Link control protocols: Line discipline, flow control, error control, synchronous and asynchronous protocols, character and bit oriented protocols, Link access procedures.

Point to point protocols: Transmission states, PPP layers, LCP, Authentication, NCP.

ISDN: Services, historical outline, subscriber's access, ISDN, Layers, and broadband ISDN.

Devices: Repeaters, bridges, gateways, routers, The Network Layer, Design Issues, Routing Algorithms, Congestion Control Algorithms, Quality of Service, Internetworking, Network- Layer in the Internet.

Transport and upper layers in OSI Model: Transport layer functions, connection management, Functions of session layers, Presentation layer, and Application layer.

Text Books:-

1. A. S. Tanenbaum, "Computer Networks"; Pearson Education Asia,
2. Behrouz A. Forouzan, "Data Communication and Networking", TMH

References Books:

1. D. E. Comer, "Internetworking with TCP/IP", Pearson Education Asia,
2. William Stallings, "Data and computer communications", Pearson education Asia

4.5 OPERATING SYSTEMS

Introduction

Evolution of operating systems. Types of operating systems. Different views of the operating system, operating system concepts and structure.

Processes

The Process concept, systems programmer's view of processes. The operating system services for process management. Scheduling algorithms. Performance evaluation.

Memory Management

Memory management without swapping or paging, swapping, virtual memory, page replacement algorithms, modeling paging algorithms, design issues for paging systems, segmentation.

Interprocess Communication and synchronization

The need for interprocess synchronization, mutual exclusion, semaphores, hardware support for mutual exclusion. queuing implementation of semaphores, classical problems in concurrent programming, critical region and conditional critical region, monitors, messages, deadlocks.

File Systems

File systems, directories, file system implementation, security protection mechanisms.

Input/Output

Principles of I/O Hardware: I/O devices, device controllers, direct memory access.

Principles of I/O Software : Goals, interrupt handlers, device drivers, device independent I/O software. User space I/O software.

Disks: Disk hardware, scheduling algorithms, Error handling, trace-at-a-time caching, RAM Disks.

Clocks: Clock hardware, memory mapped terminals, I/O software. Terminals: Terminal hardware, memory mapped terminals, I/O software.

Processes and Processors in Distributed Systems: Threads, system models, processor allocation, scheduling.

Distributed File Systems: Design, implementation, trends.

Performance Measurement, monitoring and evaluation

Introduction, important trends affecting performance issues, why performance monitoring and evaluation are needed, performance measures, evaluation techniques, bottlenecks and saturation, feedback loops.

Text Books:-

1. Galvin, P. and Silberschatz, A *Operating systems concept with Java*, Addison Wesley
2. Nutt, Gary J. *Operating Systems- A Modern Perspective*, Pearson Education

Reference Books:-

1. Dhamdhere, D.M., *Operating Systems - A Concept-Based Approach*, TMH

4.6 PRINCIPLES OF ECONOMICS & MANAGEMENT

MODULE-I

Economics : Definitions, Nature & scope of Economics, Economics Systems-meaning of Capitalism, Socialism & mixed economy.

Demand And Supplies Analysis: Law of demand and supply, exception to the law of demand, Elasticity of demand and supply and their types, Methods of measuring elasticity of demand and supply.

Theory Of Production : Scales of production, Law of returns, Break even analysis.

Monetary System: Monetary Policy – Meaning, objectives, methods, Fiscal policy – Meaning & objectives of fiscal policy in a developing country like India, Functions of Reserve Bank of India and commercial banks.

MODULE-II

Economics & Business Environment: Privatization –Growth of private capitalism in India, Business/Trade Cycles – Meaning, Characteristics & classification, Foreign capital & economic development.

Management Principles: Meaning & types of Management, Concept of Scientific Management, Management By Objectives, System Approach to Management.

Financial Management: Meaning, functional areas of financial management, Sources of Finance, Meaning of financial accounting, accounting principles-concepts & conventions, Importance of final accounts – profit & loss a/c and balance sheet, Need and importance of capital budgeting.

MODULE-III

Marketing Management: Introduction to marketing management, Market segmentation, Developing & managing advertising programs, Deciding on media & measuring effectiveness.

Production Management: Procedure for production planning & Control, Plant Location & Lay-out, Routing, Scheduling, CPM & PERT

Quality Management: Statistical Quality Control, introduction Control Charts, X Charts, R Charts, Control Charts for C (N. of defects per unit), Control chart for P(Fraction defective), Advantages & Limitations of SQC, Quality Circles:- Structure, functions & Limitations.

Text Books:-

1. Dewett , K.K., *Modern Economic Theory* , S.Chand & Co
2. Singh,B. P. and Chabra, T. N., *Business Organisation & Management*, Dhanpat Rai & Sons
3. Kotler, Philip., *Marketing Management*, PHI
4. I.M. Pandey., *Financial Management*, Vikas Publishing House Pvt. Ltd.

Reference Books:-

1. Ruddar Dutt, K.P.M.Sundaram., *Indian Economy*, S.Chand & Co.
2. Ahuja, H.L, *Advanced Economic Theory*, S.Chand & Co.
3. Grant, Leaven worth, *Statistical Quality Control* ,TMH
4. Edwin B.Flippo, *Personnel Management* , TMH
5. Koontz Harold, *Management – A Global Perspective*, TMH

4.7 MICROPROCESSOR & ASSEMBLY LANGUAGE PROGRAMMING LABORATORY

LABORATORY EXPERIMENTS:

Software Based (Using 8085 And 8086 Instruction Sets)

1. Arithmetic operation on two 8 bit numbers
2. Addition and subtraction of two 16-bit numbers.
3. Operation on two 16-bit BCD numbers.
4. Searching of the smallest and largest element in a block of data.
5. Sorting the elements of a block of data in ascending and descending order.
6. Converting 2 digit numbers to their equivalents. a) BCD to HEX and b) HEX to BCD

Hardware Based (Interfacing With 8085)

1. Program controlled data transfer using 8255 PPI.
2. Interfacing 7 segment LED display using 8255A – in static and dynamic mode.
3. Interfacing keyboard-using 8279.
4. Interfacing display-using 8279.
5. Interfacing ADC 0808/0809.
6. Interfacing DAC 0808.
7. Interfacing stepper motor with microprocessor using 8255.
8. Interfacing of 8253 / 8254.
9. Interfacing of 8251.

4.8 DATABASE MANAGEMENT LABORATORY

Laboratory Work: The laboratory work will be based on contents of course material – design of databases and query in SQL using any database package.

4.9 OBJECT ORIENTED PROGRAMMING USING C++ LABORATORY

Laboratory Work

Implementation of object-oriented features using C++ and Java including inheritance, overloading, Polymorphism, Visual Programming etc.

4.10 COMPUTER NETWORK LABORATORY

1. Conversion of Analog to digital signals.
2. Conversion of digital to analog signals.
3. Conversion of Analog to Analog signals.
4. Conversion of digital to digital signals.
5. Implementation of multiplexers.
6. To study FDM modulation techniques.
7. To study TDM modulation techniques
8. To study WDM modulation techniques
9. To study various transmission media like twisted pairs, co-axial cables, optical fibers etc.

4.11 OPERATING SYSTEM LABORATORY

Case Studies: MS, DOS, MS WINDOWS, LINUX (UNIX) operating system.

E. FIFTH SEMESTER

5.1 INTERNET CONCEPT AND WEB DESIGN

1. Internal basics

1. Concepts of internet and its evolution, application and use of internet in various fields of science and technology, specification and technical details for establishing internet.
Types of functions of modems, IP addressing, internet domains, domain name server, TCP/IP protocols, internet service providers, internets.
2. Internet connectivity
Telephone line, cable, leased line, ISDN, VSAT, RF link.
3. World wide web (www):
World Wide Web and its evolution, web page, web server, http protocol. Examples of web servers.
Navigation tools: Netscape and internet explorer to surf internet, uniform resource locator (URL)
Hypertext, hyperlinks and hypermedia, URL, its registration, browsers, search engines, proxy servers.
4. Internet applications:
E-mail, telnet, FTP, IRC, NNTP, video conferencing, e-commerce
5. Developing portals using HTML
Basic structure of HTML, designing a web page, formatting text, title, heading, colours, fonts, sizes, simple tables and forms. HTML tags hyperlink. Adding graphics and images, image maps, image files. Using tables, forms, style sheets and page.
6. Using front page
front page editor, front page explorer.
7. Client-side scripting: VB scripting Vs java script.
8. Introduction to java script, event handling, verifying, forms, working with browser windows, cookies, embedding with html.
9. Server-side scripting; scripting methods.
10. java server pages (JSP)
11. Active server pages (ASP)

text processing using ASP, handling server/ client requests, accessing databases, using IIS web server, ASP objects
12. Developing interactive web pages using java scripts/VB Script java script/ASP/CGI

Reference books

1. Internet 6-in-1 by kraynak and harkens, prentice hall of India pvt.ltd, New Delhi
2. Using the internet iv edition by kasser, prentice hall of India pvt.ltd, New Delhi
3. Using the world wide web, (iind edition) by wall, prentice hall of India pvt.ltd, New Delhi
4. Internet for everyone by Alexis Leon and Mathews Leon; Vikas publishing house Pvt ltd. New Delhi.
5. Practical guide and Internet by Ab Tiwana; Golgotha Publications pvt ltd, New Delhi.
6. Html-4 for World Wide Web by Castro Addison Wesley (Singapore) Pvt ltd, New Delhi.
7. Principals of web Designing Joel Sklar, web warrior series available with vikas publishing house pvt, ltd, New Delhi.
8. Html 4.0 unleashed by risk Dranell, tech media publication
9. Dynamic web publishing –unleashed tech media
10. using active server pages by Johnson Et.Al Prentice hall of India , new delhi
11. web development with visual basic with Cd Rom By Chaman , prentice hall of india, new Delhi
12. java server pages (jsp) by pekowsky addition Wesley (Singapore) pvt.ltd new delhi
13. active server pages (asp) by Keith Morneau Jill Batistick web Warriier series available with Vikas publishing house Pvt,Ltd, New Delhi

5.2 PRINCIPLES OF ECONOMICS & MANAGEMENT

MODULE-I

Economics : Definitions, Nature & scope of Economics, Economics Systems-meaning of Capitalism, Socialism & mixed economy.

Demand And Supplies Analysis: Law of demand and supply, exception to the law of demand, Elasticity of demand and supply and their types, Methods of measuring elasticity of demand and supply.

Theory Of Production : Scales of production, Law of returns, Break even analysis.

Monetary System: Monetary Policy – Meaning, objectives, methods, Fiscal policy – Meaning & objectives of fiscal policy in a developing country like India, Functions of Reserve Bank of India and commercial banks.

MODULE-II

Economics & Business Environment: Privatization –Growth of private capitalism in India, Business/Trade Cycles – Meaning, Characteristics & classification, Foreign capital & economic development.

Management Principles: Meaning & types of Management, Concept of Scientific Management, Management By Objectives, System Approach to Management.

Financial Management: Meaning, functional areas of financial management, Sources of Finance, Meaning of financial accounting, accounting principles-concepts & conventions, Importance of final accounts – profit & loss a/c and balance sheet, Need and importance of capital budgeting.

MODULE-III

Marketing Management: Introduction to marketing management, Market segmentation, Developing & managing advertising programs, Deciding on media & measuring effectiveness.

Production Management: Procedure for production planning & Control, Plant Location & Lay-out, Routing, Scheduling, CPM & PERT

5.3 DATABASE MANAGEMENT SYSTEMS

Part – 1 Basic Concepts

Databases And Database Users: -

Introduction, Characteristics of Database Approach, Advantages And Disadvantages of Using DBMS.

Database System Concepts And Architecture:-

Data Models, Schemas And Instances, DBMS Architecture And Data Independence, Database Language And Interfaces, Classification of Database Management Systems.

Data Modeling Using The Entity Relationship Model:-

Entity Types, Entity Sets, Attributes And Keys, Relationships, Relationship Types, Roles, And Structural Constrains, Weak Entity Types, ER Diagrams, Naming Conventions And Design Issues

Part – 2 Relational Model, Language And Systems

The Relational Data Model, Relational Constrains, The Relational Algebra and Relational Calculus:-

Relational Model Concepts, Relational Constraints And Relational Database Schema, Update Operations And Dealing With Constraint Violations, Basic Relational Algebra Operations, Example of Queries in Relational Algebra, The Tuple Relational Calculus, The Domain Relational Calculus.

SQL Relational Database Standard:-

Basic queries in SQL, More Complex SQL Queries, Insert, Delete and Update Statements in SQL, Views in SQL, Additional Features of SQL

Part – 3 Database Design Theory and Methodology

Functional Dependencies and Normalization for Relational Databases:-

Informal Design Guidelines for Relation Schemas, Functional Dependencies, Normal Forms Based on Primary Keys, General Definitions of Second and Third Normal Forms.

Part – 4 System Implementation Techniques

Transaction Processing Concepts:-Introduction to Transaction Processing, Transaction and System Concepts, Desirable Properties of Transactions, Schedules and Recoverability, Serializability of Schedules.

Concurrency Control Techniques:-

Locking Techniques for Concurrency Control, Concurrency Control Based on Timestamp Ordering, Validation Concurrency Control Techniques, Granularity of Data Items and Multiple Granularity Locking

Database Recovery Techniques:-

Recovery Concepts, Recovery Techniques Based on Deferred Update, Recovery Techniques Based on Immediate Update, Shadow Paging.

Database Security and Authorization:-

Introduction to Database Security Issues, Discretionary Access Control Based on Granting/Revoking of Privileges, Introduction to Statistical Database Security.

Text Books :

1. Fundamentals of Database Systems, Third Edition, by Elmasri/Navathe
2. Korth and Silberschatz Abraham, Database Concepts, McGraw Hall,1991
3. An introduction to Database Systems by C.J.Date.

References :

1. An introduction to Database Systems by Bipin C. Desai.
2. SQL,PL/SQL ,The programming language of oracle, Ivan Bayross BPB

5.4 DESIGN AND ANALYSIS OF ALGORITHMS

COURSE CONTENTS:

Models of computation. Algorithm analysis, order arithmetic, time and space complexities and average and worst case analysis, lower bounds.

Algorithm design techniques: divide and conquer, search and traversals. Dynamic programming. Backtracking. Branch and bound.

Sorting and searching algorithms, combinatorial algorithms, string processing algorithms. Algebraic algorithms, set algorithms. Hard problems and approximation algorithms.

Problem classes P, NP, NP-hard and NP-complete, deterministic and non deterministic polynomial time algorithms., Approximation algorithms for some NP-complete problems.

TEXT BOOKS

1.V. Aho, J.E.Hopcroft, J.D. Ullman, design and Analysis of Algorithms, Addison Wesley, 1976.

2.Horowitz, S. Sahni, Fundamentals of Computer Algorithms, Galgotia Publishers, 1984.

REFERENCES:

1. D.E.Knuth, The Art of Computer Programming, Vols. 1 and 3, Addison Wesley, 1968,1975.

2. K.Mehlhorn, Data Structures and Algorithms, Vols. 1 and 2, Springer Verlag, 1984.

3. Purdom, Jr.and C. A. Brown, The Analyses of Algorithms, Holt Rinechart and Winston, 1985.

5.5 COMPUTER GRAPHICS

COURSE CONTENTS:

Introduction: What is Computer Graphics, Elements of a Graphics, Workstation, Graphics hardware, I/o devices, Display devices

Basic Raster Graphics: Scan conversion

Filling

Clipping.

Geometric Manipulation: Transformations

Matrices, Homogeneous Co-ordinates.

Elementary 3D Graphics: Plane projections, Vanishing points, Specification of a 3D view.

Visibility: Image and object precision, z- buffer algorithms, area based algorithms, floating horizon.

Advanced Issues:

A. Curves and surfaces: Parametric Representation, Bezier and B-Spline curves.

B. Rendering, raytracing, antialiasing, fractals, Gourard and Phong shading.

TEXT BOOKS:

1. Computer Graphics (Schaum Series) by Lipschutz (MC Graw Hill)
2. Hearn and P. Baker. Computer Graphics, Prentice Hall.
3. C.Graphics by Yashwant Kanetkar.

REFERENCES:

1. D.Rogers and J. Adams, Mathematical Elements for Computer Graphics, McGraw -Hill International Edition.
2. David F. Rogers, Procedural Elements for Computer Graphics, McGraw Hill Book Company.
3. Alan Watt and Mark Watt, Advanced Animation and Rendering Techniques, Addison-Wesley.
4. Young, X Window. System Programming, OSF/Motif Edition, Prentice Hall.

5.6 COMPUTER PERIPHERALS AND INTERFACES

COURSE CONTENTS:

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.

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.

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.

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:

1. P. Pal Chandhari , "Computer Organization and design" Prentice Hall of India Pvt. Ltd, 1994.
2. Del Corso, H.Kirrmann, JD Nicod "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"

5.7 DATABASE MANAGEMENT SYSTEMS LABORATORY

1. Introduction to DBMS.
2. To implement different types of DDL, DML and DCL statements in SQL.
3. To use constraints on the created database.
4. To explore 'select' clause using where, order by, between, like, group by, having etc.
5. To implement different in-built functions on the created database.
6. To implement nested and correlated queries.

5.8 SOFTWARE LABORATORY

Experiments to plot growth of functions. Implementing heuristics and comparison with algorithms designed with asymptotic complexity in Comparison of various data structures for the same algorithm. Experiments with software packages like LEDA.

5.9 SOFTWARE LABORATORY

(Computer Graphics)

- Do two line segments intersect.
- Compute the convex hull of a set of planar points.
- Sean convert line segments.
- Clip line segments against windows.
- Fill polygon with stipple patterns.
- Use Phigs to show objects in various views.
- The truncated cube of Module 3 employed here.
- Display the view volume.
- Show a unit cube in perspective.
- Implement the de Casteljaou algorithm for curves.
- Demonstrate the properties of the Bezier curves Run a sample session on Microsoft Windows including the use of Paintbrush.

5.10 INTERNET LABORATORY

List of Practical

1. Configuring computer system to access internet
2. Using e-mail
3. Using www for accessing relevant information
4. Using telnet
5. Using ftp
6. Using IRC
7. Creating web pages using HTML
8. Creating web pages using front page
9. Demonstration of audio-video conferencing
10. Demonstration of e-commerce transaction
11. design of forms using java script or visual basic scripts
12. validation of user queries and responses in the form using java script or VB script
13. create a homepage with frames, animation, background sound and hyperlinks
14. Design shopping cart for e-commerce application
15. Develop hectometer for each client i.e. number of visitors visit to a site
16. Designing simple server side programme which accept some request from the client and respond
17. Establishing sessions between server and client
18. Design fill-out form with text check box, radio buttons etc and embed java script or VB script to validate users input.
19. Develop simple server side programme in asp (active server pages) which accept some request from the client and respond.
20. Develop interface with database (ms-access etc) for online retrieval and storage of data through html form.

F. SIXTH SEMESTER

6.1 DATA BASE MANAGEMENT SYSTEMS – II

COURSE CONTENTS:

Data base system architecture, data independence, storage structures, data representation, indexing, relational data structure, relations, attributes, keys, embedded SQL, Relational Algebra, Query by example, relational calculus, normalization & normal forms, functional dependence, over view of security, integrity, recovery, backup, etc. [25 %]
SQL, Transact-SQL, PL SQL, SQL *PLUS, Managing Database and Queries: Creating, defining and modifying Table structure, Transact-SQL PLUS and substitution of variables. [35%]
Introduction to SQL Server and Oracle Server [5%] Indexes [5%] Views [5%] Packages [5%]
Triggers And Stored Procedures [10%] Cursors [5%] Control structure [5%]

Text Books:

1. Korth and Silberschatz Abraham, Database System Concepts, McGraw Hall, 1991.
2. An Introduction to Database Systems, Vol.-1, C.J. Date (Addison Wesley) References:

References:

1. Ramez Elmasri and Shamkant B. Navathe Fundamentals of Database System, The Benjamin / Cummings Publishing Co., 2nd Edition, 1994.
2. PL/SQL The Programming Language of ORACLE, Ivan Bayross (BPB Publication)

6.2 ARTIFICIAL INTELLIGENCE AND APPLICATION

INTRODUCTION

Ai problems, foundation of ai and history of ai intelligent agents: agents and environment, the concept rationality, the nature of environments, structure of agents, problem solving agents, and problem formulation.

SEARCHING

Searching for solutions ,uniformed search strategies-breadth first search, depth first search , depth limited search , interactive-deeping depth first search bi-direction search –comparison.search with partial information (heuristic search) greedy best first search , asearch memory bounded heuristic search , heuristic function.local search algorithms : hill climbing, simulated, annealing search , local beam search, genetical algorithms. Constrain satisfaction problems: backtracking search for csps local search for constraint satisfaction problems.

GAME PLAYING

Adversial search, Game, minimax, algorithm, optimal decisions in multiplayer games, Alpha Beta pruning, Evaluation functions, cutting of search.

KNOWLEDGE REPRESENTATION & REASONS LOGICAL AGENTS

Knowledge – based Agents, the Wumpus world, logic, propositional logic, Resolution patterns in propos ional logic, Resolution, Forward & backward . Chaining. First order logic. Inference in first order logic , propositional Vs first order inference, unification & lifts forward chaining, Backward chaining Resolution.

PLANNING

Classical planning problem language of planning problems, expressiveness and extension, planning with state – space search , forward states spare search, backward states space search, heuriatics for states space search. Planning search, planning with states space search partial order, planning graphs.

LEARNING

Forms of learning, inductin learning, learning Decision tree, Statistical learning methods, learning with complex data, learning with hidden variables- The EM Algorithem, instance based learning, Neural networks.

BOOKS;

- Introduction to Artificial Intelligence- Rajendra Akerkar, PHI.
- Artificial intelligence- A modern Approach. Second Edition, Stuart Russel, Peter Norvig, PHI/ Pearson Education.
- Artificial Intelligence, 3rd Edition, Patrick Henry Winston, Pearson Education.
- Artificial Intelligence, 2nd Edition. E. Rich and K. Knight (TMH)
- Artificial Intelligence and Expert Systems- Patterson PHI
- Expert Systems: Principles and Programming- Fourth Edition, Giarrantana/ Riley, Thomson
- PROLOG Programming for Artificial Intelligence. Ivan Bratka- Third Edition- Pearson Education.

6.3 ASYNCHRONOUS TRANSFER MODE

COURSE CONTENTS:

Introduction to ATM, ATM Cable & Transmission, Theory of Operation, Choice of Payload size [20%]
ATM N/W Basics, ATM Hardware, Switch Models and their comparison [20%]

ATM traffic Management, Conjunction control [25%] User Control and Management Planes[5%]

ATM and System, Design Consideration [5%]

ATM based Protocol interworking, ATM layer Performance Measurement[15%]
Technological comparison of ATM with others structures [10%]

TEXT BOOKS

1) ATM - Theory and Application by David E. McDysan & Darren L. Spohn, Mc Graw Hill 1994

REFERENCES

1) IEEE Networks Magazine Sep '92 onwards

6.4 SOFTWARE ENGINEERING

COURSE CONTENTS

Software Engineering Principles: How is software engineering an engineering discipline, Information system characteristics, software development process models, life cycle concepts, software phases and deliverables, software development strategies. [15%]

Technical Development: Structured systems analysis and design requirements collection and specification, data flow and logical data modeling, cost benefit analysis, feasibility study, architectural and detailed design, process, data, network, control and user interface designs, physical data design, dynamic modeling for real-time systems. [15%]

Software Project Management: principles of software project management organizational and team structure, project planning, project initiation and project termination; technical, quality and management plans, project controls, cost estimation methods-function points and COCOMO, tools. [15 %]

Software Quality Management: quality control, quality assurance, quality standards, software metrics, verification and validation, testing, quality plans, tools Configuration Management [15 %]

Software Development Method & CASE: formal, semi-formal and informal methods; data function, and event-based modeling, some of the popular methodologies such as Yourdon's SAD, SSADM etc. CASE tools, CASE standards.[20 %]

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Implementation: in 3GL environment, in 4GL environment, in client-server environments, coding styles. [20 %] Documentation, Software Maintenance [5 %]

TEXT BOOKS:

- 1) Pressman R. S., Software Engineering: A practitioner's Approach, Third Edition McGraw Hill, New York, 1987.
- 2) Jalota, Software Engineering.
- 3) Sommerville I., Software Engineering, Fourth Edition, Addison - Wesley Pub. Co., 1992.

REFERENCES:

- 1) Ghezzi C., Jazayeri M. And Mandrioli D.: Fundamentals of Software Engineering, Prentice Hall, N. J. 1991
- 2) Pfleedger S. L., Software Engineering: The Production of Quality software, Second Edition, Macmillan Publishing Company, 1991.
- 3) Oehm B. W., A Spiral Model of Software Development and Enhancement, IEEE Computer, 21.pp 61-72, May 1988.
- 4) Fairley R., Software Engineering Concepts, McGraw Hill, New York, 1985.

6.5 ELECTIVE-I

1. COMPUTER VISION

COURSE CONTENTS :

Applications of Computer vision :

a)Machine vision for industrial inspection

b)Machine vision for Robotics and control

c)Image analysis of industrial and medical images Early visual processing, Review of basic image processing techniques. [10%]

Intermediate Processing: Computational approach to stereopsis, Distance and surface orientation computation from Disparity, Visual motion computation, apparent motion and correspondence Problem. [20%]

Architectural issues of intermediate processing, Parallel algorithms, Parallel solutions to conventional Image algorithms, Pyramidal architecture for vision. Fuzzy logic procedures in computer vision algorithm, Fuzzy logic procedures in computer vision algorithm, Fuzzy logic membership function, application in decision making . [20%]

Shape Representation & Recognition: Critical Issues, the 3D model representation, their derivatives and use, Relation between viewer centred and object centred representation, Correspondence between Image and Catalogued model. [30%]

Peripheral hardware for computer vision: Imaging devices, frame grabbers, display devices. [20%]

TEXTS/REFERENCES:

1)Ballard and C.M.Brown, Computer Vision , Prentice Hall, Englewood Cliffs, 1982

2)Horn, Robot Vision, MIT Press, Combridge, 1986

3)MJB Duff, Intermediate level Image processing, Academic Press, 1986

4)E.R.Davies; Machine vision Theory, Algorithms & Practicalities, Acadmic Press, 1990

5)David Vernon, Machine vision, Academic Press 6)Pratt; Digital Image Processing John Wiley & Sons, 1978

2. SYSTEM HARDWARE DESIGN

COURSE CONTENTS:

CMOS Technology :

Logic levels noise margin power dissipation, supply currents speed, delays. [10%]

Interconnect analysis Power/Ground droop/ bounce coupling analysis Transmission line effects/cross talk [40%]

power/ground distribution signal distribution Logic Design \ Random logic \

Programmable logic Microcontrollers Memory subsystem design Noise tolerant design worst case timing thermal issues in design. [40%]

Real life system design examples. [10%]

TEXTS/REFERENCES:

1)James E.Buchanan, " BICMOS-CMOS System Design" McGraw Hill International Edition 1991.

2)Jame E.Burchana, " CMOS-TTL System Design" Mc Graw Hill International Edition 1990

3)John P. Hayes. " Digital System Design and Microprocessors" Mc Graw Hill International Edition 1985.

4)Darryl Lindsay, " Digital PCB design and drafting" Bishop Graphics 1986.

5)Howard W.Johnson & Martin Graham, High Speed Digital Design-A Handbook of Black Magic, Prentice Hall, PTR Englewood Cliffs, 1993

3. Real Time System

Introduction: Definition, Issues in Real Time Computing, Structure of a Real Time System. Task Classes

Characterizing Real Time Systems and Tasks: Introduction, Performance measures for real time systems: Traditional performance measures, Performability, Cost functions and hard Deadlines

Task Assignment and Scheduling: Introduction , Classical Uniprocessor scheduling algorithms: Rate Monotonic, EDF algorithm, Task assignment, Fault tolerant Scheduling

Real Time Databases: Basic definitions, Real time Vs General Purpose databases, Main Memory databases, concurrency control issues, databases for hard real time systems

Real Time Communication: Introduction, Archtectural Issues, Protocols: Contention based protocols,Token based protocols, Deadlines based protocols, Stop and Go Multihop protocol, The polled bus protocol, Hierarchical round robin protocol.

References:

1. "Real Time Systems"-Liu Pearson Education

2. "Real ?Time Systems"-C. M. Krishna and Kang G. Shin

4. Mobile Computing

INTRODUCTION TO MOBILE COMMUNICATION

Generation of mobile communication, introduction to cellular concept-PCS architecture, Mobility management, handoff, Inter-BS, Intersystem handoff, Handoff detection, strategies of handoff, cell structure, Radio Link data transfer, channel assignment.

GSM SYSTEM OVERVIEW

GSM system architecture, Mobile station, Base Station System, Network And Switching, Subsystem, Radio interface, Air interface data transfer, Channel Coding, Interleaving Burst Formatting AMR, EMR, LAPD protocol, Mobile number portability.

ADVANCED GSM CONCEPTS

Problem in air interface, Co-Channel interference, adjacent channel interference, Path Loss, Time alignment, Timing advance, GSM call flow, inter network, intra network calls, SMS, Location Updation, Periodic registration, purging period, Authentication process, Ciphering process.

Gprs AND WAP SYSTEM OVERVIEW

Gprs FUNCTIONAL GROUP, gprs ARCHITECTURE, gprs NETWORK Nodes, GPRS interfaces, GPRS billing EDGE & HSCSD, WAP Model, WAP gateways, wap protocols, WML, WML script.

CDMA OVERVIEW & OTHER EMERGING AREAS

CDMA Architecture and Overview, Wireless Local Loops- WLL Architecture, Development Issues, Bluetooth- Overview, Bluetooth Protocols.

Books:

- Mobile Communication by William C.Y. Lee.
- Mobile Communication by J. Schiller

5. Wireless sensor Networks

6.6 Open Elective

1. COMPUTERS AND SOCIETY

COURSE CONTENTS:

A survey of a variety of computer application. [15%]

Impact of introduction of computers and its impact on privacy and security [15%]

Networking of computers and its impact on privacy and security [15%]

Information integrity [10%]

Ethical issues arising out of creation of computer viruses trojan horses etc. [10%]

Intellectual property rights in relation to computer v hardware and software.[15%]

Data banks and their impact on society. [10%]

The role of computer in education. [10%]

TEXTS / REFERENCES:

Weizenbaum, J. Computer Power and Human Reason: from judgement to Calculation.

W. H. Freeman, San Francisco, 1976.

Dunlop, C., Kling, R., (Editors) Computerization and Controversy: Value Conflicts and Social Choices, Boston Academic Press, 1991

2.Environment Science

Unit 1 : The Multidisciplinary nature of environmental studies

Definition, scope and importance (2 Lectures)

Need for public awareness.

Unit 2 : Natural Resources :

Renewable and non-renewable resources :

Natural resources and associated problems.

a) Forest resources : Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

b) Water resources : Use and over-Utilization of surface and ground water, floods, drought, conflicts and water, dams-benefits and problems.

c) Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.

f) Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Role of an individual in conservation of natural resources.

Equitable use of resources for sustainable lifestyles.

Unit 3 : Ecosystems

Concept of an ecosystem.

Structure and function of an ecosystem.

Producers, consumers and decomposers.

Energy flow in the ecosystem.

Ecological succession.

Food chains, food webs and ecological pyramids.

Introduction, types, characteristic features, structure and function of the following ecosystem :-

- a. Forest ecosystem
- b. Grassland ecosystem
- c. Desert ecosystem
- d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) (6 lectures)

Unit 4 : Biodiversity and its conservation

Introduction – Definition : genetic, species and ecosystem diversity.

Biogeographical classification of India

Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values

Biodiversity at global, National and local levels.

India as a mega-diversity nation

Hot-spots of biodiversity.

Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.

Endangered and endemic species of India

Conservation of biodiversity : In-situ conservation of biodiversity.

Unit 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, earthquake, cyclone and landslides. (8 lectures)

Unit 6 : Social Issues and the Environment

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people ; its problems and concerns. Case studies.
- Environmental ethics : Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.

- Water (Prevention and control of Pollution) Act
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation.
- Public awareness. (7 lectures)

Unit 7 : Human Population and the Environment

- Population growth, variation among nations.
- Population explosion – Family Welfare Programme.
- Environment and human health.
- Human Rights.
- Value Education.
- HIV / AIDS
- Women and Child Welfare.
- Role of Information Technology in Environment and human health. Case Studies.

Unit 8 : Field work

- Visit to a local area to document environmental and 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, hill slopes, etc. (Field work Equal to 5 lecture hours)

3.Oraganisation Structure

COURSE CONTENTS :

Understanding the nature of organizations [5 %]

A systems approach to organizations [10 %]

Explaining predicting Behaviors in Organizations. [5 %]

The individual in the organizations Organizational structure its dimensions, its influence [25%]

Taxonomy of organizations. Types of structure [15 %]

Forms of Organizational structure

Product process, functional, territorial and matrix, SBUs. [25 %]

Organizational Theory and Designs [15 %]

6.7 HARDWARE LAB - V (ATM)

Simulation of ATM Switch performance, through put with mixed load conditions.

Implementing Ethernet on various platform (Windows NT, Window 95, UNIX, Mac OS Novell Netware)

- Installation of windows NT & Novell Netware
- Comparison of Network traffic
- Handling problems related to congestion using various tools (Net watcher etc.)
- Comparison of utilization of various resources (Processor, memory, hard disk etc.)
- Under different networking loads.
- Familiarization with NDS in Novell.
- Memory Management Techniques in N/W
- Data compression & its Effects on N/W
- Security Aspects of N/W System efficiency
- Creation & maintenance user Accounts
- Permit Spooling

6.8 SOFTWARE LAB (RDBMS-II)

To run the various queries using commands of SQL.

To write programs using control structures of PL/SQL like
If-else statements.

To write programs using loops of PL/SQL like

For

Do-while

while

Implementation of

Cursors.

Procedures

Packages.

Triggers

6.9 SOFTWARE LAB (S/W ENGINEERING)

Assignments should be provided for the following:

- Use of CASE tools for development of DFD, data dictionary, E-R diagram, Structured Chart.
- Analysis and design of simple object-oriented as well as real time systems.
- Familiarity with JSP and JSD
- Documentation
- Beta Testing

G. SEVENTH/ EIGHTH SEMESTER

8.1 Expert System

COURSE CONTENTS :

Expert Systems, Definitions types, components, Expert System Development Process [15 %]

Knowledge Representation Techniques-Logic Frames, Semantic Nets, etc. [15 %]

Domain Exploration Knowledge elicitation. Conceptualization, bathering Formlizations

Methods of Knowledge Acquisition; Interviewing Sensor Data Capturing. [20 %]

Learning, Planning and Explanation in Expert System: Neural Expert System, Fuzzy

Expert System, Real Time Expert Systems. [30 %]

Implementation Tools : Prolog, Expert System Shell Expersys, etc. Study of existing expert systems-

TIERES, As Mycin & AM. [20 %]

TEXT BOOKS

1) Patterson, Introduction to AI Expert System, PHI, 1993

2) Jackson, Building Expert System, John-Wiley 1991.

8.2 FORMAL LANGUAGE & AUTOMATA THEORY

COURSE CONTENTS:

Basic Definitions Operations on Languages: Closure properties of Language Classes.

Context Free languages: The Chomsky Griebach Normal Forms. Linear Grammars and

regular Languages. Regular Expressions Context Sensitive Language; The Kuroda

Normal Form, One sided Context Sensitive Grammars. [35 %]

Unrestricted Languages: Normal form and Derivation Graph, Automata and their

Languages: Finite Pushdown 2-push down Automata and Turing Machines. The

Equivalence of the Automata and the appropriate grammars. The Dyck Language. [25 %]

Syntax Analysis : Ambiguity and the formal power Series, Formal Properties of LL(k)

and LR(k) Grammars. [15 %]

Derivation Languages; Rewriting Systems, Algebraic properties, Canonical Derivations,

Context Sensitivity.[15 %]

Cellular Automata : Formal Language aspects, Algebraic Properties Universality &

Complexity Variants. [10 %]

TEXT BOOKS

1) G. E. Reeves, Introduction to Formal Languages, McGraw Hill 1983

2) M. H. Harrison, Formal Language Theory Addison Wesley 1978.

REFERENCES

1) Wolfman Theory and Applications of Cellular Automata, World Scientists, Singapore, 1986.

8.3 LINUX ADMINISTRATION AND SHELL PROGRAMMING

1. Introduction: History of Linux, Linux Overview, Linux releases, Open Linux.
2. Installing Linux: Hardware, Software and information requirements: opening disk for Linux partitions, creating the open Linux install disks, installing Linux, Installing and configuring X-Window, installing sound drivers.
3. 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.
4. Shell: the command line special characters and file arguments, standard input/ output and redirection, pipes, redirecting and piping with standard errors, shell script, jobs.
5. Linux File Structure: Linux files, file structure, listing displaying and printing files, managing directories, file and directory operations.
6. Vi Editor: Vi editing commands, advanced VI editing commands, line editing commands, options in Vi.
7. System Administration: system management, managing users, installing and managing devices, floppy disk management, file system administration, backups.

List of Practicals

1. installing Linux
2. Installing and configuring X-windows
3. Installing Sound drivers
4. Creating and managing user accounts.
5. Practice on Linux commands
6. Establishing internet connection with modem
7. Practice on using email
8. Practice on creating and managing files and folders
9. Practice in vi editing commands
10. Uninstalling linux server.

Recommended Books

1. linux- The complete Reference by Richard Peterson, Tat McGraw Hill, New Delhi
2. linux- Install and configuration Black Book by Dee Annleblanc and Issac Yates, IDG Books India Private Ltd. Delhi
3. unleashed Linux by TecMedia Publishers.

8.4 MULTIMEDIA COMMUNICATION SYSTEM

1. Introduction: Concept and Overview
2. Hardware Requirements
 - CPU
 - Monitor
 - I/O Devices
 - CD Rom
 - Sound Card
 - Laser Disc

3. Mass Storage Devices

4. Software for Multimedia

5. Components of Multimedia

- Textual Information
 - Bitmap and Vector Images
 - Animation
 - Digital audio/ video etc
6. Hypertext
 - Concepts and Elements
 - Applications

List of Practicals

a) Using Director- Macro –media Director6 (or higher)

1. Understanding the working principle of Macromedia
2. Creating new sprites and placing them on the score
3. Move, resize, change the stacking order of the sprites on the stage.
4. View and edit sprite properties
5. Creating a film loop

b) Using Sound Forge XP

1. Understanding the sound forge XP Software
2. Creating a new sound file and perform simple editing and navigation
3. Perform the following editing of sound formats:
 - a. Mono to stereo and vice versa conversation
 - b. Conversion of 16 bit samples to 8 bit samples
4. Use of the following sound processing functions:
 - a. Simple processes and effects as in wave form display
 - b. Insert, silence, resembling, time comparison, expansion and pitch band (to stereo files)

Recommended Books

1. Multimedia making it work by Vanhan, Tay
2. Multimedia gateway to next millennium by Robert Aston and Joyce Schwarz
3. Multimedia Madness by Ron Wataski
4. Multimedia Handbook by Jessica keys, Tata McGraw Hill, New Delhi

8.5 ELECTIVE II

1.OVERVIEW OF IT MATERIALS.

COURSE CONTENTS :

Electrical and Thermal Properties of Metals: The electron gas model of an electron in an electric field., mobility and conductivity, factors affecting the conductivity of electrical materials, effect of temperature on electrical conductivity of metals, superconductivity[20 %]

Dielectric Properties of Materials : Polarization of dielectric constant of monatomic gases, other polarization methods, the internal fields in solids and liquids, the polarisability catastrophe Frequency dependence of polarisability dielectric losses, dipolar relaxation, frequency and temperature dependence of dielectric constant of polar dielectrics, ionic conductivity in insulators, insulating materials, Ferro-electricity, Piezoelectricity[20 %]

Magnetic Properties of Materials : Classification of magnetic materials; the origin of permanent magnetic dipoles, diamagnetism, Para magnetism, ferromagnetism, ferromagnetic domains, the magnetization curve, hysteresis loop, magnetostriction magnetic materials, antiferromagnetism, Ferro-magnetism, magnetic resonance ferrites, their properties and uses. [20 %]

Optoelectronic Materials: Photoemission, Photomassive materials and Photocathodes, Multialkali photocathodes, Electroluminescence. Electroluminescence panels, junction photoemitters, injection losses, gallium arsenide, gallium phosphide and other losing materials.[15 %]

Special Electrical and Electronic Materials: Alloys and compounds, Solid solution and solubility, phase diagram, alloy composition and properties, multi phase materials, ceramics preparation, Silicate Structure and polymorphism, Properties of ceramics, High temperature ceramics, Crystalline and amorphous phases, Amorphous and polycrystalline materials[15 %]

Engineering plastics : Polymer Structures : Preparation and characterization of plastics, elastomers and fibres; Application of polymers in electronics and optoelectronic device technology[10 %]

TEXT BOOKS

1. V. Rahhavan Material Science and Engg. A first course, Prentice Hall of India, 1988.
2. C.M. Srivastava and C. Srivastava, Science of Enggg. Materials, Wiley Eastern Ltd., 1987
3. Kenneth M. Ralls and Thomas H. Courtney and John Wulff, Introduction to Materials Science and Engg. , Wiley Eastern Ltd., 1975.
4. William D. Callister Jr. Materials Science and Engg. - An Introduction, John Wiley and Sons, Inc. N. Y. 1994.

REFERENCES

1. John Allison Electronic Engineering Materials and Devices, Tata McGraw Hill, 1981.

2. SYSTEM SIMULATION & MODELLING

COURSE CONTENTS:

Concept of a system, stochastic activities, continuous and discrete system, principals used in simulation and modeling for various applications. [10%]

Techniques of simulation, Monte Carlo method, type of system simulations, real time simulation stochastic variables, discrete probability function, generation of random number, poisson arrival pattern, exponential distribution, service time, normal distribution, queuing discipline, measures of queues.[30%]

Representation of time, generation of arrival pattern, Discrete simulation languages queuing and inventory control.[25%]

Discrete simulation languages an overview of use of GPSS as a simulation.[20%]

Inventory control systems for illustration of applications.[15%]

TEXTS BOOKS:

1. Gordon. G., system simulation, 2nd ed. 1989, Prentice Hall of India Pvt. Ltd.

2. Deo, Narsingh, system simulation with digital computers, PHI, New Delhi, 1993.

REFERENCES:

1. K.S. Trivedi, " Probability and statistics with reliability, quening and computer science application. P.H. is Engluood cliff.

2. Subranranian, K.R.V. and Sundaresan R. Kadayam, System simulation: Introduction to GPSS, CBS, New Delhi, 1993.

3. W. Feller, "An Introduction to probability theory and its applications," Vol 183, Wiely Eastern Ltd. ND.

3.EMERGING TECHNOLOGIES AND CUREENT IT-TRENDS

COURSE CONTENTS:

Introduction to DVD technology and its advantages over CD technology. [5 %]

Introduction to SNA Server fundamentals, SNA server network overview, Why SNA server and its connectivity with PC's [5 %]

Introduction to ISDN Services and alternatives to ISDN technology, Operating System software for ISDN, Connection of multiple devices to ISDN lines. [10 %]

MAPI and its open architecture, other messaging API's, cross platform API's, advantages and disadvantages of cross MAPI's, Windows Open Systems Architecture (WOSA).[10%]

Evaluation of the performance of AS400 & TCP/IP connectivity in an AS400 environment, Integration of IBM mainframes with TCP/IP networks. [15 %]

Distributed computing environment (DCE), DCE services, Remote Procedure Call (RPC) & DCE security, Cell Directory Services (CDS), Global Directory Services. [10 %] (GDS), Distributed to proxy server & SQL server, Internet & Online services, Internet security framework And its overview, Intranet concepts & related term development toolbox. [10 %]

Introduction to Open Database connectivity (ODBS), Object Linking Embedding [10 %]

Introduction to Telephone Application Programming Interface (TAPI) [10 %]

TEXTS BOOKS:

8.3 Reference Technical Information Network From Microsoft

4.VLSI Design

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 behavioural, dataflow and structural models.

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

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

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

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

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

Text 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 Primer": Bhasker; Prentice Hall 1995
4. "Digital System Design using VHDL":Charles. H. Roth; PWS(1998)
5. "VHDL-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)

8.6 Elective III

1. GRAPHICAL USER INTERFACE (DE-III)

COURSE CONTENTS:

GUI concepts and an introduction to MS Windows.[10%]

Understanding the components of a window [10%]

Hungarian naming and basic data types [15%]

An attempt to code the shortest windows program, Menus. [15%]

GDI-an introduction, Mouse messages, Key Board Messages [10%]

Windows, Edit controls [10%]

Windows within window - The child window, Accessories, Dialog boxes [10%]

Memory Management [10%]

Customized resources, Printing, Bitmaps and Clipboard. [10%]

TEXT BOOKS:

1.Window API Bible by Galgotia Publication.

2.Ben Ezzell with Jim Blaney, NT4/ Windows 95 Developer's Handbook, BPB Publications, 1997.

REFERENCES:

1. Charies Patzold, Programming Windows '95, Microsoft Press, 1996

2. Richard J. Simson, Windows NT Win32, API Super Bible SAMS,1997

1. ADVANCED MICROPROCESSOR (ELECTIVE III)

PREREQUISITIES: Computer Architecture and Microprocessors and Interfaces

OBJECTIVES: Having undergone a first course on Microprocessors and Interfaces, this course provides the student to the Advanced Architectural features of the State of the art Microprocessors.

COURSE CONTENTS:

Review of 8 bit microprocessors and support components [5 %]

Selected Case Studies of 16/32/64 bit microprocessors and support Contents [20 %]

RISC Architectures and Case Studies: RISC vs CISC [10 %]

Power PC 601 Alpha 21064, Pentium super space, Transputer Architectures and Case Studies : High Performance Embedded Micro controllers, Case Studies [25 %]

403 GA Development Systems and support [25 %]

Selected Applications [15 %]

TEXT BOOKS

- 1) J.T. Cain, Selected reprints on microprocessors and microcomputers, IEEE Computer Society Press, 1984
- 2) M. Rafiqzaman, Microprocessors & Micro Computers Development systems, Harper tow 1984
- 3) M. Rafiqzaman, Microprocessors & Micro Computers - Based system design, Universal Book Stall, New Delhi, 1990
- 4) INMOS Ltd. Transputer Development System, Prentice Hall, 1988
- 5) INMOS Ltd., Communicating Process Architecture, Prentice Hall 1988.
- 6) Wunnava V. Subbarao, 16/32 bit Microprocessors 68000/68010/68020, Software, Hardware & Design Applications, Macmillan Publishing Company, 1991

REFERENCES:

- 1) Kenneth Hintz, Daniel Tabak, Microcontrollers : Architecture, Implementation & Programming McGraw Hill Inc. 1992.
- 2) Data Books by Intel, Motorola, etc.
- 3) Daniel Tabak, Advanced Microprocessors, McGraw Hill Inc. 1995.
- 4) Andrew M. Veronis, Survey of Advanced Micro Processors, Van Nostrand Reinhold, 1991 MCGraw Hill Inc. 1992.
- 5) Daniel Tabak, RISC Systems, Johan Wiley & Sons, 1990
- 6) The Power PC Architecture : A Specification for a New family of RISC Processors, Edited by Cathy May, Ed Silha, Rick Simpson, Hank Warren, Morgan Kaufmann Publishers, Inc., San Francisco, California, 2nd Edition (May 1994)
- 7) Chales M. Gilmore, Microprocessors Principles and Applications, McGraw Hill International Editions, 2nd Edition, 1995
- 8) Power PC 403GA Embedded Controller User's Manual
- 9) Power PC Tools - Development Tools For Power PC Microprocessor (Nov. 1993)
- 10) Power PC 601 RISC Microprocessor User's Manual - 1993

3. IMAGE PROCESSING AND PATTERN RECOGNITION (ELECTIVE)

COURSE CONTENTS :

Background : Introduction to electronic systems for image transmission and storage, computer processing and recognition of pictorial data, overview of practical applications. [5 %]

Fundamentals : Mathematical and perceptual preliminaries, human visual system model, image signal representation, imaging system specification building image quality, role of computers, image data formats. [15 %]

Image processing Techniques : Image enhancement, image restoration, image feature extraction, image data compression and statistical pattern recognition. [45 %]

Hardware architecture for image processing: Colour image signal representation, colour system transformations, extension of processing techniques to colour domain. [15 %]

Techniques of colour image processing: Colour image signal representation, colour system transformations, extension of processing techniques to colour domain. [15 %]

Applications of Image processing: Picture data archival, machine vision, medical image processing. [10 %]

TEXTS BOOKS

1) Pratt, W. K. Digital Image Processing, John Wiley, N. Y. 1978

2) Jain, A.K. fundamentals of Digital Image Processing, Englewood Cliffs, Prentice Hall, 1989

REFERENCES:

1) Rosenfield, A and Kak, A.C., Picture Processing, Academic Press N. Y. 1982]

4. Symbolic Logic and Logic Processing

5. IT Application

6. Digital Signal Processing

Fourier analysis of discrete-time signals and systems: Discrete Fourier Series, Discrete Time Fourier Transform, Discrete Fourier Transform - Properties; Approximation of Fourier transform through DFT, Fast algorithms for DFT: The FFT algorithm - Prime factor algorithms, Convolution; Linear and circular convolution, Practical computation, Overlap save and overlap add methods, Short time Fourier transform.

Digital filters: FIR Filters: Impulse response, Transfer function, Linear phase properties, Design: window based design, frequency sampling design, minimax design. IIR Filters: Impulse response, Transfer function, Pole-zero representation; Butterworth, Chebyshev, inverse Chebyshev and elliptic filter concepts, Approximation problem for IIR filter design: Impulse in variance method, Bilinear transform method, Matched z-transform method, Minimum mean squared error method; Frequency transformations.

Least squares filter design: Deterministic least squares: whitening problem: FIR case; Signal modelling: Spectral factorization Statistical least squares: Non-causal case, FIR case, Causal IIR case, Adaptive filtering: concepts and algorithms

(a) Internal descriptions of digital filters: Signal flow graphs, State variable descriptions, State variable descriptions from primitive signal flow graphs, Transfer function from state variable descriptions, difference equation from state variable description, Co-ordinate transformation, Poles, zeros and the state variable description.

(b) Finite length register effects: Limit cycles, overflow oscillations, state variable model for overflow, round-off noise in IIR digital filters, computational output roundoff noise, methods to prevent overflow, scaling rules, and scaling operations, scaling state variable description, trade off between round off and overflow noise, measurement of coefficient quantization effects through pole-zero movement, dead band effects, constant input limit cycles.

Text Books:-

1. Boaz Porat, *A course in Digital Signal Processing*, Prentice Hall Inc.
2. Mitra S. K., *Digital Signal Processing : A Computer Based Approach*, McGraw-Hill Publishing
3. Richard A. Roberts, Clifford T. Mullis, *Digital Signal Processing*, Addison-Wesley Publishing Co

Reference books:-

1. Oppenheim A. V., Schaffer R. W., *Discrete-Time Signal Processing*, PHI
2. Chi-Tsong Chen, *Digital Signal Processing: Spectral Computation and Filter Design*, OUP
3. John G. Proakis, Dimitris G. Manolakis, *Digital Signal Processing: Principles, Algorithms and Applications*, PHI
4. Lonnie C. Ludeman, *Fundamentals of Digital Signal Processing*, John Wiley & Sons

8.7 Project

Major Project is meant for solving live problems faced by the current industries by applying the knowledge and skills gained by students in the 3 years. Students may be asked to identify the problem of project in consultation with a teacher in the second year (well in advance). Each project should be taken by 4 to 5 students. While the students are executing the projects teacher will monitor the progress of students by paying regular visit to the industries. The students will submit comprehensive project report with a fabricated model / instruments/ circuits for evaluation by the teacher guide, experts from industry and external examiner.

The project assignment may consist of

- Installation of computer system, peripherals & software
- Programming customer based applications
- Web page designing
- Data base applications
- Networking
- Software Development
- Fabrication of component/equipment
- Fault-diagnosis and
Rectification of computer
System and peripherals
- Bringing improving in the existing systems/equipment
- Any other area as per local requirement

8.8 Software project Management

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.

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.

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.

Project Economics

Project costing, project estimation techniques, automated estimation tools. Develop cost estimates and budgets with cost accounts to plan project expenditures.

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:

- Mathur, "S.S Principles of Management"
- Robbin. S.P."Organisational Behavior"
- Prof KK Aggarwal & Yogesh Singh:Software ENGG
- Pankaj Jalote." An integrated Approach to Software Engg" Narosa Publishing House, New Delhi
- Pressman "Principles of Software Engg" TMC, 5th Ed.2005

5. SUGGESTIONS FOR EFFECTIVE IMPLEMENTATION OF CURRICULUM

Curricula for degree programmes in engineering and technology have been designed by SSU Palampur faculty with close cooperation of SSE Badhani and Amritsar. They have understood the systematic approach of curriculum development and implementation. While designing the curriculum they have taken into account employment scenario, equivalence with PTU curriculum and experience of implementing existing curriculum.

Some of the suggestions for effective implementation of curriculum are:

-1. Vision and mission of institute, Philosophy objective and outcome of curriculum of programmes should be understood by all teachers and students. These should be displayed in the Department so that expectation of all stakeholders are clear to everyone.

2. Principal with Head of Departments should analyze the curriculum to find out the requirement of resources for its implementation and prepare an action plan for their availability in time. Institute should network with other organizations for sharing resources and adopt innovative approaches for managing whole courses.

3. HOD's and teachers are managers of whole programmes and subject teaching respectively. Their success in achieving objectives depends on preparing academic plan and its judicious execution.

4. Teachers should prepare rationale and objective of their respective subjects, structure of content, method and media and table of specification for evaluation. This should be given to student so that they are aware of the outcome of the course.

5. Set up a group of teachers and final year students for sharing experiences of curriculum implementation and suggest further improvement.

6. Teachers are required to plan as follows for carrying out teaching learning process effectively: -

- (a) Prepare profile of students for knowing their background and strengths so as to facilitate them in fulfilling their dreams of jobs and life.
- (b) Analyze programme and develop teaching plan.
- (c) Plan for guided self study exercises for student and available learning resources like journals, web site, educational video programming etc in addition to visit to industries and organizing industrial training, arranging expert lecture by alumni and experts from industry/ field.
- (d) The co-curricular activities like organizing different camp, social gathering study tour, hobby club etc may be used to develop generic skills like communication skills, task Management, problems solving, managing self, stress Management, Time Management and collaborating with others etc.

1. A project bank may be developed by the concerned department of the university in consultation with industry, research and other relevant field organizations.
2. Student may be given practical assignment and project to develop practical skills. This will help them in developing creativity and confidence for their gainful employment, (wage and self).
3. (a). Teachers and students should be aware of objectives and outcomes of whole programme and the role played by each subjects in achieving them as part of the curriculum.

(b). Identification of project and their details should be prepared by all teachers in consultation with students at the beginning of the year. The projects should relate to state of art technology and require use of theoretical and advance planning practical knowledge.

(c) Self learning and learning beyond syllabus should be encouraged by including optional subjects with scope of learning.

(d). Department should develop a feedback Mechnism for teaching performance and a reward system for doing excellence work.

(e) Academic calendar should include remedial classes and additional make up test to help academically weaker students. Students involved in mentoring junior students should be should be rewarded, who are actively doing mentoring.

6. APPENDIX

A. STUDENT CENTERED ACTIVITIES

Student centered activity play an imported role in the development of students of independent learning and self confident among students. Consulting library and visit to market or industry for gathering search information. This information will be presented by students during seminars. Expert lectures by eminent person from technical education, industry, culture areas; and alumni of the institute will also be arranged. Students will also undertake activities like mentoring students poor in academics, community service in respect of technology transfer entrepreneurship development and environmental awareness for fulfilling the outcome of programme.

B. MAJOR PROJECT WORK

(Industry/field oriented-practice based)

As far as possible students shall be assigned live project problem with a view to:

- 1 Develop understanding regarding the size and scale of operation and nature of field work in which Students are going to plan their role after completing the programme of study.
- 2 Develop understanding of subject based knowledge given in the classroom in the control of its application at work place.
- 3 Provide first hand experience to develop confidence amongst the students to enable them to use and apply classroom based knowledge skills to solve practical problem of the world of work.
- 4 Develop social skills and abilities like interpersonal skills, communication skills, attitude and values.

For the fulfillment of above objective, SSU University will establish close linkages with 20-25 relevant organizations and provide such experience to students. It is necessary that each organization is visited well in advance by respective teachers and projects activities to be performed by students are well defined. Efforts should be made to identify actual field problems to be given as project work to the students. Project selected should be challenging. Such chosen projects assignment should be entrusted to students which are of professional value to industrial/field organization. Each teacher would supervise and guide 10-15 students.

. The placement of students for such a practical cum project work should match with the competency profile and interest of students. Students are to be assessed both by industry and engineering college faculty.

The suggested performance criterion is given below:

a) Punctuality and regularity	10
b) Initiative in learning/ working at site	10
c) Level/processing of practical skills acquired	10
d) Sense of responsibility	10
e) Self expression/ communication skills	10
f) Interpersonal skills	10
g) Reports writing skills	20
h) Viva voce	20

Note :The above is a guideline only. SSU Palampur may devise its own criteria in consultation with industry.

C. ENTREPRENEURSHIP DEVELOPMENT CAMP AND SETTING SELF BUSINESS CLUB IN INSTITUTE

A large population of degree holders has to think of setting up their own enterprises or businesses due to lack of opportunities in organized sector. They have to be motivated and trained to search for new opportunities and avail these for becoming an entrepreneur. For this they must be acquainted with entrepreneurship development, scope of setting up self enterprise, existing business opportunities, financial support available and various aspects of managing business. In this context an entrepreneurship awareness camp is suggested. During the camp, experts from various organizations such as banks, financial corporations, service institutes etc. Should be invited to deliver expert lectures. Successful entrepreneurs should also be invited to interact with the students. Students may be encouraged to read papers or give seminar during the camp, on entrepreneurship development related topics.

1. The camp is to be organized for two to three days at a stretch during fifth semester. Lectures will be delivered on the following broad topics. There will be no examination for this subject.
 - Who is an entrepreneur?
 - Need for entrepreneurship, entrepreneurial career and self employment.
 - Scenario of development of small scale industries/service organization in India and other countries.
 - Entrepreneurial history in India, Indian values and entrepreneurship.
 - Consideration for product/business selection.
 - Opportunities for business, seminar and industrial ventures.
 - Learning from Indian experiences in entrepreneurship (Interaction with successful entrepreneurs).
 - Managerial aspects of small business.
 - Legal aspects of small business.

2. Assistance from District Industries Centers, Commercial banks, and state Financial Corporation's Small industries service Institutes, Research and developments laboratories and other financial and Development Corporation.

3. In order to arrange successful entrepreneurship awareness camp, a group of interested students for setting up their self business may be identified and given responsibility of undertaking the above. A follow up mechanisms should be evolved at the institute in order to enable student to set up and manage their enterprise. This group should regularly meet after a month to see the progress of their project and get inputs from mentors.

D. ECOLOGY AND ENVIRONMENTAL AWARENESS CAMP

A degree holder must have knowledge of different types of pollution caused due to public, Industries and construction activities. So that he may help in balancing the eco system and controlling pollution by pollution control measures. He should also be aware of environmental laws related to the control of pollution.

This can be done by organizing a camp at a stretch for 3-4 days. Lectures will be delivered on following broad topics. There will be no examination for this subject. Students interested to contribute in improving ecology and environment of the institute or community through various projects, may be allotted marks out of 20 (a part of final year project)

1. Sources of pollution natural and manmade, their effects on living and non living organisms.
2. Solid waste management; classification of refuse material, types, sources and properties of solid wastes, abatement methods, methods of vermin composting.
3. Pollution of air-causes and effects of man, animal, vegetation and non living organisms.
4. Pollution of water causes, effects of domestic waste and industrial effluent on living and non-living organisms.
5. Legislation to control pollution and protect environment.
6. Recycling for taking advantage of waste and reducing pollution.

It is suggested that, at the institution level, a voluntary group be formed for taking care of ecological balance by undertaking waste management projects- which would result in additional revenue to the institute, besides presenting a more friendly environment.

H. INDUSTRIAL TRAINING

Industrial Training shall be accomplished through attachment with an industry/ service sector organization. Teachers in consultation with industry/ service sector will identify the problem/ project for students. A Group of students placed in city will be monitored by the faculty or expert appointed for the purpose. During the 6 month training, the students will be required to maintain a training diary which will be required to be duly authenticated by his supervisor in the industry.