I- SEMESTER

ENGINEERING PHYSICS - CS-101

UNIT –I: WAVE OPTICS

Theory of Biprism and Newton's rings experiment, Michelson's Interferometer. Diffraction of single slit, Double slit and diffraction grating, resolving power, Rayleigh criterion, Resolving Power of telescope, grating and prism, concept of polarized light, Nicole prism Idea about circularly and elliptically polarized light.

UNIT-II: QUANTUM PHYSICS

Matter waves group and particle velocity, uncertainty principle, schrondinger wave equation and its application, characteristics of back ground X-rays, Duan Hunt Limit. Moseley's Law, Bragg's diffraction, Bragg's spectrometer, Compton Effect. Stimulated and spontaneous ammision, principle of Laser action, Properties of Solid state, (Ruby and Nd YAG), and gas (He-Ne & CO2) type lasers and their engineering applications Fundamental ideas about fiber optics.

UNIT –III: NUCLEAR PHYSICS

Static properties of Nuclear shell model and liquid drop model .Particle accelerator. Cyclotron, Synchocyclotron, and Betatron, Nuclear reactions, Q values. Nuclear cross-section nuclear fission, Fission energy. Theory of fission process, chain reaction, critical size. Principle of nuclear reactor, Nuclear fission, control fusion, reactor.

UNIT-IV: MAGNETIC PROPERTIES

Magnetic field, Magnetic Dipole moment, Magnetization, Magnetic vectors and their interrelations magnetic susceptibility, magnetic materials, diamagnetic, Paramagnetic, Ferromagnetic materials, ferrimagnetisms, anti ferrimagnetisms, classification of magnetic materials, and application, langevin's theory of Para magnetism, Hysterisis curie, Weiss Law, Fundamental ideas about superconductivity Meissner effect, isotope effect, Josephson Effect.

UNIT – V: DIELECTRIC MATERIALS

Dielectric polarization, gauss's law, E P and d vectors. Different type of polarization. Concept of internal field. Clausius Mossotti relationship, idea of polar and non polar dielectrics, ideal lossy dielectric. Loss tangent and idea of complex permittivity. Piezoelectricity.

Books

1. A Text book of engineering physics by M. N. Advadhmulu & P. G. Kshirsagar
2. A Text book of engineering physics by Navneet Gupta & S. K. Tiwary
3. Engineering Physics – A. S. Vasudeva, S. K. Kataria & Sons
4. Physics for Engineers by M. R. Srinivasan
5. Engineering Physics Theory & Experiments by S. K. Shrivastava & R. A. Yadav.

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ENGINEERING MECHANICS - CS-102

1. Static's:
Concurrent, Non concurrent and parallel forces in a plane, Composition and resolution of forces, Free body diagrams, Moment of a coerce and Varignon's Theorem, Condition of Equilibrium, polygon of forces and funicular polygon of forces, principle of virtural work, equivalent force systems.

2. Trusses :
Analysis of forces in the members of a truss, method of Joints, Method of section, Graphical Method for perfect Trusses.

3. Centroid & Moment of Inertia:
Location of Centroid and Moment of Inertia of plane areas, perpendicular Axis and parallel Axis theorems, product of Intertia, Principal Axes and Principal Moment of Inertia, C.G. & M.I. of solid bodies.

4. Friction:
Coulomb's laws of friction. Friction of inclined place, screw & nut friction, ladder and wedge friction, friction in Journal collar bearings, uniform pressure and uniform wear, lifting Machines.

5. Transmission of Power :
Transmission of power through belt, rope and gears, ratio and tension on tight side and slack sides, centrifugal tension, spur, bevel, worm gearing, rack, inions gear, gear Trains, Epicyclic Gear Train.

6. Kinematics;
Kinematics in Cartesian, & Polar coordinates. Particle under uniform & non uniform acceleration, tangential and normal acceleration, radial & Transverse velocity and acceleration, motion under gravity.

7. Kinetics;
Kinetics of particle, motion under constant force, Momentum and Energy Principles, Impulses and angular momentum, D'Alemberts, Principle, Motion under constant torque, Flywheel, collision of Elastic Bodies.

8. Shear force & bending moment diagram in cantilever & simply supported beam with concentrated, distributed load, and couple, overhanging beams, point of contra flexure, relationship between bending moment & shear force, Pure bending.

Books

1. Engineering Mechanics: Statics & Dynamics, Beer & Johnson, Tata McGraw Hill
2. Engineering Mechanics: Statics & Dynamics, Meriam, John Wiley

BASIC ELECTRICAL ENGINEERING -CS-103

Unit I

A. Introduction to Electrical Engg. Generation, Transmission, Distribution, & Utilization.

B. DC circuits: Maxwell's loop & node equations, Superposition theorem, Max power transfer theorem, Millman theorem, Reciprocity theorem, and Star / Delta transformation.

Unit II

Magnetic circuit and electrostatics:- Fundamental definitions, Ampere's law, Lenz's law, Calculation of mmf, Comparison of electric, magnetic & electrostatic fields, Statically & Dynamically induced emfs, self & mutual Inductances, Coefficient of coupling.

Unit III

A. Single phase AC. Circuits: Average value, RMS value, Form factor, Peak factor, Alternating waves, power & power factor, single phase series-parallel ckts, resonance, phase diagram.

B. Polyphase AC circuits: Phase sequence, Concept of line & phase quantities, Star-Delta Connections, Three phase power.

Unit IV

Measuring Instruments: Classification, operation, Torque equation, applications Merits and demerits.

Unit V

Introduction to electrical Machines: Transformer, DC Machine, induction machine, Synchronous machine, : principle types and application.

BOOKS:

1. Electrical Engg. Fundamentals - V. Deltoro
2. Electrical Machines - Nagrath Kothari
3. Electrical Machines - P.S. Bimbhra.
4. Basic Electrical Engg. - V.N. Mittle.
5. DC Machines & transformers - K. Murugesh Kumar

BASIC MECHANICAL ENGINEERING - CS-104

UNIT –I

Boilers- Names and functions of principal parts, Cochran, locomotive, Lancashire, Babcock and Wilcox boilers, boiler mountings and accessories.

Steam-Sensible heat, latent heat, super heat, internal energy, dryness fraction and its determination processes-constant pressure, constant volume, hyperbolic and throttling.

UNIT-II - IC ENGINES

Classification of I.C Engines, description and working of four stroke cycle petrol and diesel engines, two stroke cycle petrol engine and their working cycles, indicated power, brake power and efficiencies.

Thermodynamics-system, properties and processes, zero, first, second and third law of thermodynamics.

UNIT-III

Modes and applications of heat transfer unidirectional steady state heat conduction, heat transfer through composite slab, Air conditioning-need and application, description of summer and winter air conditioning.

UNIT –IV

WORKSHOP TECHNOLOGY-

Introduction to machine tool and metrology: Engineering Materials: Classification, composition, mechanical properties and uses of cast iron, mild steel, high carbon steel and high speed steel.

Machine tool: Introduction, construction and uses of lathe, drilling, shapes milling and grinding machines.

Measurement: construction and uses of measuring tools and gauges, surface plate, diaguage, sine bar, caliper, micrometer, comparators.

UNIT-V

FOUNDRY AND ABRICATION

Foundry:- Basic steps involved in foundry. Introduction to patterns, types, material allowances, mould making, composition of molding sand i.e. green sand, dry and loam sand.

Fabrication: Welding and types of weld ability of metals. Introduction to gas and arc welding-TIG, MIG and submerged, resistance welding, soldering and brazing.

Books

1. Thermodynamics & Heat Engines by Domkundwar
2. Thermal Engg. by Mathur & Mehta
3. Thermal Engg. by Pandya & Shah
4. Thermal Engg. by R. K. Rajput
5. Thermal Engg. By Ballaney
6. Workshop Technology Vol. I & II – Raghuwanshi
7. Workshop Technology Vol. I & II – Hazra Chowdhary
8. Workshop Technology Vol. I & II – W. A. J. Chapman
9. Workshop Technology Vol. I & II – P. N. Rao

FUNDAMENTALS OF COMPUTER AND PROGRAMMING- CS 105

Unit - I

General organization of typical computer, classification of computers, generation of computer. Input-output devices. Storage devices. System software like assemblers. Compilers

Unit - II

Operating systems, Introduction to UNIX. Simple UNIX commands like date. Who. Cal. tty, ls etc. file commands like mv, cp, cat. etc. Directory commands like pwd, Mkdir, Rmdir, cd etc. other commands like echo. Man etc. Modifying files using vi editor. compare UNIX and DOS. Generation of programming language.

Unit - III

Problem specification. Flow chart and algorithm development, structured programming, object oriented programming and its advantages . Data types. Assignment statements., unary ,binary and tertiary operator Input-output statements. Developing simple C Programmes. If statements, loops (for, while, do .... while). Break & continue. Switch statements. Development of C Program using above statements

Unit - IV

Array, functions. Parameter passing. Recursion. Programming in C using these statements. Preprocessors directives and macros . storage classes, scope of variables

Unit - V

Structures, Pointers, Files handling, Using init86() function, union. Enumerated data type, command line argument, working with user defined header file.

BOOKS:-

1. Unix by Summitabha Das
2. " C "programming by E Balaguruswamy
3. Complete reference of "C"
4. Fundamental of computer by V Rajaraman

SOFTWARE LAB-I – CS-106

Programming Exercises and Application Development using C & C++ in UNIX/Linux Platform

SEMINAR- CS-107

Technology Scanning/ Presentations / Exposure to latest state of art Software/ Expert Lectures/ Assignments on (.NET and Advanced topics in Java).

II- SEMESTER

MATHEMATICS – I –CS-201

Unit I
(a) Differential calculus
maclaurin's and taylor's theorem, Roll's theorem, Mean value theorem, application of rates, small increments, approximations and errors.

Unit II
curvature definition, formula in intrinsic, Cartesian and polar coordinates, radius of curvature and center of curvature. Asymptotes, envelopes, evolutes, intermediate forms.

Unit III
Tangents and sub tangents, normals and subnormals, differential coefficient of area, length in Cartesian, polar and parametric coordinates.
Partial differentiation, Euler's theorem, application of partial differentiation, approximations and errors of taylors series of two variables, maxima and minima of functions of one and two variables.
(b) Integral calculus

Unit IV
Definite integrals and their properties, integral as a limit of sum, application to summation of series.

Unit V
area: length of curves, volumes and surfaces of solids of revolutions, centre of gravity, moment of inertia(simple curves only).

Books for reference:
1.Differential &Integral calculus by Gorakh Prasad
2.Differential &Integral calculus byM.Ray,H.S.Sharma &S.S.Seth

ENGINEERING CHEMISTRY - CS-202

UNIT I : **WATER**

Source & Impurities ,Alkalinity & pH hardness of water , Degree of hardness , standards of water for drinking purposes , purification of water for domestic uses , methods of sterilization , methods of water softening , lime soda processes , zeolite and ion exchange resin processes , scale formation causes , effects and prevention . Caustic embrittlement , priming foaming , boiler corrosion and de aeration simple numerical problems on water softening and water analysis.

UNIT II : **FUELS**

Classification of fuels and their comparison, calorific values, fuel resources in India, analysis of coal clinker formation, pulverized coal as fuel, methods of manufacturing of coke and its uses, petroleum distillation, cracking, cracked gasoline. Varieties of fuel oils, their properties and uses, knocking, anti-knocking compounds. Problems based on combustion.

UNIT III : **MATERIALS** :

Composition engineering properties and uses of alloys of Al, Fe, Ni, Cu, & Zn .

Refractories : definition, classification, properties and uses, Types of cements, manufacture, properties and uses of Portland cement, Chemistry of setting and hardening of Cement.

Polymers : Polymerization, different types of polymers , plastic, their preparation, engineering properties and uses, silicones, natural and synthetic rubbers , their properties and uses, Adhesives.

UNIT IV : **LUBRICANTS**

Types and classification of lubricants , mechanism of lubrication, Physical and Chemical properties , testing of lubricants Types of greases , application of lubricants. Corrosion and Corrosion reaction , types and theories of corrosion , factors affecting the rate of corrosion , protection of metals from corrosion by various measures .Important Inorganic metallic & non-metallic coatings and organic coatings.

UNIT V

(A): Environmental Chemistry and Instrumental Techniques in Chemical Analysis. Pollution , causes of pollution ,Air pollution and its types ,Green House effect , importance of ozone layer , control of air pollution , water pollution , sources, methods of prevention , soil or land pollution & its control ,radioactive pollution & its control.

(B) Introduction , Infrared ,UV ,NMR Spectrophotometery , Chromatography , Gas Chromatography ,Colorimetery, Lambert's and Beer's Law.

Books

1) Engineering Chemistry by S.S.Dara
2) Engineering Chemistry by B.K.Sharma
3) Engineering Chemistry by Jain and Jain
4) Practical Engineering Chemistry and Calculations by S.S. Dara
5) Chemistry of Environmental Engineering – Sawyer Mackarty and Perkin – MGH International
6) Applied Chemistry- Theory and Practices – OP Virmani & AK Narula New Age International Pvt. Ltd.

COMMUNICATION SKILLS – CS-203

Unit I

Languages as a skill of communication, linguistic techniques, modern usage & style comprehension skills, English phonetic symbols, oral presentation audition.

Unit II

Application of linguistic ability, writing of definitions of engineering terms, objects, processes and principles.

Unit III

Letter writing, Application, Enquiry, calling quotations, Tenders, Order & Complaint, Company structure and systems.

Unit IV

Precise writing, noting & drafting, technical descriptions of simple engineering objects & processes, slogan writing, advertising, book review.

Unit V

Writing technical reports of the type of observation, report, survey report, report of trouble, laboratory report and project report on the subjects of engineering, debates, speech, discussion.

Books

1. Business correspondence & Report writing – by R. C. Sharma & Krishna Mohan
2. Living English Structure – By W. Stannard Allen, Longmans.
3. Student's Grammar – by Dev Willys Collins (Harper)
4. Spoken English for India – R. K. Bansal & B. Harrison (Orient Longman)

ELECTRONIC DEVICES & CIRCUITS – CS 204

Unit I

Theory of P-N junction, junction capacities zener diode, Tunnel diode, varactor diode, Point contact diode, schottky diode, half wave & full wave rectifier with & without filter. Unregulated power supply, zener diode regulator.

Unit II.

Bipolar junction Transistor, eber mole equations, early effect, transistor biasing & stabilization, transistor as an amplifier, field effect transistor (FET), MOS FET.

Unit III.

Cathode Ray oscilloscope, construction, block diagram, deflection & focusing system, lissajous figures, dual trace & dual beam CRO, Sampling & storage oscilloscope, classification of transducers, LVDT, strain gauge.

Unit IV.

Feedback amp. & oscillators general feedback theory, current & voltage feed back, effect of feed back, wein bridge & RC phase shift oscillator, LC oscillator & crystal oscillator. Direct coupled amplifier & darlington configuration.

Unit V.

Operational amplifier, inverting & non- inverting modes, comparators, Zero crossing detectors, precision rectifiers, Schmitt trigger, instrumentals amplifier, 555 timer & its application, switching characteristics of BJT, Multi vibrators, clipper & clamper circuits.

Books

1. Integrated electronic by Millman Halkias.
2. Electronic devices & circuit theory by Boyelasted & Nashalsky
3. Operational amplifiers by Gayakwad.

DISCRETE STRUCTURES – CS-205

Unit I

Sets, relations, and functions: Basic operations on sets, Cartesian products, disjoint union (sum), and power sets. Different types of relations, their compositions and inverses. Different types of functions, their compositions and inverses. Arbitrary union, intersection and product.

Unit II

Propositional Logic: Syntax and semantics, proof systems, satisfiability, validity, soundness, completeness, deduction theorem, etc. Decision problems of propositional logic. Introduction to first order logic and first order theory -- set theory, axiom of choice. Size of a set: Finite and infinite sets, countable and uncountables, Cantor's diagonal argument and power set theorem, non-computability of all number theoretic functions.

Unit III

Partially ordered sets: Complete partial ordering, chain, lattice. Complete, distributive, modular, and complemented lattices. Boolean and pseudo-Boolean lattices. Different sub lattices, monotone map and morphisms, quotient structures, filters. Tarski's fixed points theorem.

Unit IV

Algebraic Structures: Algebraic structures with one binary operation -- semi group, monoid and group. Congruence relation and quotient structures. Morphisms. Free and cyclic monoids and groups. Permutation group. Substructures, normal subgroup. Error correcting code. Algebraic structures with two binary operations- ring, integral domain and field. Boolean algebra and Boolean ring.

Unit- V

Introduction to Counting: Basic counting techniques -- inclusion and exclusion, pigeon-hole principle, permutation, combination, summations. Introduction to recurrence relation and generating function. Introduction to Graph: Graphs and their basic properties -- degree, path, cycle, sub graph, isomorphism, Eulerian and Hamiltonian walk, graph coloring, planar graph, trees.

Books and References:

R. M. Smullyan. *First Order Logic* , Springer Verlag, 1968.
J. B. Fraleigh. *A First Course in Abstract Algebra* , Narosa, 1990.
C. L. Liu. *Introduction to Combinatorial Mathematics* , McGraw Hill, 1968.

COMM. SKILLS LAB

1. Speech test.
2. Audition.
3. NLP (Neuro-Linguistic Programming).
4. Personality Assessment Centre.
5. Psychometric Test.

SOFTWARE LAB-II – CS-206

Programming Exercises and Application Development using Visual Basic, Visual C+ + programming.

SEMINAR- CS-207

Technology Scanning/ Presentations / Exposure to latest state of art Software/ Expert Lectures/ Assignments on .NET and Advanced topics in Java.

III - SEMESTER

MATHEMATICS-II – CS-301

Unit1
Differential equation first order linear and exact. First order higher degree solvable for P,X and Y , clairaut's forms.

Unit2
Second and higher order differential equations with constant coefficient, homogenous form, simultaneous differential equation of both types, second order differential equation with variable coefficients.

Unit3
Multiple integral: double and triple integrations , change of order of integration, beta and gamma function.

Unit4
Laplace transforms :transforms of elementary function, unit step function, dirac-delta function, properties, inverse transforms, solution of ordinary differential equation using laplace transforms technique.

Unit5
Fourier series, half range series, harmonic analysis.

Books

1. Engineering Mathematics – H. K. Dass
2. Higher Engineering Mathematics – B. S. Grewal

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DIGITAL ELECTRONICS – CS-302

Unit. I.
Number system & Boolean algebra, number systems: Binary , Arithmetic, octal, Hexadecimal & radix conversion.
Binary codes: BCD, excess three, gray display ASCII, EBDCIC, Parity check codes code conversion, Boolean algebra: theorems, Introduction to logic gates, NAND, NOR realization, Boolean laws & theorems.

Unit. II.
Simplification of Boolean expression, sum of product & product of sum forms, concept of min terms & max terms, minimization techniques, karnough's MAP method, Tabulation method.

Unit III.
Combinational circuits & flip flops half adder, full adder, sub tractor, BCD adder, multiplexer & demultiplexer, encoder & decoder ckts. FLIP-LLOPS: RS, clocked RS, D.J.K.T, master slave JK.

Unit. IV.
Sequential ckts, elements of sequential switching ckts, synchronous & asynchronous systems, binary ripple counter, BCD counter, UP-down counter, Shift registers, series parallel shift registers, shift left & shift right operation, Johnson & ring counter.

Unit V.
Design of sequential ckts. State diagram, state table, state assignment, characterizing equation & definition of synchronous sequential machines, mealy & moore model machines, state table & transition diagram.

Introduction to logic families, RTL, DTL, all types of TTL, ECL, NMOS, CMOS, logic etc.

Books

1) Digital logic and computer design by Moris Mano
2) Digital principles & application A.Paul Malvino & Donald. P. Leach

PRINCIPLES OF PROGRAMMING LANGUAGES – CS-303

Unit -I
Evaluation, design and applications of programming languages, aliasing, Land R values, Von Neumann bottleneck, basics of logic and functional programming. Data types in Ada, parameter passing- mechanism, scope of a variable, binding, coercion, storage allocation of multidimensional arrays in a computer, control structures like if statement, while statement etc., data abstraction.

Unit-II
Data types, simple statements like (assignment statement, if statement, switch statement), control statement like (for loop, while and do-while loops, break and continue statements etc.), arrays, functions and pointers in C, C++ and Java.

Unit -III Introduction to object oriented programming, concepts of objects, classes and instances, various types of classes like base class, derived class, abstract class etc., class hierarchy, difference between public, private and protected class, inheritance, multiple inheritance and its problem, public and private inheritance in C++ and Java.

Unit –IV Introduction to COBOL, various divisions and sections used in COBOL, simple type of statements like ADD, SUBTRACT, COMPUTE, OPEN, CLOSE, MOVE etc. in COBOL, loop type statement like PERFORM etc. in COBOL, table handling, sequential file processing, file sorting and merging in COBOL. Comparative study of various programming, languages like C, C++, Java, LISP, PROLOG, Ada and COBOL.

Unit -V Introduction to applicative languages, study of LISP, programming style, lambda calculus, property list and macro expansion in LISP and LISP programming. Data types and data structures in PROLOG, basic statements, control structures and input-output statements used in PROLOG, recursion and iteration used in PROLOG, programming in PROLOG

Suggested Text Books and References:

1. Fundamentals of Programming Languages By Ellis Horowitz, Galgotia Publications Pvt. Ltd.
2. Programming Languages by Allen B. Tucker, Mc Graw Hill International Edition, 2nd Edition, 1987
3. Object Oriented Programming in Turbo C++ By Robert Lafore, Galgotia Pub, 1998.
4. The complete reference JAVA By Herbert Schildtz & Patrick Naughton, Tata Mc Graw Hill, 1997.
5. Programming with Advanced Structured COBOL By Lawrence R. Newcomes, Schaum's Outline Series, McGraw Hill Book Company, 1987.

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DATABASE MANAGEMENT SYSTEMS – CS-304

UNIT I

DBMS concepts and architecture:

Introduction, review of file organization techniques, database approach v/s traditional file accessing approach, advantages of database systems, data models, schemas and instances, database languages and interface, initial conceptual design of database, DBMS Architecture database system utilities, data independence, functions of DBA and designer.

UNIT II

Entities attributes, entity types, value sets, key attributes, relationships, defining the E-R design of database.

Various data models:

Relational data models: Domains, tuples, attributes, relations, characteristics of relations, key attributes of relations, relational database, schemas, integrity constraints, update operations on relations.

Hierarchical data model: Hierarchical database structures, Integrity constraints, data definition and manipulation in hierarchical model.

Network data model: Records, record types and data items, set types and set instances, constraint on set membership, representation of set instances, special types of sets, DBTG proposal and implementation.

UNIT III

Relational algebra and relational calculus:

Relational algebra operations like select, project, join, division, outer join, outer union etc., insertion, deletion and modification anomalies.

Data definition in SQL, queries, update statements and views in SQL. QUEL and QBE, data and storage definition, data retrieval queries and update statements etc.

UNIT IV

Database Design :

Introduction to normalization, normal forms, functional dependency, decomposition, dependency preservation and lossless join, problems with null valued and dangling tuples, multivalued dependencies, inclusion and template dependencies.

UNIT V

Distributed databases, protection , security and integrity constraints, concurrent operations on databases, recovery, transaction processing, database machines. Comparison of various database models, comparison of some existing DBMS.

Books

1. Fundamentals of Database System - Navathe
2. Database Management System by Gerald V. Post
3. Database Management System by Raghu Ramakrishnan

DATA STRUCTURE – CS-305

Unit-I

Introduction to data structures, criteria for algorithm evaluation, arrays, ordered list, various operations in ordered list, representation and manipulation of sparse matrices, representation of multidimensional arrays.

Introduction to linked list, algorithm for creation, insertion, deletion and reversal of a linked list, concept of storage pools. doubly linked list, operations on doubly linked list, generalized linked lists, examples of linked lists, garbage collection and other applications of linked lists.

Unit –II

Stacks, procedures for insertion and deletion in a stack, applications of stack, queues, differences between stack and queues, insertion and deletion in a queue, applications of queues, circular queues, evaluation of expression, prefix, postfix and infix notations for expression, mazing problem.

Unit-III

Introduction to trees, representation of trees in memory, concept of binary tree, operations on binary trees, introduction to spanning trees and cut sets, simple application of trees. Terminology and representation of graphs, traversal of graphs, study of various properties of graphs, Hamiltonian paths and circuits, Eulerian path and circuits, concept of planar graphs, applications of graph.

Unit – IV

Use of Symbol tables, various types of symbol tables like static tree table, dynamic tree table, hash table etc. representation of sets using lists, hash tables, bit vector, trees etc., operations of sets.

Unit V

Sequential search, binary search and study of other search techniques with their time complexity and memory requirements. Introduction to sorting, study and comparison of various internal and external sorting techniques with their time and memory requirement.

Suggested Text Books and References :

1. Fundamentals of Data Structures By Ellis Horowitz and Sartaj Sahani, Galgotia, 9th Edition 1996.
2. Data Structures using C By Tanenbaum, Langsam, Augsentein, PHI, 1997.
3. Data Structures by Lipstchutz, Schaum Series.
4. Fundamental of Data Structures and Algorithms by A. Droviski, Vikas Publication. New Delhi.

DIGITAL ELECTRONICS LAB – CS-306

- Verification of truth tables of various logic gates.
- Design and implementation of half and full adder, Substractor.
- Design and implementation of Code converters,
- Realization of Multiplexers and demultiplexers, flipflops, counters and shift registers.

PRINCIPAL OF PROGRAMMING LANGUAGE LAB: – CS-307

1. Programming implementation of various OOPS concepts:
   (i) class & objects
   (ii) encapsulation
   (iii) inheritance
   (iv) polymorphism
   (v) function & operator overloading
   (vi)
2. Programming using Cobol, C, C++ & Java.

3. Program development in Lisp & Prolog

DATABASE MANAGEMENT SYSTEM LAB: – CS-308

Develop a software using Oracle for any of the following:

- Library Management
- Reservation system
- Payroll system
- Inventory control
- Student information system

DATA STRUCTURE LAB – CS-309

- Implementation of stack , queue and Linked list , Graphs , Trees
- Program for Sequential, Binary and Linear Search.
- Program for different sorting methods.
- Program to generate postfix and prefix from a given form of notation.

CAD LAB – CS-310

Introduction of CAD, coordinate system, translation rotation and scaling transformations, point specification, plotting technique, dimensioning, 2D&3D drawing concepts, drawing practice, elementary design calculations, e.g. area, moment of inertia, volume etc.. Computer aided drafting using AUTOCAD

SEMINAR- CS-311/CS-409/CS-511/CS-611/CS-710/CS-809

Technology Scanning/ Presentations / Exposure to latest state of art Software/ Expert Lectures/ Assignments on .NET and Advanced topics in Java.

IV - SEMESTER

MATHEMATICS III –CS – 401

Unit I
Matrices : Rank , Solution of simultaneous equation by elementary transformations . Eigen values and eigen vectors.

Unit II
Probability distribution : Binomial normal and Poisson's distribution.

Unit III
Partial Differential equation : PDE of first linear and non-linear. Linear PDE of second and higher order .

Unit IV
Fourier Transforms : Definition , sine and cosine transform , transform of elementary function .

Unit V
Boolean Algebra : Basic postulates , simplification of Boolean function using these postulates, Application in switching circuits.

Books

3. Engineering Mathematics – H. K. Dass
4. Higher Engineering Mathematics – B. S. Grewal
5. Engineering Mathematics – Manish Goyal

ENVIRONMENTAL ENGG - CS-402

Unit I

Environmental problem and issues Ecosystem, global warming, Green House effect, Depletion of ozone layer, Human activity and meteorology. Genetic and plant biodiversity, EL-Nino phenomenon and its effects. Explosion of environmental issues, land and soil pollution.

Unit II.

Aquatic environment standard of water for different uses DOB.O.D. and C.O.D. characteristics sewage & disposal, Water pollution, Sources and effects, and inorganic water pollutants. Introduction of domestic and industrial waste water treatment, basic concepts aerobic and anaerobic treatment process.

Unit III

Air pollution

Introduction, structure of the atmosphere, chemical and photochemical reactions in the atmosphere, effects of air, pollution sources & classification of air pollutions harmful effects of Co_1 Co_2 CH_4 SO_x No_X H_2 S Ozone & particulate, Basic concepts for air sampling techniques, Photochemical Smog, Acid Raim.

Unit IV.

A. Noise pollution and radioactive pollution Noise pollution- general introduction of noise pollution and its effects, sound unwanted from of noise changers, traffic noise prediction and control, radioactive wasti sources characteristics and disposal.
B. Solid and Hazardous waste management sources types and composition of solid waste physical, chemical Biological characteristics, disposal of solid waste.

Unit V

Collection of base line Data, Introduction and concepts of initial environmental examination (IEE), Environmental Impact Assessment EIA, Environmental Impact statement (EIS), environmental Audit EA Risk Assessment (RA) etc.

Regulatory Responses:-

Review of national and international developments related to environmental issues, laws, and legislation.

Books:

1. Chemistry in Engineering & technology vol-II Tata MC Graw
2. Chemistry of environmental Engineering S awyer and Parkin – Mc Graw Hill international
3. “Environmental by A.K. De, Wiley eastern limited, new delhi.
4. “Environmental pollution monition and conform khopkar S.M. New age international pub.
5. S.R. Khirsagar Sewage and Sewage treatment
6. D.N. May _ Nandbook of Noise assessment Van Nostrand.

Introduction to Environmental Engineering & Science – gillberd M. Masters, PHI,

MICROPROCESSOR AND MICROCONTROLLER – CS-403

Unit 1
Microprocessor(8085) :- internal architecture, instruction set and classification, Interrupts and data transfer schemes, memory – mapping and its interfacing, assembly language programming.

Unit 2:
Microprocessor(8086):- organization, Architecture, addressing modes, instruction set, assembly language programming, memory management, real & protected mode

Unit 3:
Salient features of advanced Microprocessors, RISC and CISC processors, Review of evolution of advanced Microprocessors: 8086, 8088, 80-186/286/386/486/Pentium, super scalar architecture of Pentium, Alpha AXP and Ultras arc processors.

Unit 4:
Introduction of various Interfacing chips like 8212, 8155, 8255, 8755, and its interfacing keyboards, printers , LEDS, motors, ADC, DAC, and stepper motors and introduction to programmable keyboard / display interface, general-purpose programmable peripheral devices (8253) 8254 programmable interval timer, 8259A programmable interrupt controller & 8257 DMA controllers. Serial I/O & data communication: RS 232C and various bus standards, USART 8251.

Unit 5:
Introduction to microcontroller(8051):- its architecture, pin description, I/O configuration, interrupts, addressing modes, an overview of 8051 instruction sets..

Suggested Books:

1. B.B. Brey(PHI),"The Intel Microprocessors, Architecture, Programming and Interfacing".
2. D. Hall (Mc-Graw Hill), "Advanced Microprocessor and Interfacing".
3. A. P. Mathur(TMA), "Introduction to Microprocessor ". Intel Microprocessors Data Manuals.
4. Microprocessor Arch. Programming & Application with 8085 by R.S Gaonkar.
5. Introduction to Microprocessors by P.K. Ghosh & P.R Sridhar, PHI.

Barkatulah University Institute of Technology, B.U., Bhopal

OOPS METHODOLOGY, ANALYSIS AND DESIGN – CS-404

Unit I

Objects , objects as software modules, objects interaction , classes, method lookup, hierarchies of classes , inheritance , polymorphism, abstract classes .

Unit II

Identifying objects and classes , representation of objects , association with objects , aggregate components of objects.

Unit III

Object oriented programming languages class declarations object declaration, mandatory profiles message sending association recursive association , many to many association .argument passing .

Unit IV

Inherited methods, redefined methods , the protected interface, abstract base classes. Public and protected properties, private operations disinheritance, multiple inheritance.

Unit V

Overview of C++ as object oriented programming language, loops, decision, structures and functions, arrays and pointers, virtual function, files and stream.

Books:-

1. Object oriented programming in C++ by Robert Lafore.
2. Object oriented programming with C++ by David parsons.
3. Object oriented design with C++ by Ken Barclay

Barkatulah University Institute of Technology, B.U., Bhopal

THEORY OF COMPUTATION – CS-405

Unit I

Introduction to theory of Computation and Finite Automata: Mathematical Preliminaries & Notation : Sets, functions and relations, Graphs and Trees, Proof Techniques, Basic concepts , Languages, Grammars, automatas, deterministic finite accepters, Deterministic accepters and Transition Graphs, Languages, Non deterministic finite accepters, definition of a NDFA, Equivalence of DFA and NDFA, Reduction of the Number of states in finite automata.

Unit II

Grammars and Languages: Regular expression, Regular Grammar, Regular languages, closure properties of Regular languages, Context free grammars, Simplification of Context free grammars and Normal forms, Properties of context free languages.

Unit III

Push – Down Automata: Non deterministic push down automata: Definition of a push down automata, The language accepted by a push down automata, Push down automata and context free languages, Push down automata for context free languages, CFG's for PDA, Deterministic Push down automata and Deterministic Context free languages, Grammars and Deterministic context free languages

Unit IV

Turing Machines: The Standard Turing Machine: Definition of a Turing Machine, Turing Machines as language accepters, and Turing Machines as Transducers. Combining Turing Machines for complicated tasks, Turing thesis, other models of Turing Machines.

Unit V

Limits of algorithmic computation, Some Problems that can not be solved by Turing Machines, Computability and Decidability, the Turing Machine Halting Problem, Reducing one Undecidable Problem to another, Undecidable Problems for Recursively Enumerable languages, The post correspondence problem: Indecidable problems for context free languages, Recursive function, Primitives recursive functions, Ackermanris functions, recursive functions, Post Systems : Rewriting systems : Matrix grammars, Markov Algorithms.

Suggested Books:

1. John C. Martin, "Introduction to languages & the theory of Computation" TNM.
2. Peter Linz, "An Introduction to formal languages & automata" Narosa Publication House.
3. Z. Kovahi "Switching & Finite Automata Theory" McGraw Hill.
4. M.A. Harrison "Introduction to Formal Langues Theory" Addison Wesley.
5. J.E. Hopcroft & J.D. Ullman "Introduction automata theory languages & computation" Addison Wesley.

MICROPROCESSOR AND MICROCONTROLLER LAB –CS-406

- Introduction to 8085 & 8086 kit.
- Assembly language programming in 8085 and 8086.
- Verification of different interfacing cards -8155, 8255, ADC, DAC, 8212 etc.
- Programming in 8051 microcontroller.

OOPS LAB – CS-407

- Program to demonstrate the use of classes, Constructors, destructors, operator overloading, inheritance, polymorphisms.
- Program to demonstrate the use of inline function, friend function, virtual functions.
- Program to demonstrate the use of file handling & I/O operations.

SOFTWARE LAB-III– CS-408

Programming Exercises and Application Development like Web designing using Photoshop, Flash, ASP, Active-X etc.

SEMINAR- CS-311/CS-409/CS-511/CS-611/CS-710/CS-809

Technology Scanning/ Presentations / Exposure to latest state of art Software/ Expert Lectures/ Assignments on .NET and Advanced topics in Java.

V – SEMESTER

NUMERICAL ANALYSIS – CS-501

T – 100, Sessional – 50

Unit I

Different types of errors : Relative error , absolute error , truncation error , round off error etc , estimate of error . Solution of Transcendental and polynomial functions , methods of regular falsi , secant , bisection , successive approximation and Newton – Raphson and order of convergence of these methods.

Unit II

Interpolation and Numerical Differentiation : Polynomial interpolation with equal and unequal step size (eg. Newton's, Gausses, Sterling's, Bessel's, Everett's, etc. formulas) and their error terms. Numerical differentiation with error terms. Spline interpolation (Cubic Splines).

Unit III

Solution of eigen value problem , Linear Simultaneous equations, Chole-sky's method, iterative method (Gauss Seidel method). Convergence and stability of the methods. Second, third and Runge-Kutt methods .

Unit IV

Numerical Integration : Trapezoidal rule , Simpson's 1/3 rule , Simpson's 3/8 rule , Boole's and Weddle's rule.

Unit V

Use of cubic spline , Gaussian Integration and their error terms . Ordinary differential equations : Euler's method , multi step predictor corrector methods (Adam and Milne's method) .

Books

1. Engineering Mathematics by H. K. Dass
2. Numerical Analysis – Gupta and Malik
3. Numerical Methods in Engineering and Science – Dr. B. S. Grewal
4. Numerical Analysis – P. Kandasamy

Industrial Economics & Business Organizations- CS-502

T–100, S – 25

Unit I

INTRODUCTION TO ECONOMICS

Introduction to economics, its importance, approaches and uses of study, engineering and economics. Economic problems. Economic good and Wealth, Demand and supply. Competition, Monopoly, Theory of firm, Money and its function, theory of money and choice, bank and its functions, employment and income, gross national product, net national product- consumption, savings and investment.

Unit II

FEATURE OF INDIAN ECONOMY

Broad feature sof Indian economy, Natural resources and economic development, infrastructure in the Indian economy, Agriculture development, Green revolution, Population, Population theories, Unemployment, Poverty, and balance regional development. Economic growth and economic development, Indian Industries, Industrial policy, Industrialization in India, Role, Plan and pattern of industrialization, Public Vs private Sectors, Economic reforms in India, India's five year plans.

Unit III

INDIAN ECONOMY & GLOBAL TRANSACTIONS

The indigenous and modern banking system in India, Reserve Bank of India, Monetary and Fiscal policies, Financial Institutions and SEBI, Free Trade and protection, India's Foreign Trade and WTO, Balance of payments. India currency systems and foreign exchange, foreign Capital Investment, Foreign aid and FEMA.

Unit IV

INTRODUCTION TO BUSINESS ORGANIZATION

Concept nature and scope of business, business and its environment, economic, legal social and political environment of business, business ethics.

Forms of business organization- Types and their functions, roles and responsibilities, HUF, Partnership, Joint Stock Companies, private and Public Limited companies, Cooperatives, Joint stock and public sector Entrepreneurship, promoters and financial institutions, concept of business growth profit maximization Vs social responsibility, concept of business growth, role and problems of small business, Joint Ventures, multinationals.

Unit V

INTRODUCTION TO MANAGEMENT

Evolution, development and modern philosophy, management in India, Scientific Management, Rationalization and quality circles. Principles of management – Nature and function of management, Management By Objectives (MBO) and management by Exception (MBE)- Importance, characteristics, applications, Management theory Jungle Schools of management thought, Management Information Systems (MIS).

Books

1. Indian Economy : Ruddar Dutt & KPM Sundaram
2. Indian Economy: A. N. Agrawal
3. Managerial Economics: Joel Dean.
4. Organization & Management : R. d. Agrawal

5. Essentials of Management : Koontz, O'Donnel
6. Principles & Practice of Management: Chhabra & Singh

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ANALYSIS AND DESIGN OF ALGORITHMS- CS-503

T – 100, S – 25

UNIT-I

Concepts of algorithm, asymptotic complexity, examples of analysis use of recurrence relation in analysis of algorithms, removal of recursion, heap and heap sort, disjoint set structure.

UNIT-II

Divide and conquer technique, analysis and design of algorithms base on this technique for binary search, merge sort, quick sort, selection problem, matrix multiplication.

UNIT-III

Study of greedy strategy, solutions based on greedy strategy for knapsack problem, minimum spanning trees, scheduling problem, shortest paths optimal merge patterns. Concept of dynamic programming and problems based on this approach such as 011 knapsack problem, multi-stage graphs, shortest paths, 29raveling sales person problem, reliability design problem.

UNIT –IV

Depth-first search, breadth first search, bi-connected components.
Backtracking concept and its examples likes 8 queen's problem, Hamiltonian. cycle problem, introduction to branch & bound and its examples like 8 piece puzzle problem traveling sales-person problem.

UNIT – V

Binary search trees, height balanced trees, AVL trees, 2-3 trees, B-trees hashing. Introduction to lower-bound theory introduction to NP-Complete and NP Hard problems, examples of NP complete problem like Hamiltonian path and circuits, eulerian paths and circuits etc.

Books

1. Computer Algorithms: Horowitz, Sartaj Shani & Sanguthevar Rajasekaran, Galgotia Publication.
2. V. Aho, J. E. Hopcroft, and J. D. Ullman. *Design and Analysis of Computer Algorithms* , Addison Wesley, 1974.
3. Introduction to Algorithms: Cormen, Leiserson & Rivest, PHI Publication.
4. R. E. Tarjan. *Data Structures and Network Algorithms* , SIAM Press, 1983.
5. K. Melhorn. *Data Structures and Algorithms: Vol II* , Springer Verlag, 1984

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OPERATING SYSTEM-CS-504

T – 100, S – 25

Unit I

Introduction to Operating Systems, Operating system services, multiprogramming, time-sharing system, storage structures, system calls, multiprocessor system. Basic concepts of CPU scheduling, Scheduling criteria, Scheduling algorithms, algorithm evaluation, multiple processor scheduling, real time scheduling I/0 devices organization, I/0 devices organization, I/0 devices organization, I/0 buffering.

Unit II

Process concept, process scheduling, operations on processes, threads, interprocess communication, precedence graphs, critical section problem, semaphores, classical problems of synchronization. Deadlock problem, deadlock characterization, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock, Methods for deadlock handling.

Unit III

Concepts of memory management, logical and physical address space, swapping, contiguous and non-contiguous allocation, paging, segmentation, and paging combined with segmentation.

Unit IV

Concepts of virtual memory, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation. Security threads protection intruders-Viruses-trusted system.

Unit V

Disk scheduling, file concepts, file access methods, allocation methods, directory systems, file protection, introduction to distributed systems and parallel processing case study.

Suggested further readings

Operating Systems Concepts by Silberschatz, Galvin, Gagne
Operating System by Deitel
Modern operating system by Tanenbaum.
Operating System by Peterson.

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COMPUTER ARCHITECTURE- CS-505

T – 100, S –25

Unit I

Introduction to computer organizations and architecture, computer system components, bus organized computer, memory address register, data register, program counter, accumulator, instruction register. Instructions fetch. Decoding and execution. Instruction formats and addressing modes, instruction set design issues, micro operations. Register transfer language.

Unit II

Control unit organization. Instruction sequencing, instruction interpretation. Hardwired control and micro programmed control organization, control memory, address sequencing, microinstruction formats, micro program sequencer, microprogramming, microinstruction encoding, horizontal and vertical micro instructing.

Unit III

Arithmetic and logic unit design. Addition and subtraction algorithm. Multiplication algorithm. Division algorithm. Floating point arithmetic. Processor. Configuration, instruction pipe ling, branch handling, CISC and RISC architecture features, superscalar architecture.

Unit IV

Input- output organization, programmed I.O. I/O addressing , I/O instruction. Synchronizations. I/O interfacing, standard I/O interfaces interrupt mechanism, DMA I/O processors and data communication.

Unit V

Memory organization and multiprocessing basic concepts and terminology. Memory hierarchy, semiconductor memories (RAM ROM) virtual memory. Cache memory, Associative memory, memory allocation and management policies, structure of multiprocessor.

Books :-

1. Computer Organization and Architecture Design and Performance by Willam Stalling
2. Computer Architecture and Organization by John P. Hayes
3. Computer Architecture and Organization by M. Morris Mano.

ANALYSIS AND DESIGN OF ALGORITHM LAB- CS-506

P– 25, S – 25

- Implement Divide and Conquer methods.
- Implementation of greedy methods.
- Implementation of Dynamic Programming method.

OPERATING SYSTEM LAB- CS-507

P–50, S – 25

- Study of various operating system like DOS, WINDOWS , UNIX and LINUX with following:
  - Memory management.
  - File management.
  - Scheduling methods.
  - Protection and Security.
- Implementation of Bankers algorithms for deadlock avoidance.
- Implementation of Semaphores.

COMPUTER ARCHITECTURE LAB – CS-508

P–25, S – 25

- PC hardware study.
- Programming in Assembly language.
- Study of RAM/ROM operations.

SOFTWARE LAB-IV – CS-509

P–50, S – 25

Programming Exercises and Application Development using Java, C#, Database (like MS Access, Excel)

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VI – SEMESTER

SOFTWARE ENGINEERING AND REUSABILITY– CS – 601

T – 100, S –50

Unit I

Introduction to software engineering software characterization and components. Software as a product, software process & process models, capability maturity model (CMM). Software metrics and measurements software project planning (Project scheduling and tracking, cost estimation methods).

Unit II

Requirements analysis- analysis principles, complexity, methods, structured analysis method formal specification. Data dictionary, software prototyping and specifications, other requirement analysis methods. Storage and processing time analysis, data base requirement, SRS documentation. Unified modeling language, data modeling technique

Unit III

Design principles, design concepts like abstraction, refinement, modularity, control hierarchy, software architecture, structured, data structure, information hiding etc. modular design, design heuristics for modularity, oriented design, user interface design. other design methods. Software list analysis, configuration management and version control system documentations,

Unit IV

Software coding and testing influence of implementation language and coding, coding sale coding efficiency, software quality assurance, software testing techniques, software testing strategies. Comparison of test methods. Choice of test data. Classification of test data. Other verification & vilification methods. Software maintenance process, quality management, maintenance cost and maintainability measures.

Unit V

Engineering of Component based systems, Component based development S/W process model, Mc Call's Quality factor's, Domain Engineering, Component Engineering, Describing Reusable Component. The reuse Environment. Impact on Quality, Production and cost, Reuse metrics.

Text/ References

Pressman R.S.,3rd Edition,Software engg.-A practitioners Approach ,Mc Graw,Hill,International,Eddition 1992

Jalote,P.1st Edition ,2nd Eddition is Shortly due from Springer verlag.AN Integrated Approach to software engg,Narossa,1991

S/W Testing techniques ,boris,beizer,2ndEddition,Van Nostrand Reinhold

Measuring S\w reuse –principles practices and economic models ,J.S.Poutin Edition Wesley

ANALOG & DIGITAL COMMUNICATIONS-CS-602

T – 100, Sessional – 25

Unit I

Signal analysis and analog modulation:

Analog & Digital signal, convolution, correlation, autocorrelation, of Analog Signals, amplitude and angle modulation, spectral analysis and relation, noise source, band pass noise, noise performance of AM and FM signal.

Unit II

Pulse Modulation:

Natural sampling, flat top sampling, sampling theorem, PAM, bandwidth, pulse time modulation, method of generation and detection of PAM, and PPM, time division multiplexing, Noise in pulse modulation system.

Unit III

Pulse code modulation:

Quantization of signal, quantization errors, PCM, PCM system, companding multiplexing PCM system, differential PCM, delta modulation, adaptive delta modulation, noise in PCM system.

Unit IV

Information theory and Coding:

Unit of information, entropy, Joint and conditional entropy, information rate, mutual information, channel capacity of BSC, BEC and binary channels, Shannon Harte'y theorem, bandwidth S/N trade off, average length of code control coding, Hamming distance, block code, convolution code.

Unit V

Digital Communication:

Differential phase shift keying (DPSK), quadrature phase shift keying (QPSK), M-ray PSK, Binary frequency shift keying (BFSK), comparison of DPSK QPSK, M-ray FSK, duo-binary encoding, base band signal reception, probability of optimum filter, matched filter.

Text/ References

1. Principle of Communication By:- Taub Schilling
2. Communication Systems By:- B.P. Lathi
3. Communication Systems By:- Haykins
4. Communication Systems By:- Singh & Sapre

UNIX INTERNALS, SHELL PROGRAMMING & LINUX – CS-603

T – 100, S– 25

Unit I

Introduction to the kernel:- Architecture of the Unix, the buffer cache, Internal representation of files:- inode, accessing blocks, releasing blocks, structure of regular files, conversion of path name to an inode, inode assignment to new file, allocation of disk-block.

Unit II

System calls for the file systems:- OPEN, READ, WRITE, CLOSE, PIPES:- the pipe system call opening a named pipes, reading and writing pipes, closing pipes, DUP,LINK, UNLINK, system call for TIME and CLOCK.

Unit III

The structure of processes:- process states and transitions. Layout of system memory, the context of a process, saving the context of the process. Manipulation of the process address space.
Process Control:- Process creation, signals, Process termination, awaiting process termination, the user id of a process, changing the size of the process,

Unit IV

Shell Programming:- Study of different types of Shell like C Shell, Bourne Shell etc. Shell variable, Shell Script. Shell Command. Looping and Making choices:- For Loop, While and Until, passing Arguments to Scripts. Programming in different shells.

Unit V

LINUX Filesystems Hierarchy, editors, common Linux command, Mounting & Un-mounting CD- ROM, Floppy Disk, Different access permission, Backup & Restoring, Network Configuration command Ipconfig, hostname, Telnet

Book;-

The Design of Unix Operating system by Maurice Bach
Advanced Unix- A Programmer Guide by Stephen Prata.
Linux Bible by Christopher Negus

COMPUTER GRAPHICS & MULTIMEDIA – CS-604

T – 100, S – 25

Unit I

Introduction to Raster scan displays, Storage tube displays, refreshing, flickering, interlacing, color monitors, display processors resolution, working principle of dot matrix, inkjet laser printers, working principles of keyboard, mouse scanner, digitizing camera, track ball , tablets and joysticks, graphical input techniques, positioning techniques, rubber band techniques, dragging etc.

Unit II

Scan conversion techniques, image representation, line drawing, simple DDA, Bresenham's Algorithm, Circle drawing, general method, symmetric DDA, Bresenham's Algorithm, 2D & 3D transformation system, Translation, Rotation, Scaling, Reflection Inverse transformation, Composite transformation.

Unit III

World coordinate system, screen coordinate system, parallel and perspective projection, Representation of 3D object on 2D screen. Point Clipping. Line Clipping Algorithms, Polygon Clipping algorithms. Curves, parametric function, Bezier Method, B-spline Method,

Unit IV

Introduction to Hidden Surface elimination, Basic illumination model, diffuse reflection, specular reflection, phong shading, Gouraud shading ray tracing, color models like RGB, YIQ, CMY, HSV etc.

Unit V

Multimedia components, Multimedia Hardware, SCSI, IDE, MCI, Multimedia data and file formats, RTF, TIFF, MIDI, JPEG, DIB, MPEG, Multimedia Tools, Presentation tools, Authoring tools, presentation.

Books:

1. James E. Shuman, "Multimedia in Action" Thomson / Vikas Publishing House.
2. Tay Vaughan " Multimedia: making it work" Tata McGraw Hill 1999, 4th Edition
3. Prabhat k Andleigh, Kiran Thakral "Multimedia System Design", PHI
4. Donald Hearn and M.P. Becker "Computer Graphics" PIR Pub.
5. Folay Vandam,Feiner, Hughes "Computer Graphics Principle & Practice" Adison Wesley,2/e. 1997
6. Rogers "Principles of Computer Graphics" TMH.
7. Neumann "Interactive Computer Graphics" TMH

COMPUTER NETWORK – CS - 605

T – 100, S – 25

Unit I

Introduction to data communication, networks, standard organization, analog and digital signals, channel capacity, Band width, sampling, multiplexing, concepts of circuit and packet switching

Unit II

Layered Network architecture, OSI Layers model functions of each layer, TCP/IP reference model, transmission media- analog and digital transmission, guided and unguided media, Asynchronous and synchronous transmission .

Unit III

Data Link Layer: Simplex, Half duplex and Full duplex, Flow and error control, stop and wait protocol, sliding window protocol with their efficiency, ARQ techniques and their performance, HDLC.

Multiple Access : Static and dynamic channel allocation, media access control for LAN and WAN, ALOHA : pure and slotted ALOHA, Token ring, Gigabit Ethernet, Introduction to 802.11, Bluetooth.

Unit IV

Routing :Definition, Elements of routing Techniques, Least cost routing algorithms, Dijkstra's algorithm, Bellman –Ford algorithm, Routing strategies, congestion control, Internetworking, Internet and intranet.

Unit V

Functions of transport layer, congestion control and Quality of Service, TCP and UDP, Encryption and decryption techniques, functions of application layer, Socket Interfaces and network security issues.

Suggested Books

1. Computer Networks – Tanenbaum A.S. - PHI
2. Data Communication and Networking -Forouzan
3. Data and Computer Communication – William Stallings

ANALOG & DIGITAL COMMUNICATIONS LAB -CS-606

P– 25, S – 25

- Amplitude modulation and demodulation
- Generation and Detection of DSB-SC,SSB,VSB
- Frequency modulation and demodulation
- Radio transmitter and Receiver
- Noise performance of AM & FM systems.
- Sampling Theorem and data reconstruction
- Generation and detection of PAM,PWM,PCM,PTM.
- Delta modulation, ADM,
- Generation and Detection of ASK,PSK,DPSK,FSK,QAM.

UNIX INTERNALS, SHELL PROGRAMMING & LINUX LAB– CS-607

P– 25, S – 25

- Study and installation of Unix/Linux.
- Study of various commands in Linux/Unix.
- Study of editors in Unix/Linux.
- C programming in Unix Environment.
- Shell programming.

COMPUTER GRAPHICS & MULTIMEDIA LAB – CS-608

P– 25, S – 25

- Implementation of various Line drawing & circle drawing algorithms.
- Implementation of curve generation algorithms.
- Implementation of 2D and 3D translation algorithm.
- Mouse programming.
- Design multimedia application using FLASH, DREAM WEAVER and PHOTOSHOP.
- Game designing.

COMPUTER NETWORK LAB – CS - 609

P– 25, S – 25

1. Working on LAN Trainer to study various LAN protocols: - ALOHA, Slotted ALOHA, Sliding Window Protocol, Token Ring.
2. Study of ISDN trainer.
3. Study of ATM Networks.
4. Working on simulators for routers.

VII- SEMESTER

INFORMATION TECHNOLOGY PROJECT MANAGEMENT-CS-701

T – 100, S – 50

Unit I

Business System: Nature & objectives, Business Organization & Management, Environment of Business System. Evolution, Nature & functions of Management, Principles of Management, Management in India, Management Thoughts and theories, Management by Objectives(MBO), Management by Exceptions(MBE)-Importance, Characteristics, Applications.

Unit II

Concept of a Project, Project Management, Tools and techniques for Project Management, Project Manager: Role and Responsibilities of Project Manager, Project management profession, System view of Project Management, Project phases & Project life cycle. Organizational Planning, Frames & Structures.

Unit III

Organizing Human resource management, Motivation Theory. Influence, Power & Effectiveness, Staff Acquisition & Team Building; Project Communication: Direction, Coordination & Control, Communication Planning, Information distribution & reporting; Risk of IT projects, risk identification, risk quantification, risk response development, risk response control, Quantification, Quality planning & assurance, Tools & techniques for quality control. Quality cost models.

Unit IV

Project Integration Management: Development, Execution and Control, Project scope management. Planning & Scope statement, Scope definition & WBS scope, verification and control, Time Management and its techniques. Cost management: Principles, Planning, Estimating and budgetary & Control. Project Procurement Planning, Solicitation Planning, Solicitation and Source Selection.

Unit V

Project Implementation Initiating, Planning, Executing Project and Controlling, Project Closure and Evaluation. Overview of Microsoft Project 98/2000 Software, MS Project for Cost Management, Resource Histograms & resource leveling. Overview of Primavera Software.

Books:

1. IT Project Management- Kathy Schwable (Vikas Pub)
2. Elements of Management- H. Koontz
3. Principles of Management- Stonier (PHI)
4. IT Project Management- Joshep Phillips (TMH)
5. Information Technology Project Management- Jack T. Marchewka (Wiley)

SYSTEM PROGRAMMING AND COMPILER DESIGN – CS-702

T – 100, S – 25

Unit I

Function of an assembler. phases of an assembler. pass structure. study of various tables used like symbol table. op-code table etc. Introduction to macros. macro definition and call. macro expansion. nested macro. macro facilities like flow of control. expansion time variables etc. design of a macro pre-processor.

Unit II

Introduction to loading. linking and relocation. design of the linker. relocation factor and types of relocation. Various types of software tools like editors. debug monitors etc.

Unit III

Functions of a compiler. various phases of a compiler. bookkeeping. Boot Strapping in a compiler Basic Parsing technique like Shift reduce parsing. operator precedence parsing. top down parsing predictive parsing. LR parsers etc. SLR and LALR parsing table.

Unit IV

Syntax. directed translation schemes. intermediate code generation. syntax. trees. three address code. quadruple and triples. translation of various type of statements like assignment. while. case. for etc. Introduction to symbol table generation. data structure used for symbol table generation. error detection and recovery in a compiler. removal of lexical. syntactic. semantics errors and errors. encountered in other phases.

Unit V

Introduction to code optimization. loop optimization. techniques using DAG. reducible flow graphs. depth first search etc. data flow analysis. Introduction to code generation. code generation using DAG. register allocation and assignment in code generation. problems in code generation.

Book:-

System Programming and Operating System" by D.M Dhamdhare 2nd edition
Principle of compiler design by Alfred V. Aho and Jeffery D. Ullman

ARTIFICIAL INTELLIGENCE & FUZZY SYSTEM- CS-703

T – 100, S – 25

Unit I
Meaning and definition of artificial intelligence, various types of production systems, characteristics of production systems, study and comparison of breadth first search and depth first search techniques, other search techniques like hill climbing, best first search, A* algorithm, AO* algorithm etc. and various types of control strategies-

Unit II
Knowledge representation, problems in representing knowledge, knowledge representation using propositional and predicate logic, comparison of propositional and predicate logic, resolution, refutation, deduction, theorem proving, inferencing, monotonic and non-monotonic reasoning.

Unit III
Probabilistic reasoning, Baye's theorem, semantic networks, scripts, schemas, frames, conceptual dependency, fuzzy logic, forward and backward reasoning. Game playing techniques like minimax procedure, alpha-beta cut-off etc.,

Unit IV
Planning study of blocks word problem in robotics, understanding and natural language processing. Introduction to learning, various techniques used in learning, neural networks, applications of neural networks, common sense, reasoning and expert systems.

Unit V
Introduction to fuzzy logic, neuro fuzzy, and soft computing, from conventional AI to computational intelligence, Neural Network, Evolutionary computation, Neuro fuzzy and soft computing characteristics, Fuzzy set theory; Basic definition & terminology, set theoretic operations, MF formulation & parameterization, Fuzzy union, intersection & compliment. Fuzzy Rules & fuzzy Reasoning, Extension Principles and Fuzzy Relations, Fuzzy if-then rules, linguistic Variables, Fuzzy reasoning, compositional rules of inference, Fuzzy systems as function estimators, Fuzziness as multivalence.

Books:
Charniak and Mcdermott. Introduction to Artificial Intelligence , Addison-Wesley, 1985.
Ginsburg. Essentials of Artificial Intelligence , Morgan Kaufmann, 1993.
Winston. Artificial Intelligence , 3rd Edition, Addison Wesley, 1992.
E. Charniak and D. McDermott. Introduction to Artificial Intelligence , Addison-Wesley, 1985.
E. Rich. Artificial Intelligence , McGraw-Hill, 1983.
J. Sowa. Conceptual Structures , Addison-Wesley, 1984.
S.R. Jang, Sun & Mizutani, Neuro-Fuzzy and soft computing, PHI.
Bart Kosko, Neural Network & Fuzzy Systems, PHI.
Haykin, Fuzzy Logic & Artificial Neural Network: A Comprehensive Foundation, Asea Pearson.

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ELECTIVE – I – CS-704

T – 100, Sessional –25

WEB TECHNOLOGY

Unit 1:
Internet Concept, Architecture and Protocols. IP Addressing scheme –sub netting, super netting and classless addressing, Routing of IP packets , Binding protocol address (ARP and RARP), IP Datagrams and Datagram forwarding, IP encapsulation, Fragmentation and reassemble, IPv6 - motivation, frame format and addressing.

Unit 2:
Startup procedure –BOOTP and DHCP
Internet Control Message Protocol: Introduction and usage for testing reachability, route tracking, MTU determination, message format, error reporting, query, and checksum.

Unit 3:
User Datagram Protocol(UDP) : Format of UDP message, pseudo headers, UDP encapsulation and protocol layering, checksum computation, multiplexing and demultiplexing in UDP, port numbers and socket addresses, Use of UDP.

Transmission Control Protocol: Properties of reliable delivery, sliding window concept architecture of TCP frame, header checksum, Connection establish and release, TCP timers, Congestion control, TCP operation, Interior and exterior routing-RIP, OSPF and BGP.

Unit 4:
Domain name system: Introduction, DNS client server Model, Server hierarchy, server architectures, optimization of DNS performance, DNS entry types, message format.

World Wide Web: Introduction, HTML format, Client-server interaction, Browser architecture, CGI, JAVA techniques for Dynamic Web Documents, Socket Interfaces.

Unit 5:
Web applications: Remote login, telnet, FTP, NFS, TFTP, electronic mail (SMTP, MIME), Internet Management(SNMP) and NMS.

Suggested Books:

1. "Computer Networks and Internet" by D.E.Comer
2. TCP/IP- Protocol Suite by B.A. Forouzan
3. "Internetworking with TCP/IP"- Vol –I - Duglus.E. Comer
4. "Internet" by Coleman & Dyson

DIGITAL SIGNAL PROCESSING

Unit I

Signals and Systems:-
Representation and analysis of discrete signal and systems. Analysis of discrete time linear time- invariant systems and test for causal, static, Time-invariant, and stable system, properties of convolution and interconnection of LTI system.

Unit II

Z transform
Z –transform and inverse, Z transform. Properties of Z- transform, Rational Z transform, stability, poles and zeros of Z transform.

Unit III

RECURSIVE AND NON-RECURSIVE SYSTEMS:-
Representation and block-diagram representation of recursive and Non-recursive systems. LTI systems characterized by constant coefficient difference equations. Realization of LTI systems. Structures of finite-Impulse and Infinite impulse response systems.

Unit IV

DISCRETE FOURIER TRANSFORM
Discrete Fourier transform and inverse DFT to other transforms properties of DFT, linear and circular convolution. Fast Fourier transform direct computation of DFT and FFT algorithm. Radix -2 and Radix -4 FFT algorithm. Intro. Of wavelet transform, relation between wavelet transform and DFT.

Unit V

DESIGN OF DIGITAL FILTERS.
Design of FIR filters, using windows and linear phase, frequency sampling method. Design of IIR filters using impulse-invariant and bilinear transformation method.
Multirate signal processing, Application of MATLAB for filter design.

Books

1) Digital Signal Processing - Alan V Oppenheim & Ronald .W. schaper
2) Digital Signal Processing - John G Proakis, Dimitris G Manolakis
3) Digital Signal processing – S K. Mitra

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VLSI DESIGN

Unit I

Review of Logic design fundamentals : combinational logic, k-maps, designing with NOR and NAND gates, hazards in combinational networks. Mealy sequential network design, Moore sequential network design, synchronous design, machine design.

Introduction to VHDL:VHDL description and combinational network, modeling flip-flops multiplexes using VHDL processes, complications and simulations of VHDL code, modeling a sequential machine, variables, signals, and constants, arrays, VHDL operators functions and procedures, packages and libraries.

Unit II

Attributes, multi-valued logic and signal resolutions. IEEE 1164 standard logic, generics, generate statement, synthesis of VHDL code, synthesis examples, files and TEXTIO.

Unit III

Designing with programmable logic devices ROM, PLA'S, PAL'S, PLD'S, designing with programmable gate arrays, FPGA'S, CPLD'S(complex programmable logic device).
Floating point arithmetic multiplication and other operations.

Unit IV

Hardware testing and design :Combinational logic testing, sequential logic testing, scan testing, boundary scan, built-in self test.

Unit V

Design examples and case studies: USART design, micro controller design, design of microcomputer CPU, filter design etc.

BOOKS:

1."VHDL primer" by Bhaskar
2."Digital system design using VHDL" by Charles Roth
3." Modern VLSI design (system of silicon)" by Wayne Walf.

Wireless Communication and Mobile Computing

Unit I

Introduction to wireless Communication : Frequency for radio transmission, signals, antenna, signal propagation, multiplexing – TDMA, CDMA, modulation, spread spectrum –DSSS and FHSS, cellular systems.

Unit II

Telecommunication Systems and Mobility Management : PCS architecture , GSM,DECT,IMT 2000,Handoff, Roaming management , Handoff detection, channel assignment, Hard /Soft Handoff, Intersystem Handoff and Authentication.

Unit III

Wireless LAN : Infrared V/s radio transmission, IEEE 802.11 a and b.
Bluetooth – architecture and protocol. Wireless local loop architecture and technologies.

Unit IV

Mobile Network and Transport Layer : Mobile IP, DHCP, Mobile ad-hoc Networks, TCP, Indirect TCP, Snooping and Mobile TCP, selective retransmission , Transmission oriented TCP, TCP over 2.5/3G wireless Networks.

Unit V

GSM architecture ,operation, administration and maintenance, VOIP service for mobile networks , GPRS architecture, Interfaces and procedures, WAP protocols and gateway.

Books

1. Wireless Digital Communication – Feher
2. Wireless Communication and Network – William Stallings
3. Mobile Communication – Schiller
4. Mobile Communication Engineering – Lee
5. Wireless and Mobile Network Architecture – Yi Bing Lin & Imrich Chalamtac

ELECTIVE – II - CS-705

T – 100, Sessional –25

NETWORK SECURITY

Unit I

Introduction to network security, security methodology, threat and risk, analysis,defence model, security policy, development, security organization

Unit II

Controlling physical access – role of physical security, classification of assets, securing assets, physical intrusion detection/authentication and authorization Controls:- usernames and password, certificate based authentication, user rights , role based authorization and access control lists.

Unit III

Data security : principles of data security architecture, data storage and file encryption, digital rights management.
Security management architecture – administrative security, accountability controls, activity monitoring and audit

Unit IV
Intrusion –detection system: IDS concepts types and detection models features. Securing E-mail servers, proxy coactivity and security, DNS security, credit card security, OS security, IP security

Unit V
Application security- web application security , regular application security, embedded application security, remote administration security, data base security
Firewalls and TCP/IP, packet filtering firewalls, stateful packet- inspection firewalls, OS-based firewalls, functions of firewalls

Books

1. William Stallings, " cryptography and network security " second edition, prentice hall, 1999
2. "Complete reference network security" TMH Robert Bragg, Mark, Kieth Strasburg

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PATTERN RECOGNITION

Unit I

Introduction to pattern recognition , Types of images, Regular patterns, Irregular patterns, Pattern recognitions systems :Fundamental problems , Designs, Concepts and methodologies: Character recognition ,Speech recognition, Finger print recognition, Image autocorrelation, Classification, Color processing, Correlation, Model , Sensors, Restoration, Wavelet processing, Image blocks in MPEG.

Unit II

Combine detection method, Edge detection, Edge linking, Gradient, Laplacian , Line detection, Motion based, Point detection, Snake Method.

Unit III

Boundary description, Detection, Matching merging, Segmentation, Smoothing, Splitting of boundaries, Syntactic analysis of region boundaries, Study of shape by region analysis.

Unit IV

Statistical pattern recognition, Bayer theorem : Bayes Classifier for normal patterns, Multiple features, Decision boundaries, Estimation of error rates. Trainable pattern classifier, Deterministic approach, Perception approach, Gradient approach: Gradient descent algorithms- LMSE algorithms. Features extraction, syntactic pattern clustering, Hierarchical and part ional clustering.

Unit V

Fuzzy approach applied to pattern recognition, Classificatory analysis preprocessing, Feature detection and primitive extraction, Adaptive classification of fuzzy grammar. Fuzzy clustering, Fuzzy image processing.

Books:

1. Earl Rose, Richard Johnson Baugh, Steve Jost, Pattern Recognition &
2. Image Analysis.
3. J.T. Tou, R.C Gohzale, Pattern Recognition Principle, Addison Wesley.
4. Fuzzy sets and Fuzzy logic, George J.Klir , Bo yuan.
5. Digital image processing, Rafael C. Gonzalez, Richard E Woods, Pearson education (second edition) 2003.

MANAGEMENT INFORMATION SYSTEM

UNIT- I

Fundamentals of Management Information Systems (MIS), Understanding all the three domains – Management, Information and Systems, Misconceptions about MIS, Importance of MIS, IS framework for Business Professionals, Components of an Information system, Major roles of Information systems.

UNIT - II

Types of Information Systems- strategic systems, tactical systems and operational systems, Study of different types of Information systems prevailing in Business under these categories.

UNIT III

Role of IT in business functions, Viewing business as a system, Various types of business processes, Value chain, supply chain and customer's experience. Characteristics of a business process, Degree of structure, Level of integration, Complexity treatment, Exception and error handling, Evaluating a business process performance, Work system framework, Balance between elements of a work system, Viewing Information systems and Projects as work systems, Relationship between work systems and Information systems.

UNIT IV

Information system planning, Phases/Building and maintaining an information system, Security and control in an information system.

UNIT V

Using information system for competitive advantage, Strategic information systems, Applying telecommunication in business, E-commerce

References :-

1. Information System – a Management Perspective by Steven Alter
   Publisher – Addison Wesley

2. Information Systems – The Foundation of E-business By Steven Alter
   Publisher – Addison Wesley

3. Management Information Systems – Managing Information technology in Business Enterprise by James A. O'Brien.
   Publisher – TMH

4. Management Information System – Avdesh Gupta, Anurag Malik
   Publisher – Firewall Media.

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COMPUTER PERIPHERALS AND SYSTEM INTERFACES

Unit I

Key board : Key board function, types.
CRT display Monitor.
Printer : function, characteristics, type of printer and printing mechanism.
Magnetic Storage device : Basic principle, Recording technique, Floppy disk drive, Hard disk drive, Special types of disk drive, Mouse and Trackball.
Modem, Fax modem, CD Drive, Scanner, Scanner Digital Camera, DVD, Power Supply, Special peripherals.

Unit II

Microprocessors Intel 8088, Intel 80386, Intel 80486, Pentium Pro, Pentium II, Pentium III, Pentium IV, Celeron Processor, PC Basic Support Chip in Motherboard, I/O Modes, I/O Channels, I/O Processor, Bus Controller DMA Controller, Interrupt Controller.

Unit II

Installation and Preventive Maintenance: Routine checks, BIOS setup, Preventive maintenance , Virus, Data Recovery.
Troubleshooting: Computer Faults, fault Diagnosis, POST, Layman Checks, Problem of Various Peripheral Devices.

Unit IV

Interfacing:
Serial and Parallel interfaces, RS-232 interface, current loop interface, UERT.

Printer Controller :
Introduction, Programming sequence, Controller Hardware Overview, Circuit description, new generation Parallel part.

Floppy Disk Controller :
Introduction , Controller overview, FDD interface, FDCIC, FDC Commands, Sector interleaving, Data Separation, New Generation FDC.

Unit V

Hard Disk Controller :- Introduction, HDC command IDE, EIDE, SCSI, Hard Disk Format Procedure, HDC Specification and features.
Display Adapter: RT Controller principle, colour/graphics adapter, HGA, EGA, AGP, MGA

Books:

1. Microprocessors and Interfacing : D.Hall , TMH.
2. IBM PC and Clones : B Govindarajalu, TMH .
3. Peripherals Inter corporation: John B. Peatman.

DISTRIBUTED SYSTEMS

Unit I

Introduction to distributed systems

Goals of Distributed systems, Hardware & software concepts, Design issues. Communication & Distributed Systems: Layered Protocols, ATM Networks, the Client-Server models, Remote Procedure Call & Group Communication.

Unit II

Synchronization in Distributed systems

Clock Synchronization, Mutual exclusion, Election algorithm, The Bully algorithm, a ring algorithm, Atomic Transaction, Deadlock in distributed systems, Distributed deadlock prevention, Distributed deadlock .

Processes & Processors in Distributed Systems

Threads, system models, Processor allocation, Scheduling in distributed systems, fault tolerance & real time distributed systems.

Unit III

Distributed file systems

Distributed file systems design, distributed file systems implementation, Trends in distributed file systems. Distributed shared memory: what is shared memory?, Consistency models, page based distributed shared memory, shared variable distributed shared memory, Object based DSM.

Unit IV

Overview of Distributed Systems, Features of distributed & centralized databases. DDBMS, levels of distribution transparency, data fragmentation & integrity constraints, Management of distributed transaction, concurrency control, reliability, distributed database administration.

Unit V

Case Studies MACH

Introduction to ACH, Process management in MACH, Memory management in MACH, Communication in MACH, UNIX emulation in MACH.

Case study DCE: Introduction to DCE threads, RPCs time service, Directory Service, Security Service, Distributed file Systems.

Reference:

Tanenbaum, Andrew.S. , Distributed Operation System, PHI
Distributed systems and networks by Buchanan
Distributed databases and principles and system by Stefano Ceri and Giuseppe Pelagatti

SYSTEM PROGRAMMING AND COMPILER DESIGN LAB – CS-706

P – 50, S – 25

(i) Study and design pass I & pass II of an assembler for simple instruction set.

(ii) Program to generate different data structure used in assembler.

(iii) Study of linking & loading of programs.

(iv) Implementation of various phases of compiler.

ARTIFICIAL INTELLIGENCE LAB - CS-707

P– 50, S – 25

1. Write a program to implement water-jug problem.
2. Write a program in prolog to play game of TIC-TAC-TOE with computer.
3. Implement A* & AO* Algorithms.
4. Study of forward & backward reasoning.
5. Study of various knowledge representation techniques.

SEMESTER – VIII

EMBEDDED SYSTEM – CS-801

T–100, S–25

Unit I

Hardware fundamentals:- Gates, timing, diagram, memory, microprocessor, buses, DMA. Interrupts:- Microprocessor architecture , interrupt basics, interrupt latency, shared data problem.

System partitioning, building the architectural model, Input and output processing, Hardware and software partitioning. Timing requirements.

Unit II

Microprocessor selection. Microprocessor versus Micro-Controller analysis CISC versus RISC study of major embedded processor architecture memory system design. System optimization. Architecture for embedded software:- round robin, found robin with interrupts. Function-queue-scheduling and real time operating system.

Unit III

Real time operating system :-Tasks and task states, task and data, semaphores and shared data. Operating system services:- inter task communication, timer services, memory management, events and interaction between interrupt routines and real time operating system. Software selection issues. Selecting an RTOS, RTOS performance metrics, RTOS scalability and tool support. Compiler Selection.

Unit IV

Embedded system design using real time operating system: encapsulating semaphores and queues, hard real time scheduling consideration saving memory space.

Unit V

Development tools and debugging:- Host and target machines. Linker/ location, target system testing, instruction set, asset macro. Establishing a software development environment C runtime environments Embedded debuggers Cross – development methods Embedded file formats, readers. Creating object files- the build process loading software in to remote targets.

Books:-

1. An Embedded Software Primer by David E. Simon ISBN
2. Embedded System Design by Arnold S. Berger.

DATA WAREHOUSING AND DATA MINING-CS-802

T–100, S–25

Unit I

Introduction to data mining:-kinds of data, relational databases, traditional databases, advanced database systems, data mining functionalities & patterns generated. data warehouse & operational databases, multidimensional data model. data warehouse architecture:-process flow, extract & lad process. clean & transform data. backup & archive process load & warehouse manager

Unit II

Data warehouse design:-identifying facts & dimensions. Designing:-fact tables, dimension tables. star flake schema query redirection. Multidimensional schemes:-portioning strategy, aggregation, data marting, metadata. Capacity planning, tuning the data warehouse. testing the data warehouse: developing test plan. testing operational environment, database, application.

Unit III

Data preprocessing, data cleaning, data integration & transformation, data reduction. data mining primitives, language & system, architecture of data mining system.

Unit IV

concept description:- characterization & comparison. mining & association rules in large databases. Mining single dimension & multilevel association rules for transactional databases relational databases & data warehouses.

Unit V

Issues regarding classification & prediction. methods of classification & prediction. cluster analysis:-type of data in cluster analysis clustering methods. multidimensional databases. text databases & world wide web.

Books:-

1. Data mining concepts & technique by jimali klan & Micheline Kamber
2. Data warehousing in the real world by sam Anahory & Dennis Murray

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ELECTIVE – III – CS-803

T–100, Sessional–50

NEURAL NETWORK

Unit I

Introduction: Artificial Neuron, Single layer artificial neural network, Multilayer, Training of artificial neural network, Biological model for artificial neural network.

Unit II

Perception & back propagation: Perception representation, Ex-of, Linear seprability, Perception learning & training algorithm, Back propagation training algorithm.

Unit III

Counter propagation network & statistical method : Introduction network structure, Training of the Kohonen layer & application Boltzmann training Cauchy training , Artificial specific heat method statistical Hopfield networks , Hopfield nets & Boltmann Method.

Unit IV

Adaptive resonance theory: ART architecture, ART classification operation , ART implementation , ART training .

Unit V

Optical neural network, Electro optical matrix multiplier, Holographic correlators , Optical neurons , introduction to cognitron & non cognitron.

Books

1. Neural Network by S Ranka.
2. Neural Network by Philip D. Wasserman
3. Elements of artificial neural networks By:- Kishan Mehrotra, Chilkuri, K.Mohan and Sanjay Rana, Penram International.
4. Neural Networks and Fuzzy Systems by:- Bart Kosko, Prentice Hall of India.
5. Fundamentals of artificial neural networks By:- Nohamad H. Hassoun Prentice Hall of India.

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COMPUTER AIDED SIMULATION & MODELING.

UNIT 1:
System & models: The concept of a system environment, stochastic activities, continuous and discreet system, system modeling. Types of models: static physical models, dynamic physical models, static mathematical models, dynamic, mathematical models, principles used in muddling, simulation of a pareparsuit problem and simulation of an inventory problem.

UNIT 2:
Continuous system models, differential equations, analog computers, analog methods, hybrid computer, digital analog simulations, continuous system simulation. Languages, CSMP III hybrid simulation, feedback system, simulation of an interactive system, real time simulation.

UNIT 3:
Discrete system simulation: Probability concepts in simulation, random number generations and their testing, stochastic variable generation, fixed time-stop vs. event-to-event model.

UNIT 4:
Simulation of queuing systems: Arrival pattern, Poisson arrival pattern, exponential distribution, service times, simulation of a single-server queue, the normal distribution, measures of queues.

UNIT 5:
Simulation languages: Continuous and discrete simulation languages block structured continuous simulation languages, GPSS, SIMSCRIPT, SIMULA, factor in selection of a discrete simulation language.

Books

1. Computer Simulation and Modeling – Francis Neelamkaril
2. Simulation Methods and Algorithms – Jan Ogrodzki
3. Simulations and Modeling - Zordan

DIGITAL IMAGE PROCESSING

Unit I.

Introduction to image processing system: Image process, digitizer, Display and recording devices, Digital Image fundamentals: image model, relationship between pixels imaging geometry.

Unit II.

Manipulation on Images

Images transformation: Introduction to fast Fourier transformation, Walsh transformation, hadmard transformation, Hotelling transformation, Hough transformation method, Histogram, modification

Image smoothing: Neighborhood averaging, Median filtering, lowspass filters. Average of multiple images, image sharpening by differentiation technique. High pass filtering.

Unit III

Image Restoration, Degradation model for continuous function, effect of digitalization on degradation models, algebra approach to resteration, east mean square filter interactive restoration, grey level interpolation.

Unit IV.

Image Encoding & Segmentation: Encoding: Mapping, Quantizer, Coder, Segmentation: detection of discontinuation by point detection, line detection. Edge detection. Edge linking & Boundary detection: Local analysis, Global by Hough transform & Global by graph theoretic techniques. Thresholding : Definition, Global Thresholding, Filtering: Median, Gradient.

Unit V

Simple methods of Representation

Signatures, Boundary segments, skeleton of region , Polynomial approximation., Application of Image processing tool box of MATLAB.

Books

1. Digital image processing – Rafael C.Gonzalez Rechard E.Wood
2. Fundamental of Digital Image Processing by Anil.k.jain
3. Image Processing Toolbox- Matlab - Mathwork Foundation

REAL TIME AND FAULT TOLERANT SYSTEMS

Unit I

Basic concepts in real time-time systems, systems and signals, reactive system, definitions of real-time systems, event-driven and discrete-event systems, deterministic & stochastic systems, Embedded systems, Control systems, concurrent systems, distributed systems, complex systems, fault tolerant systems & reliability, safety-critical systems, internal structure of real time systems, performance measures, examples of real time systems & real world applications modeling real time systems. Designing real time systems, software/hardware co-design.

Unit II

Real time kernels & programming languages, multi-tasking, resource sharing. inter-task communication & synchronization, priorities, drivers, scheduling, criteria for programming languages, CONIC,PAISELY,RT-LINUX,WINDOWS CE, Vx works, RTx-DOS,QNX. Synchronous programming languages basic concepts, Sync Charts, SIGNAL,ARGOS,ESTEREL

Unit III

Real-time computer hardware & process interfacing, central processing unit, Micro-controllers ,memories, specialized processors, bus structures, digital signal interfacing, pulse interfaces, analogue signal interfacing, Real time clock & timer, Interrupts, direct memory access, serial & parallel interfaces ,pipelining, coprocessors

Unit IV

Fault –tolerant real time systems, basic concepts, causes of failures, types of failures, fault detection, fault recovery, redundancy, Byzantine failure

Unit V

Basic concepts in hybrid control systems, continuous petrinets, hybrid petrinets, and definition of hybrid systems, applications, examples, modeling, and hybrid systems with state machines. Formal modularity & hierarchy, further examples, tools(CHARON**)**

Books

A. C. Shaw, Real Time Systems and Software, Wiley, 2001
R. Bennett, Real- Time Computer Control, Prentice- Hall, 1994
J.E. Cooling, Real-Time Software Systems, International Thompson Computer Press, 1997

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INTELLECTUAL PROPERTY RIGHTS & CYBER LAWS

Unit 1: Intellectual Property Rights-Concepts and Evolution

Introduction to Intellectual Property Rights, Evolution of Intellectual Property Laws Standards and Concepts in Intellectual Property, Conventions and Treaties Relating to Global Administration of Intellectual Property Rights, Protection and Classification, Regional Conventions and Treaties, Organization, Jurisdiction enforcement and Administration of IPRs, IPRs and Information Technology IPRs and Bio- technology, IPRs and Traditional Knowledge, Management of Intellectual Property Rights, Law of Intellectual Property and Ethical Issues, Knowledge Driven Economy and IPR, Intellectual Property Rights in India and abroad.

Unit -2: Law of Patents, Copyright and Trademarks

Introduction ,Evolution of Patent Law, Scope and Purpose, Classification of Patents, Patent Law in India: Patent Act of 1970, The Patents (Amendments) Act, 2002, Patent Office and Authorities, Grant of Patent, Right and Obligation of a Patentee, Infringement of Patents, Offenses and Penalties, Patents and other commercial Law, Patents – International Law, Patents Law- Emerging Trends, Social Implication of Patents.

Introduction to Copyrights as forms of Intellectual Property, Copyright Law in India (Copyright Act of 1957) - meaning, Form of Copyright and Ownership Assignment/License, Registration and terms of Copyright, Copyright infringement , Offences, Remedies and Enforcement, Broad casting Organization and performers, Copyright – International Law, Introduction to trademarks, Trademarks – forms of Intellectual Property, Law of Trade Marks in India (Trademark Act of 1999)- meaning, registration and authorities, Right conferred by Registration and use of Trademarks, Infringement of Trademarks and passing off, Offences, remedies and enforcement, Trademarks –International Law

Unit 3 : Law of Designs, geographical Indications and other Intellectual Property

Introduction to designs – Industrial Designs, Design Laws in India: Designs Act of 2000, Registration of Design, Owners Rights, Piracy of Designs, Offences, Remedies and Enforcement, Designs- International Law, Introduction to Geographical Indication, Law of Geographical Indication in India: Geographical Indication of Goods (Registration and Protection) Act, 1999, Registration of Geographical Indication, Infringement of Registered Geographical Indication Offence, Remedies and Enforcement

The Semiconductor Integrated Circuit Lay Out Design Act, 2000, The protection of Plant varieties and Farmers rights Act, 2001, Law Relating to Diversity

Unit 4 : Introduction to Cyber Law & Information Technology Act, 2000

Evolution of Computer Technology, Emergence of Cyberspace, Cyber Jurisprudence, Jurisprudence and Law, Doctrinal Approach, Consensual Approach, Real Approach, Cyber Ethics, Cyber- Jurisdiction, Hierarchy of Courts, Civil and Criminal Jurisdictions, Cyberspace –Web space (WWW), Web Hosting and Web Development Agreements (specimen), Domain Names, Internet as a Tool for Global Access, Overview of IT Act, 2000, Amendments and Limitations of IT Act, Digital Signatures, Cryptography, Cryptographic Algorithm, Public Cryptography, Private Cryptography, Electronic Governance, Legal Recognition of Electronic Records, Legal Recognition of Digital Signature, Certifying authorities, Cyber Crime and Offences, Network Service Provider Liability, Cyber Regulation Appellate tribunal, Penalties and Adjudication

Unit 5 : Cyber law issues and related legislation

Patent Laws, Trademark law, Copyright, Software –copyright or patented, Domain Name and Copyright disputes, Electronic Database and its Protection, IT Act and Civil procedure Code, IT Act and Criminal Procedure Code, Relevant Sections of Indian Evidence Act, Relevant Sections of Bankers Book Evidence Act, Relevant Section of Indian Penal Code, Relevant Section of Reserve Bank of India Act, Law Relating to Employees and Internet, Alternative Dispute resolution, Online Dispute Resolution (ODR)

1. Law and Practice of intellectual Property in India by Vikas Vashishth
2. Intellectual Property by A.Kalank
3. Intellectual Property- patents,copyrights,trade marks and allied rights by Cornish W R
4. Patents ,copyrights, trade marks and design by B L Wadhera
5. Intellectual property law by P Narayana
6. Patents ,copyrights, trade marks and design by Rajeev Jain

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ELECTIVE – IV – CS – 804

T–100, Sessional–50

ADVANCED COMPUTER ARCHITECTURE

Unit I

Introduction to parallel processing and pipelining, array computers, multiprocessor systems, dataflow diagrams and applications of parallel processors.

Unit II

Various types of pipeline processors like arithmetic pipelines, instruction pipelines etc,. reservation table, design of various types of pipelines, instruction pre-fetching and branch handling in pipelines, data buffering and busing structures in pipelines.

Unit III

Meaning of instruction streams and data streams, classification of computers based on these as SISD,SIMD, MISD and MISD ,SIMD computer organization. Various types of SIMD interconnected networks like static and dynamic networks, mesh connected networks , cube connected networks etc. SIMD matrix multiplication and parallel sorting algorithms.

Unit IV

Various types of array and associative processors , loosely and tightly coupled microprocessors. Various types of interconnection networks like time shared or common bus ,crossbar switch, multiport memories etc.

Unit V

Control flow and data flow computers , data flow computers ,data flow graphs and languages ,static and dynamic data flow computers ,systolic array architecture, RISC,CISC. Architecture case study: LINUX clusters.

BOOKS:

1. Advanced computer architecture by KAI HWANG
2. Computer Organization & Architecture by WILLIAM STALLINGS.

ROBOTICS

Unit I

Introduction: Basic components of robotic system, classification of a robot, characteristic of robot, performance, advantages and disadvantages of robot, applications of a robot.

Unit II

Kinematics for manipulators, homogeneous transformations, solution of kinematics equation, Lagrangion equation, and manipulator dynamics, iterative Newton-Euler dynamics formations.

Unit III

Position planning, position velocity and force control, controller design, digital simulation.

Unit IV

Sensing system: types of sensors, Robot sensing technology and sensing system design, machine vision, artificial intelligence, control technique.

Unit V

Programming language for robots, applications of computer controlled robots in manufacturing and programmable automation.

Books:

Introduction to Robotics : John J Craig.

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E-COMMERCE

Unit I

What is E-Commerce? E-Commerce & the Digital Nervous system, Why E-Commerce is important? E-Commerce benefits, Understanding E-Commerce, Technology & Flow of Information through an organization, Types of E-Commerce.

Unit II

Area of Application of E-Commerce- E-Procurement, Marketing & Promotion, Brand Management, Inventory Management, Supply Chain Management, E-Commerce Myths.

Unit III

Cost Benefit Analysis of e-Commerce, Calculating ROI, How does E-Commerce Add value? Technology issue related to interface & interoperability, Interface to legacy, ERP and other system, Establishment of standards for the interoperability of Communications network, Information and data exchange & security services. Changing Geopolitical landscape, Trade rules, Tax & other monetary issues.

Unit IV

Measuring success of E-Commerce, What Criteria must E-Commerce solution meet? E-Commerce requirements, translating requirements into success measurements, identifying critical success factors, Calculating & Managing the risk.

Unit V

E-Commerce building blocks- Hardware requirements - Web Servers, Transaction Servers, Database Servers, Network Communications, Software requirements – Web Server software, Processing web based transactions, security, External service provider- Internet service provider, Web Hosting, Procedure/Providers, Application service provider, E-Commerce site essentials, E-Commerce best practices.

References:

E-Commerce Strategies by Charles Trepper - PHI

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PARALLEL ALGORITHM

Unit I

Introduction to parallel algorithm. Parallel processing terminology:- contrasting pipelining & data parallelism. Control parallelism, scalability, sieve of eratosthens control:- parallel approach , data parallel approach, data parallel approach with I/o.
PRAM algorithms:- a model of serial computation . PRAM model of parallel computation , PRAM algorithms.
Processors arrays, Multiprocessors & Multi-computers:- processors organization, processor arrays, multiprocessors, multi-computers. Flynn's taxonomy, speedup, scaled speedup and parallelizability.

Unit II

Parallel programming languages:- programming parallel processors. FORTRAN 90. C* SEQUENT C, Ncube C, OCCAM, C-LINDA. Notation for expressing parallel algorithms. Mapping & scheduling:- mapping data to processors on processors arrays &multi-computers. Dynamic load balancing on multi computers static scheduling on UMA multiprocessors.

Unit III

Elementary parallel algorithms:- classifying MIMD algorithm, reduction :- hypercube SIMD model, shuffle exchange SIMD model, 2-d mesh SIMD model, UMA multiprocessor model.
Matrix multiplication:- sequential matrix multiplication, algorithm for processors arrays:- algorithm for multiprocessors, algorithm for multi-computers.
Introduction to fast Fourier transform, discrete Fourier transform:- inverse discrete Fourier transform, sample application.

Unit IV

Parallel processing, Parallel Computers structures,
Designing of parallel algorithms, analyzing algorithm, general principles of parallel computing, parallel sorting algorithms Batcher's bitonic sort. Bitonic sort using the perfect shuffle, parallel bubble sort, add-even transport, Tree sort, quick sort, sorting on the CRCW, CREW, EREW models.

Unit V

Searching a sorted sequence, CREW, CRCW & EREW searching, searching on a random sequence EREW, ERCW, CREW & CRCW searching on SIMD computers, searching on a tree, mesh, A Network for merging, merging on the CREW, ERFW models, Computing Fourier Transforms, computing the DFT in parallel, a parallel FFT algorithm.

Books:

1. Design & analysis of parallel algorithm by Salim & Akl, PIII(International Editions)
2. Design Efficient Algorithm for parallel computers by Michel J. Quinn, Mc GRAW-Hill, International Editions.

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ATM NETWORKS

Unit 1

Introduction to ISDN, B-ISDN, B-ISDN services, ATM Basics, ATM Services, Architecture of B-ISDN, virtual channel, Virtual path, ATM performance parameters, Signaling Techniques.

Unit 2

ATM – Performance Reference Model (PRM) layered architecture, relationship between ATM PRM and OSI reference model, Layer functions, User Network Interface (UNI), Physical layer of UNI, function of transmission convergence sub layer, Physical medium characteristics; ATM layers cell headers of B-ISDN, UNI and NNI, ATM Adaptation layer, operation and maintenance of B-ISDN UNI.

Unit 3

B-ISDN signaling, meta-signaling, ATM adaptation layer for signaling, signaling protocols, switches & cross connects.

Unit 4

ATM transmission network, Cell transfer functions, transmission systems, network synchronization, trunk, network structure, ATM network implementation and its equipments.

Unit 5

Evolutionary scenarios for B-ISDN fiber to the customer, TCP/IP over ATM, Voice delay & Eco problem, Telecommunications Management networks, Gigabits LAN's, Optical switching, ATM standardization.

Reference:

- Rainer Handel, Huber & Schooder "ATM Network", Addison Wesley
- David E Mc Dysan, ATM Theory & Application, McGraw Hill
- Tennanbaum, Computer Network
- William Stalling, An Introduction to ISDN, McMillan publishing Co., USA

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SOFTWARE QUALITY ASSURANCE AND TESTING

Unit I

Introductory concepts - Software Quality system and Quality attributes, Software Quality Assurance, Software Processes, Role of SQA in software development life cycle.

Unit II

Software Quality Metrics- product quality metrics, process quality metrics, software quality management models, Technical metrics for Object Oriented Systems.
Steps in SQA Implementation,:- Identification of applicable software product standards, practices and conventions, Metrics, Reviews, Audits, Documentation, Error reporting and corrective action, Access control, Risk management.

Unit III

Software Quality Assurance standards like SEI, CMM & CMMI, ISO, IEEE, American Society for Quality (ASQ).

Unit IV

Software Testing, Object Oriented testing, Types of testing like blackbox testing, white box testing, unit testing, adhoc testing, alpha or beta testing, mutation testing, end-to end testing, sanity testing or smoke testing, bugs in software and debugging, software verification and validation, walkthrough, inspection, quality of a good software test engineer.

Unit V

Foundations of Modern testing, Steps involved in developing and running software tests, test planning, test analysis, test design and implementation, test execution and reporting,
test cases.

Testing tools – configuration management tools, website testing tools.

Books

1. S/W Testing techniques ,boris,beizer,2ndEddition,Van Nostrand Reinhold

2. Measuring S\w reuse –principles practices and economic models ,J.S.Poutin Edition Wesley

EMBEDDED SYSTEM LAB – CS-805

P-25, S–25

1. Implementation of Round Robin Scheduling and Round Robin Scheduling with Interrupts.

2. STUDY OF:-
   - Direct Memory Access Controller
   - Real Time Operating System
   - Embedded Processor Architecture.
   - CISC and RISC
   - Operating System Services

DATA WAREHOUSING AND MINING LAB -CS-806

P-25, S–25

- Design an application using Data warehousing
- Design an application for mining data from Multidimensional databases, Text databases and World Wide Webs