M.J.P. Rohilkhand University, Bareilly

रूहेलखण्ड विश्वविद्यालय, बरेली

Course Structure & Detailed Syllabi

For

Bachelor of Technology

Department Of Computer Science & Information Technology

FIRST YEAR

SEMESTER-I

Sl. No.	Course No.	Subject	Credits	Teaching Schedule			Contact Hrs
1	PH-101	Physics-1	4	3	1	0	4
2	CY-101	Chemistry-1	4	3	1	0	4
3	MA-101	Mathematics-1	4	3	1	0	4
4	HU-101	Technical writing-1	3	2	1	0	3
5	EE-101	Basics Electrical Engineering	4	3	1	0	4
6	ME-102	Applied Thermodynamics	3	2	1	0	3
7	ME-109	Manufacturing Technology	2	1	1	0	2
8	CS-101*	Computer Fundamentals & Programming	2	3	0	0	3
TOTAL			26	20	7	0	27
LABORATORY COURSE							
9	PH-101P	Physics Lab	2	0	0	3	3
10	CS-101P*	Computer Programming Lab	2	0	0	3	3
11	ME-109 P	Manufacturing Technology Lab	2	0	0	3	3
TOTAL			6	0	0	9	9
Semester Total			32	20	7	9	36

SEMESTER-II

Sl. No.	Course No.	Subject	Credits	Teaching Schedule			Contact Hrs
1	PH-102	Physics-II	4	3	1	0	4
2	CY-102	Chemistry-II	4	3	1	0	4
3	MA-102	Numerical Analysis	3	2	1	0	3
4	HU-102	Technical writing-II	3	2	1	0	3
5	EC-102	Basics Electronics	4	3	1	0	4
6	ME-101	Engineering Mechanics	3	2	1	0	3
7	ME-106/ CS-102*	Graphic Science/ Computer Fundamentals & Programming	3	0	0	3	3
TOTAL			24	15	6	3	24
LABORATORY COURSE							
8	CY-102P	Chemistry Lab	2	0	0	3	3
9	EC-102P	Basic Electronics Lab	2	0	0	3	3
10	CS-102P*	Computer Programming Lab	2	0	0	3	3
TOTAL			4	0	0	6	6
Semester Total			28	15	6	9	30

- CS-101* → Ist Sem in Branches CSIT, ME & CH
- CS-102* → IInd Sem in Branches EE, EI & EC
- CS-101P*→ Ist Sem in Branches CSIT, ME & CH
- CS-102P*→ IInd Sem in Branches EE, EI & EC (Credits : 2)

SECOND YEAR

SEMESTER-III

Sl. No.	Course No.	Subject	Credits	Teaching Schedule			Contact Hrs
1	CS-201	Data Base Management System	3	2	1	0	3
2	CS-203	Discrete Mathematical Structure	3	2	1	0	3
3	CS-205	Data Structure	4	3	1	0	4
4	CS-207	Object Oriented Programing	4	3	1	0	4
5	MA-201	Mathematics-II	4	3	1	0	4
6	EI- 201	Analog Electronic Circuits	4	3	1	0	4
	TOTAL		22	16	6	0	22
	LABORATORY COURSE						
7	CS-205 P	Data Structure Lab in C/C++	2	0	0	3	3
8	EC-201 P	Electronics Circuits Lab	2	0	0	3	3
9	EC-203 P	Electronics Devices Lab	2	0	0	3	3
	TOTAL		6	0	0	9	9
	Semester Total		28	16	6	9	31

SEMESTER-IV

Sl. No.	Course No.	Subject	Credits	Teaching Schedule			Contact Hrs
1	CS-202	Analysis & Design of Algorithm	4	3	1	0	4
2	CS-204*	Computer Organisation	4	3	1	0	4
3	CS-206	Data Communication	4	3	1	0	4
4	MA-202	Mathematics-III	4	3	1	0	4
5	EC-202	Signal & Systems	4	3	1	0	4
6	EC-204	Digital Electronics	4	3	1	0	4
	TOTAL		24	18	6	0	24
	LABORATORY COURSE						
7	CS-208 P	Database Project Lab	2	0	0	3	3
8	EC-204 P	Digital Electronics Lab	2	0	0	3	3
	TOTAL		4	0	0	6	6
	Semester Total		28	18	6	6	30

- CS-204 * → IV th Sem in Branches CSIT,EC, EI & EE
- **Additional Course:** CS-201 P, for B. Tech- III rd Sem, Branches EC & EI

THIRD YEAR

SEMESTER-V

Sl. No.	Course No.	Subject	Credits	Teaching Schedule			Contact Hrs
1	CS-301	Computer Networks	3	2	1	0	3
2	CS-303	Software Engineering	4	3	1	0	4
3	CS-305	Principles of Programming Languages	3	2	1	0	3
4	CS-307	Theory of Computation	4	3	1	0	4
5	CS-309	Operating Systems	4	3	1	0	4
6	EI-309	Microprocessor	4	3	1	0	4
	TOTAL		22	16	6	0	22
	LABORATORY COURSE						
7	CS-301 P	Computer Networks Lab	2	0	0	3	3
8	CS-309 P	Operating Systems Lab	2	0	0	3	3
9	EI- 309 P	Microprocessor Lab	2	0	0	3	3
	TOTAL		6	0	0	9	9
	Semester Total		28	16	6	9	31

SEMESTER-VI

Sl. No.	Course No.	Subject	Credits	Teaching Schedule			Contact Hrs
1	CS-304	Compiler Design	3	2	1	0	3
2	CS-306	Interactive Computer Graphics	4	3	1	0	4
3	CS-308	Distributed Systems	4	3	1	0	4
4	CS-310	Programming with JAVA	4	3	1	0	4
5	CS-312	Data Mining Techniques	3	2	1	0	3
6	EC-302	Digital Signal Processing	4	3	1	0	4
	TOTAL		22	16	6	0	22
	LABORATORY COURSE						
7	CS-306 P	Computer Graphics Lab	2	0	0	3	3
8	CS-310 P	JAVA Programming Lab	2	0	0	3	3
9	EC-302 P	Digital Signal Processing Lab	2	0	0	3	3
	TOTAL		6	0	0	9	9
	Semester Total		28	16	6	9	31

- **Additional Course:** CS-302 i.e. Computer Networks
  For branches EC & EI in VIth Sem

FOURTH YEAR

SEMESTER -VII

Sl. No.	Course No.	Subject	Credits	Teaching Schedule			Contact Hrs
1	CS-401	Advanced Computer Architecture	4	3	1	0	4
2	CS-403	Simulation & Modeling	4	3	1	0	4
3	CS-***	Departmental Elective-I	4	3	1	0	4
4	**-***	Pool Elective	4	3	1	0	4
5	CS-405	Seminar	3	0	1	0	1
6	TRN-401	Industrial Training	3	0	0	0	0
	TOTAL		22	12	5	0	17
	LABORATORY COURSE						
7	CS-401 P	Simulation Lab	2	0	0	3	3
8	CS-403 P	Major Project	4	0	0	9	9
	TOTAL		6	0	0	12	12
	Semester Total		28	12	5	12	29

SEMESTER –VIII

Sl. No.	Course No.	Subject	Credits	Teaching Schedule			Contact Hrs
1	CS-402	Advanced Computer Networks	4	3	1	0	4
2	CS-***	Departmental Electives-II	4	3	1	0	4
3	CS-***	Departmental Elective-III	4	3	1	0	4
4	**-***	Open Elective	4	3	1	0	4
	TOTAL		16	12	4	0	16
	LABORATORY COURSE						
5	CS-402 P	Advanced Computer Networks Lab	2	0	0	3	3
6	CS-406 P	Major Project Lab	10	0	0	15	15
	TOTAL		12	0	0	18	18
	Semester Total		28	12	4	18	34

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LIST OF ELECTIVES

CS-431 Network Management Systems
CS-432 Object Oriented Analysis and Design
CS-433 Artificial Neural Networks
CS-435 Parallel Computing and Algorithm
CS-438 Fault Tolerance Computing
CS-439 Artificial Intelligence & Expert System
CS-441 Advanced Data Base Management System
CS-442 Fuzzy Sets and Applications *
CS-443 Network Security and Cryptography
CS-444 VLSI Design
CS-445 Stochastic Models for Computer Applications
CS-446 Digital Image Processing
CS-447 Web Technology
CS-448 Distributed database System
CS-449 Embedded System
CS-450 Internet Programming with .net framework
CS-451 Wireless network and Mobile Computing
CS-452 Real Time System

*Note: Some detailed syllabi are not available. It will be decided by Concern teacher, if taught.

FIRST YEAR (FIRST SEMESTER)

PH-101 Physics-I   **Credits 4(3-1-0)**

UNIT 1: Free Oscillations
Free oscillations in one dimension (mass-spring, LC circuit) longitudinal and transverse oscillations, Superposition principle, Beats, Transverse modes of continuous string, classical wave equation, standing waves, wave velocity. Fourier analysis of a periodic function, Fourier coefficient, normal modes, dispersion relation.

UNIT 2: Forced Oscillations :
Damped harmonic oscillation, steady state oscillation under periodic force, Resonance, various cases of resonance-Mechanical and electrical low pass filters.

UNIT 3: Progressive Waves :
One dimensional harmonic traveling waves, dispersive & non dispersive waves, phase velocity, Index of refraction, characteristic impedance, energy transport by traveling wave, reflection and transmission, Impedance matching between two transparent media, Modulation of pulses & wave packets, group velocity, Fourier analysis, Coupled oscillations.

UNIT 4: Interference & Diffraction :
Interference between two point sources, constructive and destructive interference. Young's double slit experiment, interference at far points, relative phase coherence condition, Newton's rings, Llyods single mirror, single slit diffraction, angular width of diffraction limited beam, angular resolution of human eye, Fraunhofer & Fresnel diffraction. Two slits & many slits diffraction pattern, Angular width of principal maxima.

UNIT 5: Polarization:
Description of polarization states, production of polarized transverse waves, Double refraction.

UNIT 6: Some Special Topics :
(a) Structure of crystalline solids. Free electron model. failure of this model, Periodic potential, Band theory. Femi energy, metals insulators & semiconductors
(b) Wave mechanics, Schrodinger's equation. Time independent Schrodinger's equation, Particle in a box, step potential, Tunnelling phenomena

Books :
1) Waves and oscillation : Berkeley Physics Course III
2) Fundamental of Optics : Jenkins and White
3) Introduction of Solid State Physics : C. Kittel
4) Solid State Physics : A.J. Dekkar
5) Quantum Mechanics : Powell
6) Quantum Mechanics : Singh and Bagdel
7) Quantum Mechanics : Schiff

CY-101 Chemistry-I   **Credit 4 (3-1-0)**

UNIT 1: Chemical Bonding :
Nature of the bond, chemical constitution and physical properties,atomic and molecular orbitals, metallic and covalent bonds, directional nature of covalent bond, polarity and hydrogen bonding, application of surface tension, viscosity, dipole moment and refractive index.

UNIT 2: Chemical Kineties :
Rate of reaction, order of reactions, determination of the rate equation, reversible first order reactions, parallel first order reactions, Zero Order reactions, Effect of temperature, Relation between rate constants of the forward and backward reactions. Simple second order reactions, half life and its relations to reaction order, Steady-state approximations, Method of initial slops to determine reaction order, Ostwald's

UNIT 3: Physical and Chemical Analysis :
Redox, Argentometric and complexometric titration and calorimetric analysis, a brief introduction to instrumental method for quality control in Engineering Industries.

UNIT 4: Chemistry of Materials :
Chemical, Physical properties and applications of glass, refractories, porcelain, lime and cement.

UNIT 5: Coordination compounds and Organometallies:

Introduction, classification and nomenclature of coordinate and organometallics compounds, chemical and physical properties and their applications.

UNIT 6: Stereo Chemistry :
Asymmetric carbon atoms, chirality, configuration, specificity of absolute configuration (D and L) and (R and S), recemic mixture, elements of symmetry, diastereomerism and atropisomerism; Electronic effects, inductive, mesomeric effects, hyperconjugation and their influence on chemical and physical peoperties; role of free radicals in chemical (e.g. polymerization), environmental and biological systems.

UNIT 7: Reaction Mechanism :
Brief study of elimination (E1 & E2), nucleophilic substitution (SN1 & SN2) reactions, Pinacole-Pinacolone rearrangement, Cannizzaro reaction, Skraup synthesis, Baeyer-reaction and Darzens glycidic ester condensation.

MA-101 Mathematics-I   Credits 4(3-1-0)

PART A: Differential Calculus :
UNIT 1: Definitions:
Functions of a real variable, Value of function, Limits, Continuity and Differntiability of such functions.
UNIT 2: Successive Differentiation:
nth differential coefficient of a function: Standard Forms,Leibnitz theorem.
UNIT 3: Tangent and Normal :
Definitions, Angle of intersection of two curves, Angle between radius vector & tangent, Pedal equation.
UNIT 4: Curvature :
Definition, Intrinsic, Cartesian, Pedal and Polar formulae of Radius of curvature, Center of curvature.Indeterminate forms, Asymptotes, Curve tracing.
UNIT 5 : Partial Differentiation :
Definition, Partial differential coefficient, Euler's Theorem,Jacobians.Taylor's theorem with remainder term, Minima and Maxima of functions of two and three variables, Lagrange's method of undetermined multipliers.

PART B: INTEGRAL CALCULUS
UNIT 6 : Integral Calculus :

Reduction Formulae, Wallis' formula.

UNIT 7 : Definite Integral :
Properties, Integral as a limit of sum, Summation of series. Beta and Gamma functions : Definitions, Relation between Beta & Gamma functions, Duplication formula.
UNIT 8 : Multiple Integrals : Double and triple integrals, Change of order of integration and Change of Variables in double & triple integral, Dirichlet's theorem. Volumes and Surfaces of Revolution, Area enclosed by plane curves.

HU-101 Technical Writing-I   Credits 3(2-1-0)

UNIT 1: Pre-Requisites of Scientific Writing; Salient features; BOCUST Formula; Grammaticalpre-requisites: Usage,Sentence Fragments, Question tag, Modifiers,Connectives, Split Infinitives, Dangling Participle,Gerunds,Ellipsis. Coherence & Unity : Methods
UNIT 2: Phonology of Engish; Speech Mechanism: Organs of Speech;Consonants, Vowels, Semivowels;Phoneme & Allophone; stress Patterns;Intonation: Major Tones & Their Functions.

EE-101 Basic Electrical Engineering   Credits 4 (3-1-0)

UNIT 1: Basic Concept: Definitions & units, Introduction to Basic Laws, Circit Elements, KVL, KCL, Ideal & Real Sources, Dependent & Independent Sources, Conversion of Voltage Source into Current Source & vice Versa, Controlled and Uncontrolled Sources, Loop and Nodal Method of analysis, Star to Delta Transformation & vice-versa.
UNIT 2: Magnetic Circuit: MMF, Flux, Reluctance, Magnetic Effect of Electrical Current, Hysterisis & Eddy Current Losses.
UNIT 3: Network Theorems: Superposition, Thevenin, Norton, Maximum Power Transfer & Reciprocity Theorems.
UNIT 4: Steady-State Response: Steady-State Response of Circuit to Sinusoidal functions, Phasor Representation of Sinusoids, Concept of Complex Impedance, Series & Parallel AC Circuits, Series & Parallel resonance.
UNIT 5: Balanced Three-Phase Circuit: Generation of Three Phase Voltage, Star/Delta Connected Supply, Balanced Load Circuits, Line and Phase Voltage & current Relations. Concept of Three Phase Power.
UNIT 6: Transient: Response of RC, RL & RLC Circuit to DC Excitation only (simple

problems)

UNIT 7: Instruments: Introduction to MI,MC Instruments, Extension of range, Dynamometer Type Wattmeter, Simple problems based on these instruments.

Books:

1) Basic Circuit Therory by L.P.Huelsman, PHI.
2) Hughes Electrical Technology by M.Smith, Addison-Wessley Pub
3) Electrical Technology by B.L.Theraja.
4) Electrical Engineering Fundamentals by V.Deltoro, PHI

ME-102 Applied Thermodynamics   Credits 3(2-1-0)

UNIT 1:

Thermodynamic system, surrounding, universe, classification of Thermodynamic system, macrosopic Vs microscopic view point, Thermodynamics properties, cyclic process, Quasi-static process, Zeroth law of thermodynamics. Definition of work, work done during quasistatic process, work, a path function, limitations of the use òP. dv flow work, heat, specific heat, heat-path function, definition of C_p & C_v, Enthalpy, (Numericals based on Quasi static process)

UNIT 2:

Law of conservation of mass, law of conservation of energy, first law of thermodynamics, Perpetual machine of the first kind, definition of flow process & non-flow process. First law applied for Non-flow process (constt.Volume, const Temp, const pr, Polytropic process & Isentropic process) First law applied to flow process, steady flow energy quation (SFEE) some application of SFEE, like (Boiler, Nozzle, Turbine, Rotary Compressor, et c) (Numericals prob. based on there application)

UNIT 3:

Limitations of the first law of thermodynamics, heat engine, Thermal efficiency of heat engine, thermal efficiency of heat Pump or COP of heat pump.Second law of thermodynamics, Kelvin Plank statement, PMM of second kind, Clausius statement, Clausius inequality, entropy, entropy change, entropy diagram, entropy principle. (Numericals related) to I & II law & Clasius inequality)

UNIT 4:

Basic steam power cycle- Carnot cycle, Rankine cycle comparison of Rankine & Carnot cycle. Air Standard Cycle: Otto cycle, Diesel cycle, dual cycle, comparison between otto, diesel & dual cycle, Brayton or Joul cycle, (Calculations of thermal power of these cycles) (Numerical problems)

UNIT 5:

Properties of Steam: Introduction, phase transformation, effect of pressure on saturated temp, conditions of steam, thermodynamics properties of steam, dryness fraction, brief discription about Mollier diagram.Boiler: Definitions, uses, classification of boiler, brief description to the boiler (Lancashire, Cornish, cochran boilers) typical high pressure boiler Benson, La Mont, Loeffler, Velox) brief discription, boiler mountings & accessories, only name & their functions,performance of boilers, evaporation, equivalent evoporation, boiler thermal effiiciency, heat loses in a boiler plant.

Text Book: P.K. Nag
Reference Book: P.L. Ballaney

ME-109 Manufacturing Technology   Credits 2(1-1-0)

UNIT 1: Carpentry:
Wood, timber-exogeneous & endogeneous, Cross section of an exogeneous tree, Seasoning of wood, Seasoning methods, defects (Both natural and that occurs during conversion), Brief description of carpentry tools, various carpentry process. Carpentry joints.
UNIT 2: Pattern & Pattern making:
Pattern, definition, types of pattern (Single piece, split, cope & drag, Match plate, Sweep, Loose piece, Gated patterns), Pattern making allowances, Design considerations in pattern making, pattern making materials, Core prints.
UNIT 3: Foundry:
Moulding materials, types of foundary sands; characteristics of foundary sands; Bnders & additives; additives; moulding procedures (Floor moulding, Bench moulding, Pit moulding,Machine moulding), Green sand moulding, Dry sand moulding,COathe specifications; 2, Core making processes.
UNIT 4: Foundary tools & equipments:
Tools used in foundary (hand tools); moulding machine- (Jolt machine, Sqeezing machine, Sand Slinger, Push off machine), Furnaces (Pit furnace, Cupola furnace) .

UNIT 5: **Welding:**
Welding (Definition); Pressure and non-pressure, arc welding (AC and DC arc welding, Introduction to Carbon arc welding, metal arc welding, TIG & MIG welding);Electric resistance welding (Spot, seam, projection, But, thermit welding), welding tools and equipments, Gas welding (oxyacetelene).

UNIT 6: **Bench work & fitting:**
Tools (holding tools, striking tools, cutting tools), various operations performed in fitting shop (detailed).

UNIT 7: **Machine tools: Definition, types:**
Lathe operations in brief (facing, plain turning, step turning, taper turning, threading, drilling and boring). Milling machine (introduction & brief description of operations only).

CS101 Computer Fundamental & Programming Credits 2(3-0-0)

UNIT 1:

Introduction to Computers:
Basic definition, Generation, Classification of computers, Introduction to Computer architecture.

Number Systems:
Introduction, Classification- Decimal, Binary, Octal, Hexa Decimal, and their convertibility, Data representation, ASCII, BCD, Gray Code.

Input/Output:
Input System, Input device- Keyboard, Mouse, Joystic, Lighten, MCR MICR,Touch Screen, Graphic Tablet, Voice Input System, Output System, Output Devices-VDU,Printers,Plotters.

UNIT 2:

Planning The Computer Program:
Purpose of program planning, Algorithms, Flowcharts, Decision Tablets, Pseudo code.

Memory:
Introduction, Characteristic, Main Memory, secondary memory, Back- Up Memory, Cache Memory, Primary Memory, Semiconductor Memory, Memory Management Unit.

UNIT 3:

Basic Operating System Concept:
MS-DOS, WINDOWS, Introduction to basic commands Of DOS, Evolution of Operating Systems, Batch Processing, Spooling, Multiprogramming, Multiprocessing, Time Sharing, On Line Processing, Real-Time Processing, Introduction to Internet, Basic Terms related with Internet.

Computer Software:
Introduction to Software, Relationship between Hardware and Software, Types of Software, Acquiring software, Firmware.

UNIT 4:

Programming in C:
History, Introduction to C Programming, Language, Structure of C Programs, Compilitation and Execution of C Programs, Debugging Techniques, Data Type and sizes, Declaration of Variables, Modifiers, Identifiers and Keywords, Symbolic constants, Storage Classes(Global, Automatic, External, Register, And Static), Enumerations, Command line Parameters, Macros, The C Preprocessors.

UNIT 5:

Operators:
Unary Operators, Arithmetic and Logical Operators, Bit wise Operators, Assignment Operators, Expressions, Conditional Expressions, Precedence and order of evaluation.

Control Statements:
if-else, switch, break, continue, the comma operator, Goto statement.

Loops:
for, while, do-while.

Functions:
Built-in and user-defined, Function declaration, Definition and Function call, parameter passing, call by value, Call by reference, Recursive Functions, Multifile programs.

Arrays:
Linear Arrays, Multidimensional Arrays, Passing array to functions, Arrays of strings.

UNIT 6:

Structure And Union:
Definition and differences, Self-referential Structure.

Pointers:
Introduction, Accessing the address of a variable, Declaring & Initializing pointers, Accessing a variable though in pointer, Pointers and Arrays, Pointers and character strings, Pointers and functions.

Refrences:
1) Computers Fundamental by Rajaraman.

2) Computers Fundamental by B. Ram.
3) Computers Fundamental by P.K. Sinha.
4) 'Programming in C' by E. Balagrusamy, TMIL.
5) 'Let Us C' by Yashwant Kanetkar, Narosa.
6) Exploring 'C' by Yashwant Kanetkar.

FIRST YEAR (SECOND SEMESTER)

PH102   Physics-II   **Credits 4(3-1-0)**

UNIT 1:   Electrostatics :
Coulomb's law, Electric field, field due to continuous charge distribution, a line of charge, sheet of charge etc., Electrostatic potential, Potential of a charge distribution, Gradient of Potential, Dipole, Field due to a dipole (general), Torque, energy. Gauss's Law and its applications, Capacitors,energy stored in Capacitors.

UNIT 2:   Dielectrics :
Energy of an electric field, Polarization, Dielectric constant, Susceptibility,Permittivity, Field in dielectrics, Atomic Theory, Polarizability, Clausius -Mosotti relation.

UNIT 3:   Electric Current :
Electric current, Current density, Ohm's law, e.m.f., RC circuits.

UNIT 4:   Magnetic Field :
Magnetic field and currents, Ampere's law, Biot-Savart's law, Motion of charge in electric and Magnetic field, cyclotron, mass spectrograph, divergence & curl of fields. Magnetic vector potential, Magnetic dipoles, torque & energy, dipole moment, electron in an orbit.

UNIT 5:   Magnetic field in matter :
Magnetization, the three magnetic vectors (B,M & H) units,susceptibility and permeability, Dia, para, and ferromagnetism, Magnetic domains, hysteresis,Maxwell's equations in free space and in matter, Ferroelectrics.

UNIT 6:   Electromagnetic induction :
Magnetic flux, Faraday's Law, Lenz's Law, Motor & generators, Time varying magnetic field, Betatron, Self & mutualinductance, RC, LR and LCR circuits.Energy density in magnetic field.

UNIT 7:   Maxwell's Equations :
LC oscillations. Displacement Current, Maxwell's equations in vacum & matter (Integral and Differential forms), conservation of electromagnetic energy, Poynting theorem, Radiation from a point Charge.

UNIT 8:   Electromagnetic wave:
Wave equation, Plane waves, wave through non-conducting medium, Polarization, reflection and transmission, Snell's Law.

Books:
1) Electricity and Magnetism : Berkeley Physics Course II
2) Electromagnetic waves & Radiating systems : Jordan andKeit

CY-102 Chemistry-II   **Credits 4(3-1-0)**

UNIT 1:   Principles of Photochemistry and their applications:
Mechanism of fluorescence and phosphorescence as explained by Jablonski diagram, Beer Lambert law, Grotthus Drapper law, Stark Einstein law, Quantum yield and its determination, Photosensitization and quenching, Photochemical rate law and kinetics of photochemical reactions, application of photochemistry.

UNIT 2:   Adsorption and desorption equilibria:
Physisorption and chemisorptions, desorption activation energy, sticking probability and fractional coverage. Derivation and use of Langmuir adsorption isotherm, the Temkin isotherm and Freundlich isotherm. Derivation of Gibb's adsorption isotherm., capillary active and capillary inactive substances. use of adsorption measurements to determine surface area, BET theory.

UNIT 3:   Chemistry of various polymers:
Illustration of principles with reference to polymeric materials, their engineering uses, thermo plastic and thermosetting resins, fibres, rubber, biopolymers and their applications.

UNIT 4:   Fuel :
Coal (origin and analysis of coal; FSI, calorific value and its units, Gasification of coal, mobile process and selective synthesis through Zeolites), natural gas, petroleum and their industrially useful fractions, their performance, analysis of coal and fuel gas, combustion, calculations and hydrogen as fuel.

UNIT 5:   Introduction to:
(a) Proteins: Amino acids, classification, synthesis of   -amino acids, peptides,classification of proteins, structure of proteins, structure elucidation of peptides, structure and importance of proteins.
(b)Carbohydrates: Classification, chemistry of glucose, constitution of glucose,configuration of glucose, cyclic structure of glucose, properties of glucose.
(c)Vitamins: Structure, occurance and importance of vitamins mainly A,B1,B2,B6,C,D,E, and K.
   (d)Antibiotics: Importance of antibiotics mainly Penicilin,

Chloramphenicoland Streptomycin.

UNIT 6: Environmental Chemistry:
Pollutions and their control : Environmental air pollution,pollution due to industrial chemicals and their toxicology, acidification, water and marine pollution, pollution due to agricultural activities, Eutrophication, oil pollution, solid waste disposal, Radiation and thernal pollution, Noise pollution, Green house gases and their effects to the global environment, industrial techniques in environmental chemical analysis and techniques for pollution control.

MA-102 Numerical Analysis   Credits 3(2-1-0)

UNIT 1:
Finite differences, Forward, Backward and Shift operators, Properties of E and Delta, Fundamental theorem of Difference Calculus, Difference table, One and More missing terms, Factorial Notation, Methods of representing any given polynomials in factorial notation, Method of separations of symbols, Interpolation with equal and unequal intervals, Newton's forward and backward interpolation formulae, Lagrange's interpolation formula Divided differences and their properties, Newton's formula for unequal interval, Central difference operators. Gauss and Bessel's interpolation formula.

UNIT 2: Numerical solution of Ordinary differential equation of First order:
Euler's method, Runge-kutta method, Milne's method

UNIT 3: Numerical solution of Algebraic & Transacendental equations :
Iteration method, Bisection method, Regula-Falsi method, Newton-Raphson method.

UNIT 4: Simultaneous Linear Algebraic Equations :
Introduction, Different methods of obtaining solutions, Cramer's Rule, Gauss elimination method, Jordan's method, Crout's method, Factorization method, Jacobi iterative method, Gauss Siedel iterative method, Relexation metod, due to Southweill.

UNIT 5: Matrix Inversion:
Gauss Jordon method, Crout's method, Doolittle method, and Choleski's method, Iterative method and Escalator method etc.

UNIT 6: Curve Fitting :
Scatter diagram, Method of Curve fitting, Particular cases, Fitting of Straight line and Parabola, Fitting of curves of types y=abx, y=axb and

xy
= b + ax etc.

HU-102 Technical Writing-II   Credits 3(2-1-0)

UNIT 1:
Business Correspondence : General Principles Ramification: Job Application, Inviting and Sending Quotation,Sales Letter,Notices, Agenda, Minutes.

UNIT 2:
Masters of English Prose:Francis Bacon - Of Ceremonies and Respects Addison & Steele - Uses of the Spectator William Hazlitt - My First Acquaintance with Poets Carlyle - Hero as Man of Lettere George Orwell - Politics and English Language M.K.Gandhi - My First Experiments with Truth

EC-102 Basic Electronic Devices   Credits 4(3-1-0)

UNIT 1: Introduction to semiconductor physic:
Crystalline solids, band theory of solids, Insulators, semiconductor and metals.

UNIT 2: Transport phenomena in semiconductors:
Mobility and conductivity, electron and holes in an intrinsic semiconductor, donor and acceptor impurities, charge densities in a semiconductor, The Hall effect, conductivity modulation, Generation and recombination of charges.Diffusion, injected-minority carrier charges

UNIT 3: Junction diode characteristics:
The open ckted p-n junction, the p-n junction as an rectifier, form factor, Avarage voltage and current, half wave and full wave rectifierr, the current components in a p-n junction diode, The V-I Characteristics, the temp.Dependence of the characteristics, diode resistance, space charge, transition capacitance C, charge control description of the diode, diffusion capacitance, Junction diode switching times, Zener diode, its application. Bipolar Junction Transistor: The junction transistor, Transistor configuration: i.e.CE, CC & CB current-voltage characteristics.

UNIT 4: Introduction to vacuum tubes:
Diodes, Triodes, and Introduction to CRT.

References:

1) Integrated Electronics: Analog and Digital circuit and system by Millman and Halkias/TMH.N.Delhi
2) Electronic Principles by Malvino, TMH,N,Delhi
3) Streetman

ME-101 Engineering Mechanics   Credits 3(2-1-0)

PART A : STATICS:
UNIT 1: Introduction:
Introduction to Mechanics. Definitions. Idealisation in mechanics, Rigid body, Particle Basic Concepts-Space, time ,mass, force characteristic of a force- types of force system. Fundamental Principles.Newton's law of motion Newton's law of gravitation, Parallelogram law,Principle of transmissibility. System of units.

UNIT 2: Statics of Particles:
Concurrent forces in plane. Introduction. Resultant of forces, Parallelogram law, Triangle law of force, Polygon law. Resolution and Components of force. Resultant of several concurrent forces-problems. Equilibrium of particle, Equilibrant. Equation of Equilibrium. Applications of Statics of particles, Free Body diagram-problems.

UNIT 3: Statics of Rigid Bodies:
Non concurrent forces in plane. Introduction. Moment of a force about a point. Varigons theorm-problem. Moment of a couple-problems. Resultant of   Coplanar non concurrent system Problems,Equilibrium of rigid bodies- problems.Applications of Statics of rigid bodies-problems. Applications of statics of rigid bodies. Types of Support in two dimensions. Beams. Types of load-Problems.Multi-force members-problems.

UNIT 4: Centre of gravity and Moment of Inertia of plane area:
Introduction. Centroid of area, Centroid of a rectangle, Centroid of a right-angled triangle, Centroid of a circle,Qudrant and semicircle-centroid of Composite area, Centroid and axis of symmetry- problems. Moment of Inertia of plane area: Introduction, Second moment of area, product of area, Parallel axis therom, prependicular axis therom, radius of gyration. Moment of Inertia of plane area by integration, Rectangle, Right angled triangle, circle, semi circle,Quadrant of a circle, Types of steel sections, Moment of Inertia of composite sections-Problems

UNIT 5: Friction :

Introduction of friction, types of friction,Characteristics of dry friction, laws of friction. Angle of friction. Angle of repose, cone of friction. Applications of A Body on Horizontal plane or inclined plane subjected to forces-Problems. Two bodies in contact-Problems. Ladder friction- problems. Wedge friction-Problems. Belt friction- Problems.

UNIT 6: Bending Moment and Shear force diagram:
Introduction.S.F. and B.M.diagrams. Sign conventions for S.F. and B.M. Determinate structures & indeterminate structures. S.F. and B.M. diagrams for simply supported beams with a point load at mid point, Eccentric point, beam carrying UDL, beam carring UVI, Overhanging beams, beams carrying inclined loads, beams subjected to couple-Problems. Relations between load, shearforce and bending moment.

PART B : DYNAMICS:
UNIT 7: Linear Motion:
Introduction to Dynamics. Equatiion of motion in a straight line.Equation for final velocity. Equation of motion for distance covered (s).Derivation of v2-u2=2as - Problems. Distance travelled in the nth second- problems. Equation of motions due to Gravity-Problems.
Laws of motion:
Newton's law for linear motion. Definations, Mass, Weight, Momentum, Unit of force-Problelms. Motion on an inclined surface- Problems.

UNIT 8: Newton's Second law:
D' Alemberts Principle- Problems (for horizontal & inclined surface). Analysis of lift, motion problem. Motion of several connected bodies. Motion of two bodies connected by astring, when one body is lying on horizontal surface and other is hanging free, when one body is lying on inclined plane and other is hanging free case (i) Smooth inclined surface case (ii) Rough inclined surface of co-efficient of friction 'μ' - (only problems)

UNIT 9: Work Power & Energy:
Work - Units of work - Problems (horizontal & inclined surface). Power Derivation of the expression for power required to drive a body, problems Energy, Types of Energy Problems. Laws of Conservation of Energy. Newton's law of conservation of momentum. Plastic impact & Elastic impact. Driving a pile into ground- Problems. Motion of connected bodies, Problems Work done by spring, Problems.

UNIT 10: Impact of Elastic bodies:
Types of impact. Newton's law of elastic bodies. Co-eficient of restitution, loss of kinetic energy during impact-problems.

Text & References Books :

1) Engineering Mechanics by S. Rajasekaran & g. Sankarasubramanian (Chapter 1 upto Chapter 5),Vikas Publications, New Delhi.
2) Engineering Mechanics & Strength of Materials by R.K. Bansal (Chapter 6,7 & 9) Lakshmi Publications, New Delhi.
3) Engineering Mechanics by S.S.Bhavikatti & K.G.Rajashekarappa New Age Publications, New Delhi

ME-106   Graphic Science   Credits 3(2-1-0)

UNIT 1:   Introduction:
Importance of Engineering Drawing, Engineering Drawing Instruments and Uses, Layout of Drawing sheet, Lettering and Dimensioning, Types of Lines.

UNIT 2:   Scales:
What is scale, Representative factor, Types of Scale: Plain,   Diagonal and Vernier scales, Metric Measurements and conventions, Plain Scale. Diagonal Scales-Principle of diagonal scale, Vernier Scales-Types of vernier :Forward or Direct Vernier, Back ward or Retrograde Vernier.

UNIT 3:   Conic Section:
Definition, and different methods of construction of ellipse,hyperbola and parabola by Eccentricity method, Construction of parabola and ellipse by:Concentric circles method, Oblong method, Parallelogram method.

UNIT 4:   Special Curves:
Cycloidal curves, namely Cycloid, Epicycloid and Hypocycloid Trochoids, Epitrochoids and hypotrochoids

UNIT 5:   Projections:
Principle, types and conventions a) Projections of point and straight lines, b) Projections of lines inclined to both the planes, Projection of planes a) Projection of solids b) Projection of solids inclined to both H.P. & V.P. (of prisms pyramids   etc).

UNIT 6:   Theory of Projections and orthographic projections:
Introduction, Types of projections, Orthographic projections, Planes of Projection, Four quadrants, Types of orthographic projections. a)First Angle projection, b) Third Angle projection, Six view of I angle projection, Six views of III angle projection ways of Projecting view drawings.

UNIT 7:

Sectioning of solids, sectioning of planes and true shape of the section.

UNIT 8:   Sectional views; section lines:
Types of sectional views-full sectional view and Half sectional view; Parts not sectioned, Treatment of dotted lines in sectional view.

UNIT 9:   Isometric Projections :
Theory of isometric projection- Isometric lengths, Isometric scales:- Methods to draw Isometric view or projection, various positions of Isometric axes. Isometric projection with isometric lines, non-isometric lines and with curved & circular surfaces.

Text Book:
1) A Text book of Engineering Drawing (Geometrical Drawing) by R.K. Dhawan.
2) Engineering Drawing & Graphics, by K.Venugopal.

SECOND YEAR (THIRD SEMESTER)

CS-201 Data Base Management Systems   Credits 3(2-1-0)

UNIT 1: **Introduction:**
Data Base System Concepts and architecture, Data models, scheme and Instances, Data Independence Data Base Languages and Interfaces, Network Model, Hierarchical Model.

UNIT 2: **Data Modeling Using the Entity-Relationship Model:**
ER model concepts, Notations for ER diagram, Extended E-R diagram Extended E-R model, Relationships of higher degree.

UNIT 3: **Relational Data Model and Languages:**
Relational model concepts, constraints, Relational Algebra, Relational Calculus, Tuple and Domain calculus, SQL: Data definitions queries, Basic Structure, set operators, Aggregate function, Derived Relations. Modification of the Database, Joined relations and up-dates in SQL.

UNIT 4: **Protecting the Database Against Misuse:**
Integrity constraints, Views, security, Encryption, security in statistical Databases.

UNIT 5: **Database Design:**
Functional dependencies, Normal forms, First second, and third functional personal normal forms. BCNF. Multivalued dependencies Fourth Normal form. Join Dependencies and Fifth Normal form, Inclusion Dependencies.

UNIT 6: **Transaction Processing concepts:**
Transaction and system concepts, schedules and Recoverability, serializability of schedules.

UNIT 7: **Concurrency Control Techniques:**
Locking Techniques for Concurrency control. Time stamping and Concurrency control.

UNIT 8: **Query Processing:**
Catalog Information for cost Estimation, Measures of Query Cost, Selection Operation, Sorting , Join Operation, Other   Operation, Evaluation of Experessions, Transformation of Relational Expressions, Choice of Evaluation Plans.

References:
1) Abraham Silberschatz. Henry F. Korth S.Sudarshan; database system concepts, McGraw hill Book co. 1997.
2) Dater, C.J; An introduction to database system volume I & II, Addison-Wesley, 1981, 1983.
3) Ullman, Jeffrey D: Principles of database systems 2nd Edn Galgotial Publ ication Pvt. Ltd. 1982.
4) Whittigton, R.P. Database system engineering, Claventor Press.

CS-203 Discrete Mathematical Structures   Credit 3(2-1-0)

UNIT 1: **Logic:**
Propositions, Conditional and Biconditional Disjunctive normal Form and Simplification, Predicates, Valid Arguments and proofs.

UNIT 2: **Set Theory:**
Sets, Set Relations, Set opeartions, Infinite Collection of sets, Power sets, Cartesian Products, Inductively defined sets, Formal Languages, Proofs by Induction.

UNIT 3: **Functions:**
Functions, Injective and Surjective, Composition of functions, Inverse Function, Functions and Set operations.

UNIT 4: **Counting And Countability :**
Counting Principles, Functions and Counting, Permutations and Combinations, Combinatorial arguments, Infinite Sets and Countability.

UNIT 5: **Relations:**
Relations, Compositions of Relations, Equivalence Relations , Equivalence Classes, Order Relations, Recurrence Relations, Lattice.

UNIT 6: **Graph Theory :**
Basic Concepts, Paths and Connecivity, Planar Graphs, Trees, Rooted Trees, Shortest parth algorithm.

UNIT 7: **Introduction To Algebra :**
Binary operations, Semigroups, Groups, Subgroups, Cosets and Lagarnge's Theorem.

References:

1)Olympia Nicodemi, "Discrete Mathematics", CBS Publications, Delhi.
2)J.P. Trembley & R. Manohar, "Discrete mathematical Structure", Mc Graw Hill Book Co., NY.

CS-205 Data Structures   Credits 4(3-1-0)

UNIT 1: Basic Concepts & Notation:
Introduction to data structure, Binary and decimal integers, Real numbers, Abstract data types (ADT), Abstract Data Type for varying length character Strings.

UNIT 2: Arrays:
The array as an ADT, Using one dimensional array, implementing one Dimensional array, two dimensional array, multidimensional array

UNIT 3: Stacks:
Definition and examples, primitive operations, Array representation of stacks, Example: Infix, Postfix, and Prefix: Basic definitions and Examples, Evaluating a postfix expression, Converting an expression from infix to postfix,Recursion - tower of Hanoi;

UNIT 4: Queues and Link Lists:
The Queue and its sequential Representation, Priority Queue; Linked Lists: Inserting and removing nodes from the list, Linked list as a data Structure, Other List structures: Circular Lists, Doubly Linked Lists

UNIT 5: Trees: Binary Trees:
Operation on Binary Trees, Traversal: In order, Preorder, Post order; Application Binary Tree. Binary search tree, Expression Tree; Binary Tree Representation: Array representation, Link List representation; Example: Huffman Algorithm

UNIT 6: Sorting:
Introduction, Selection sort, bubble sort, insertion sort, quick sort, and Merge sort, Heap sort.

UNIT 7: Search:
Basic search Techniques : Sequential Searching, Indexed Sequential Search, Binary Search, Interpolation Search ; Tree searching : inserting into Binary Search Tree (BST), Deleting from a BST, Balanced (AVL) Tree, Search Tree and B-Tree

UNIT 8: Hashing:
Introduction, Hash function: Division Method, Midsquare Method, Folding Method, hash table;

UNIT 9: Graphs and Their Applications :
Introduction, Wars hall's algorithm, Dijkstra's algorithm, Graph traversal: Depth first search, Breadth First search.

References:
1) Data Structures using C/C++: Tennenbaum, PHI
2) Introduction to Data Structures : Schaum Series. by Lipetu, Mac Graw Hill
3) Data Structures by Augenstein & Tenenbaum.

CS-207 Object Oriented Programming   Credits 4(3-1-0)

UNIT 1: Basics Of Object Oriented Programming:
What is Object orientedprogramming, Procedure oriented programming, problems with structured approach, OO terminology, Characteristics of Object oriented languages, Objects, Classes, Data Abstraction, Data Encapsulation, Inheritance, Polymorphism, Dynamic binding, Message passing, Structure of C++ Program

UNIT 2: Tokens, Expressions And Control Structure In C++ :
Tokens. Basic data types, User defined data types, reference variables. Operators in C++, Operator Overloading, Loops (For, while and do), Decisions(if, if-else and switch), Control statements(break, continue and goto).

UNIT 3: Building Objects With Classes:
Specifying classes, defining member function, Inline function, main function, call by reference, function overloading, friend and virtual function, Constructor and Destructors, Copy constructor, Dynamic constructors.

UNIT 4: Defining Operations On Objects:
Copy constructor, Defining operator overloading, overloading unary operator, overloading binary operator, overloading binary operator using friend function, manipulation of strings using operators, rules of operator overloading.

UNIT 5: Using Inheritance In C++ :
Derived class, single inheritance, multilevel inheritance, multiple inheritance, Hierarchical inheritance, hybrid inheritance,

hybrid inheritance, virtual base class, abstract class, Constructor in Derived class

UNIT 6: Pointer's, Virtual Functions And Polymorphism :
Dynamic binding, static binding, virtual function, pure virtual function, dynamic binding through virtual function, pointer to objects, this pointer and pointer to derived class.

UNIT 7: Working With Files:
Classes for file stream operfation, detecting EOF, file modes, file pointers and their manipulations, error handling during file operation. Command line argument.

UNIT 8: Object Oriented System Developnwnt:
Procedure oriented paradigm, procedure oriented development tools, object oriented paradigm, steps in object oriented analysis and steps in object oriented design.

UNIT 9: Templates And Exception Handling:
Templates, class templates, function templates, member function templates, exception handling.

References:.
1) Programming in C++ by Bjarne Stroustroup,
2) Object Oriented Programming with C++ by Balagurusamy, TMH.
3) Turbo C++ by Robert Lafore,
4) Complete Reference C++ by Herbert Shield,

MA-201 Mathematics II   Credits 4(3-1-0)

UNIT 1:   Matrices :
Difinition of a matrix, associated elementary operations, different types of matrices : Hermitian, skew Hermitian, etc. Inverse of matrices, rank of matrices solution of simultaneous linear equations, linear transformations, Eigen values and eigen vectors, linear dependence and independence of vectors, Caley Hamilton theorem, quardratic forms.

UNIT 2: Ordinary Differential Equations :
Equations of first order and first degree, Linear differential equations of higher order with constants and variable coefficients, methods of undetermind coefficients, removal of first derivative and method of variation of parameters, homogeneous linear equations, simultaneous equations, applications to physical & engineering problems.

UNIT 3: Integral Transform :
(a) Laplace transforms : Existance Theorem, Laplace transforms of elementory functions, shifting theorems, Laplace transforms of derivatives and integrals, change of scale property, Laplace transforms of heavyside's unit step function, dirace delta functions, periodic functions, error functions etc.
(b) Inverse Laplace transforms : convolution theorem and its applications, applications of Laplace transformation to solve ordinary & partial differential equations with constants and variables coefficients, simultaneous equations applications in mechanics, electric circuits and bending of beams.
(c) Fourier transforms : complex fourier transforms, Fourier sine & cosine transforms, shifting theorems, change of scale properties, moduations thereoms, relations between Fourier & Laplace transforms inverse Fourier transform, finite relations between Fourier & Laplace transforms inverse Fourier transform, finite Fourier transforms, Fourier series, half range series, harmonic analysis.

UNIT 4: Vector:
Differentiation & Integrations of vectors. gradient, divergence and curl, vector identities. Green's stoke's and Gauss theorems (without proot) and their applications.

EI-201 Analog Electronics Circuit   Credits 4(3-1-0)

UNIT 1 :
Diodes as circuit element, ideal diode model, The piecewise linear diode model, clamping circuits, clipping (Limiting) circuits, clipping at two independent levels, Rectifiers, Half wave, full wave, Bridge rectifires, filter circuits.

UNIT 2 :
The junction transistor, transistor current components, transistor as an amplifier, The CB, CE and CC configuration, typical transistor junction voltage values.Transistor Biasing and thermal stabilization: The operating point, Biasing Circuits, fixed bias, bias stability, self bias or emmiter bias, fixing of Q-point using graphically & analytical methods, stabilization against variation in Ico, Vbc, B; Bias compensation Diode.

UNIT 3 :
The Transistor at low frequencies: Two port devices and the hybrid model, The h-parameter, determination of h-parameters from input

and output characteristics, Analysis of a transistor amplifier circuit using h-parameters, the emitter follower (its modeling), miller's theorem and its dual, cascading transistor amplifier (upto 2 stages), simplified hybrid model, high input resistance transistor ckts-e.g. darlington, emmiter follower.

UNIT 4:

Field effect transistors: General description on FET, JFET operation, and its characteristic, MOSFET, The FET small signal model, The low frequency CS and CD amplifiers at high frequencies.

UNIT 5:

Power amplifiers: Class A, class B, class C, class AB & push-pull amp., Oscillators: sinusoidal, phase shift, resonant-circuit, wein bridge, crystal oscillators.

References:

1) Integrated Electronics Analog and Digital circuits and systems. J millman/ Halkias
2)Electronic Devices And Circuit Theory: Robert Boylestad & Nash Lsky (PHI)
3)Electronic Devices & Circuits: Allen mottershed (TMH)

SECOND YEAR (FOURTH SEMESTER)

CS-202 Analysis & Design of Algorithms   Credits 4(3-1-0)

UNIT 1: Introduction :
What is an algorithm, writing algorithms in SPARKS, Writing structured programs, Analyzing algorithms, sorting recurrences.

UNIT 2: Divide - And - Conquer :
The general methods Binary search, Finding the maximum and minimum,Mergesort, Quicksort, Selection sort, Strassens's matrix multiplication.

UNIT 3: The Greedy Method :
The general method, optimal storage on tapes,Knapsack problem, Job sequencing with deadlines, Optimal merges patterns, Minimum panning trees, Single source shortest path algorithm.

UNIT 4: Dynamic programming :
The general method, Multistage graphs, all pairs shortest paths, optimal binary search trees, O/I Knapsack, The travelling salesperson problem.

UNIT 5: Basic Search And Traversal Techniques :
The techniques, code optimization, and depth first search, Breadth first search.

UNIT 6: Backtracking :
The general method, The 8-queens problem sum of subsets, Graph coloring, Hamiltonian cycles, Khapsack problem.

UNIT 7: Branch-And-Bound:
The method, travelling salesperson problem.

References:
1) Design and Analysis of Algorithms by Aho, Hopcroft and Ullman, Addision Weseley.
2)Algorithms : Theory and Practices by Brassard and Bratley, PHI.
3)Fundamentals of Computer Algorithms by Horowitz & Sahni, Computer Science Press.

CS-204 Computer Organization   Cerdits 4(3-1-0)

UNIT 1: Introduction:
Review of digital logic; Logic gates, design of Adder and Subtractor using gates & K-MAP. functioning of multiplexer, demultiplexer, flip-flops.

UNIT 2: Arithmetic for Computers :
Introduction to number system, negative numbers, addition & subtraction, logical operation, constructing and A.L.U. Multiplication & division (with algorithms), floating point arithmetic.

UNIT 3:   Processor Design:
Processor organization,   Processor Level, information representation, Instruction format, Addressing Modes (Implied mode, immediate mode, register indirect mode, autoincrement or Autodecrement mode, direct addressing mode, indirect addressing mode, relative addressing mode, Index Addressing mode), instruction types.

UNIT 4: Control Design :
Control memory Address sequencing, microinstruction interpretation, CPU control unit. Basic concepts of microprogrammed control, microprogram sequencer for a control memory. microprogrammed control, micropragram sequencer for a control memory. microinstruction formats.

UNIT 5: Memory Organization :
Classification of memories, Memory Hierarchy, Optimization of memory hierarchy, Virtual Dynamic Address Translation Scheme addressing scheme for main memory, segmented memory system, paged segment memory, memory management policies. High speed memories, Characteristics of Cache memory, Cache memory organization, Block replacement policies, interleaved memories, Associative memory.

UNIT 6: System Organization :
Bus arbitration, Programmed I/O (IO adderssing, IO instruction), DMA (Type & procedure), interrupts (procedure, interrupt selection, vectored interrupts), Concurrency Control, System Management.

References:
1)Computer Architecture and Organization, By John P.Hayes, Mc Graw Hill.
2)Computer organization and design, by John L. Hennessy & David A. Patterson, Morgan Kaufman.
3) Computer System Architecture, By. M. Morris Mano, PHI.

CS-206 Data Communication   Credits 4(3-1-0)

UNIT 1: Introduction to Data Communication:
UNIT 2: Signals :
Analog and Digital, periodic and aperiodic signals, analog signals, time and frequency domains, composite signals, digital signals.
UNIT 3: Data Transmission :
Data transmission basics, asynchronous and synchronous transmission, error detection methods, data compression, transmission control circuits, communication control devices.
UNIT 4: Encoding and Decoding :
Digital to digital conversion, analog to digital, digital to analog, analog to analog conversions.
UNIT 5: Modulation & Demodulation of Digital Signal:
Interfaces and modems, digital data transmission, DTE - DCE interface,
other interface standards, Modems: 56k modem, cable modem
UNIT 6: Multiplexing:
Many to one/one to many, FDM, WDM, TDM, multiplexing application telephone system, DSL, FTTC.
UNIT 7: Introduction to Mobile Communication:

References:
1) Data communication, computer networks and open systems, Fred Halsall. PEA
2) Data communication, Stalling, PHI
3) Data communication and networking, Behrouz A Forouzan, TMH
Computer network, A. Tannenbaum, PHI

MA-202 Mathematics-III   Credits 4(3-1-0)

PART A: Differential Equation :
UNIT 1:
Solution in Series: Solution in series of second order linear differential Equations with polynomial coefficient.
UNIT 2:
Legender's differential equation : Solution of LDE, Laplace I integral & Laplace II integral, Genrating function, orthogonality conditions, recurrence relation and problems.

UNIT 3:
Bessel diffential equation: Solution of BDE, concept for J_n (n) and J_{-n} (n) Generating function, Jacobi series, Bessel integral, recurrence relation & Problems.
UNIT 4:
Partial differential equation : formation of equation by elimination of arbitrary constants and arbitrary function, solution of equations - General, particular & complete integrals, Lagrange's linear equations, standard types of Ist order partial differential equations, Non linear P.D.E. of Ist order, Charpit's method, Homogeneous and None homogeneous equations of higher order with constant coefficients.
UNIT 5:
Application of PDE : Boundry and initial value problems, Derivation of one, two & three dimensions wave equation, wave equation, heat equations, & Laplace equation, their solution's and problem's.

PART B: Complex Analysis :
UNIT 6:
Analytic Function : Definition, Cauchy-Riemamn equations in eartesian & Polar form, Harmonic function, Harmonic Conjugate, Milne's thomson Method.
UNIT 7:
Complex integration: Cauchy's theorem, cauchy's integral formula, Morera's theorem, Liouvill's theorem, Taylor's & Laurents theorems, Power series, Singular points, pole's different types of singularities.
UNIT 8:
Residue: Cauchy's rediduce theorem, Evaluation of integrals by contour Integration method.

EC-202 Signal & Systems   Credits 4(3-1-0)

UNIT 1:
Fourier analysis of signals, Amplitude, Phase & Power spectrum, Orthogonality of functions, Types of signals, Fourier Transform of some useful functions, Singularity functions & its properties, Dirac delta function & its properties, Sampling function, Laplace Transform of some useful functions.

UNIT 2:

Convolution of signals, Graphical & analytical methods of convolution, sampling theorem (time domain & frequency domain), Nyquist rate & Nyquist interval, Aliasing, Aperture effect, Recovery from sampled signal, Natural sampling, Flat top sampling, Time convolution theorem, Frequency convolution theorem.

UNIT 3:

Power & Energy signals, Energy & Power spectral densities of signals, Cross correlation, Auto correlation.

UNIT 4:

Systems & Filters: Linear system, Time invariant & LTI system, Impulse response, Causal systems, Filter characteristics of linear systems, Low pass filter High pass filters, Band pass filters, Band stop filters.

References:

1)Modern Digital & Analog System by B.P.Lathi
2)Communication systems by Singh & Sapre
3)Communication systems by Simon Haykins
4)Digital communication systems by Taub Schilling

References:
1) Digital logic and computer design -by MORRIS MANO(PHI)
2) Digital principles and applications -by MALVINO & LEACH McGraw-Hill Book Co.
3) Fundamental of digital electronics -by BARTTEE

EC-204 Digital Electronics   Credits 4(3-1-0)

UNIT 1:

Brief review of Boolean algebra; Minimization of switching functions.

UNIT 2:

IC logic families: TTL, NMOS, CMOS, ECL, ITL,; Simplification of Booleanfunctions using different approaches.

UNIT 3:

Combinational logic: Design of combinational logic circuit using differentchips (different gates) : Code converter, encoders, decoders, multiplexers, demultiplexers, 7-segment decoder/driver, ROM, PLA, etc.

UNIT 4:

Sequential logic circuit: Flip Flop, registers, counters, and the memory unit.

UNIT 5:

Analog to Digital converter and digital to analog converters.

THIRD YEAR (FIFTH SEMESTER)

CS-301 Computer Networks   **Credits 4(3-1-0)**

UNIT 1:   Introduction:
Basic Concepts, Transmission Mode, Categories of Network, The OSI Model, Functions of the layers, interface Services, Connections and Connectionless Oriented Services, Service Primitives.

UNIT 2:   The Physical Layer :
Transmission Media, Switching, Circuit Switching & Packer Switching, Message Switching.

UNIT 3:   Data Link Layer :
Data Link Control : Line Discipline, Flow Control, Error Control.
Data Link Protocol : A Synchronous Protocol & Synchronous Protocols.

UNIT 4:   Medium Sub Access Sub Layers :
The Channel allocation problem, Topologies: asymmetric and symmetric, Multiple Access Protocol, IEEE Standard 802 for LAN & MANS. (IEEE 802.3 (Ethernet), IEEE 802.4 (Token ring). IEEE 802.5 (Token Bus), IEEE 802.6 (DQDB).

UNIT 5:   Network Layer:
Network layer design issue, Routing Algorithms (types and Characteristics): Shortest path routing, Flooding, Distance vector routing, Link State routing. Congestion control algorithms: General principles of congestion control, congestion prevention policies, traffic shaping.

UNIT 6:   Introduction to Routers:
Bridges, ATM, ISDN, SNMP, PPP, HTTP, FTP, TELNET, POP3, SLIP, Network Simulator (NS-2)

Reference:
1) Data Communication and Network by Stalling. PHI.
2) Computer Networks by A.S. Tannebaum. PHI.
3) Data Network by Bertisekar D, Gallegar R. (PHI)
4) Data Communication And Networking by Behrouz A Forouzan. TMH

CS-303 Software Engineering   **Credits 4(3-1-0)**

UNIT 1:   Software :
The process and its management : Software and Software engineering the importance of software, software characteristics, components and applications, a crisis on horizon, software, myths, software engineering paradigms- a definition. classical life cycle. prototyping, spiral mode fourth generation techniques.

UNIT 2:   Project Management:
(a) Software Metrics : The project management process, metric for software productivity and quality, measuring software metrics for software quality, integrating metrics within software engineering process. (b) Estimation: Observations on estimating, planning objectives, scope, resources, decomposition techniques LOC and FP estimation, models-COCOMO model. (c) Planning : Risk analysis, software project scheduling, acquistion. re-engineering, organizational planning project plan.

UNIT 3:   Software Requirement Analysis :
(a) Requirement analysis fundamentals : Requirement analysis . communication techniques analysis principles software prototyping specifications. (b) Structured analysis and its extensions: Basic notations and its extensions-Data flow diagrams, extensions for real time systems, ward and Mellor extensions, Hatley and Pirbhai extensions. (c) Object oriented analysis and data modeling : Object oriented concepts, object oriented analysis modeling classification and assembly structures, defining object. (d) Alternative Analysis Techniques : Data structure oriented methods, the DSSD approach, Jackson system development.

UNIT 4:   The Software Design Fundamentals:
The design process, design fundamentals abstracton, refinement, modularity software architecture, control hierarchy, data structure, software procedure, modular design data design procedure design.

UNIT 5:   Various Design Techniques And Its Implementations:
(a) Data flow oriented design: Desigh and information flow; design process considerations, transform analysis, transaction analysis, design post processing design optimization. (b) Object oriented design: concepts, design methods, class and object definitions, refining operations, programcomponents and interfaces, a notation for OOD, detail design, and alternative design strategy. (c) User interface design: Human factors, human computer interaction, human- computer interface design, interface design guidelines, interface standards.

UNIT 6:   **Software Qulaity Assurance And Testing :**
(a) Software quality assurance : Quality assurance, software reviews formal technical review,   software quality metrics, formal approaches to SQA, software reliability. (b) Software testing techniques: Fundamentals, While-Box testing, Black-Box testing. (c) Software testing strategies: A strategic approach to software testing, unit testing, integration testing (top-down and bottom-up, integration comments on integration testing, test documentation), validation testing, system testing, the art of debugging.

UNIT 7:   **Software Maintenance And Configuration Management :**
Software maintenance : A definition, maintenance characteristics,maintainability, maintenance tasks, maintenance side effects, reverse engineering and re-engineering.

Reference:

1)Software Engineering : A Practitioner's approach by Roger S. Pressman (McGraw Hill International Edition)
2)Fundamentals of Software Engineering by Orio GHEZZI, Mehdi Jazayeri Dino Mandrioti. PHI.
3)An Integrated Approach to Software Engineering : Pankaj Jalote, Narosa Publiccation.

CS-305 Principles of Programming Languages Credits 3(2-1-0)

UNIT 1:   **Introduction:**
Why study programming language?

UNIT 2:   **Virtural computer and actual computer :**
Difination, syntax and semantics

UNIT 3:   **Data objects, variables and constant :**
Data types, specification of elementary data types, types checking (Static and dynamics).

UNIT 4:   **Vectors and arrays :**
Implementation of one and multidimension arrays, records and structures, Their implementation, Record and arrays with structured component, pointer.

UNIT 5:   **Parallel programming :**
Principle of Parallel programming language coroutines, syncronization of tasks using interrupts, semaphores and messages, mutual exclusion, critical section.

UNIT 6:   **Abstract data types :**
Data Abstraction, information, hiding, encapsulation by subprograms-subprograms as Abstract operration, subprogram defination & invocation, generic subprogram.

UNIT 7:   **Subprogram control :**
Simple subprogram call-return with its implementation Recursive programe with its implementation Referencin environment

References:

1)Programming Languages (2nd ed.) by Ravi Sethi
2)Programming Languages (2nd ed.) by Ravi Sethi & Terrence W. Pratt.

CS-307 Theory of Computation   Credits 4(3-1-0)

UNIT 1:   **Introduction:**
A general introduction to Strings, languages, graphs, trees and relations. Motels of Computation : RAM and RASP Models of Computation. Complexities of Algorithm run on these models with linear and logarithmic costs and their inter relationships. Turing machines and their relatinship to RAM & RASP models., Finite State Machines, Regular expressions; Deterministic - Finite systems, Non deterministic Automata with and without e-moves Proof of equivalence of DFA and NDFA without e-moves, Construction of DFA from NDFA with e-moves Regular expressions : Definition, eqivalence of finite automata and regular expression with the proof and examples.

UNIT 2:   **Properties of regular sets:**
Definition of Pumping Lemma along with examples, effective Closure properties of regular sets: Unior, Intersection, Complementation, Concatenation, Kleen-Closure, Minimisation of a given DFA (only numerical example and no proofs.)

UNIT 3:   **Context Free Grammars :**
Definition of CFG, left most and right most derivations, definition of Ambiguous grammers, simplification of context free grammar : Remobal of useless symbols, e-production, Unit production. Conversion of a given grammar into Chomsky normal form, Griebach normal form (examples only).

UNIT 4.   **Push Down Automata & Properties of context free languages :**
Definition of instantaneous descriptions, definition of Deterministic PDA, Construction of PDA for a given language, constuction of CFL's given the transition function of PDA, Pumping Lemma (definition

and examples), effective Closure, Properties of CFLs : Unior, Concatenation and Kleen closure.

UNIT 5: Turing machine :
Definition, Construction of Turing machines for simple languages, Definition of Computable languages and functions, Definition of total recursive, partial recursive functions, construction of turing machine for simple arithmatic function.

References:
1) Instruction to Automata Theory. Language and Computation by J.E. Hoproft and J.D. Ullaman, Narosa Publishers.
2) Theory of Computation by D.Wood, John Welley and Sons.

CS-309 Operating systems   Credits 4(3-1-0)

UNIT 1: Introduction And History :
What is an operating system generations of OS. bare system, batch system time sharing and real time system, multiprocessor systems, types of services, user's view operating system's view.

UNIT 2: Processor Management :
Concept of process, process state state diagrams, CPU scheduling concepts job scheduling, process scheduling algorithms, multiple processor scheduling.

UNIT 3: Fine Management:
File concepts, types, access methods, operation on files, free space management, allocations, implementation, directory eystem.

UNIT 4: Concurrent Processes And Programming :
Precedence graphs, critical section problem, semaphores, classical process coordination problems, interprocess communication, motivation modularization, synchronization, concurrent languages.

UNIT 5: Memory Management :
Preliminaries, bare machines, resident monitor, swapping, fixed and multiple partitions, pagging, segmentation, page replacement apgorithms allocation of algorithms, tarshing, locality concepts.

UNIT 6: Device Management :
Techniques of device management, device characteristics channels and control units, device scheduling algorithms, virtual devices, SCM, sector queuing.

UNIT 7: Protection And Deadlocks :
Goals of protection, mechanism and policies, domain of protection, access matrix, existing systems, language based protection, protection, problems, serucity what is deadlock characterization, deadlock prevention, deadlock avoidance, detection and recovery from deadlock combined approach.

UNIT 8: Design Principles:
Goals, mechanisms and policies layered approach, virtual machines, multiprocessors, implementation, system generation.

UNIT 9: Case Study:
General concepts of UNIX MSDOS, CTSS, MULTICS OS/360, Windows NT.

References:
1) Operating System concepts by J.Peterson & A. Silberschetx, Addition-Wesley Publishing Company.
2) Operating System by Deitel, Addison Wesley.
3) Operating System by M.Milenkovic, TMH.
4) Operating System : Design & Implementation by A.S. Tannenabaum, PHI.

EI-309 8-bit Microprocessor & Micro controller Credits 4(3-1-0)

UNIT 1:
General feature of microprocessor. Microprocessor architecture and it's operation. Memory, Memory organisation & type of memory

UNIT 2:
8085 microprocessor: internal architecture and operation, control signals, Flag register, timing control unit, decoding, execution of an instructions and memory interfacing.Timing: Memory and input output read/write cycle of an instructions set.

UNIT 3:
How to write and execute a simple program timing or execution of the instsruction. Addressing modes, Programing Technique: Programing technique for looping, counting and indexing. Counter programs and timing delay program and timing calculations. Stack operation and subroutine Programs.

UNIT 4:
Peripheral chips: 8255, A to D and D to A converters., DMA 8257, 8253 programmable interval timer, 8279 programmable keyboard/ display

interface, 8259 interrupt controller and 8251 programmable
communication interface with serial input output data communication.

UNIT 5:

Microcontroller 8051 Architecture and programing.

Reference:

1) Microprocessor Architecture programming and application with
   8085/8080A by Ramesh S. Gaonkar.

CS-304 Compiler Design   Credits 3(2-1-0)

UNIT 1:   Introduction to Compiling:
The phases of a compiler, Cousins of the Compiler, grouping of Phases, Bootstrapping.

UNIT 2:   Lexical Analysis:
Role of lexical analyzer, Input buffering, specification & Recognition of tokens, Finite automata, Regular expression, Conversion of regular expression to FNA, optimization of DFA states.

UNIT 3:   Syntax Directed Translation :
Syntax directed definition, 3-address code, Postfix notation, Quadruples,Triples, implementation of syntax directed translator, parse tree and syntax tree.

UNIT 4:   Syntax Directed Translation :
Syntax directed definition, 3-address code, Postfix notation, Quadruples, Triples, implementation of syntax directed translator, parse tree and syntax tree.

UNIT 5:   Symbol Tables :
The contents of symbol table, Data structure for symbol tables,representing scope information.

UNIT 6:   Error detection and recovery :
Errors, Lexical phase errors, Syntactic-phase errors, Semantic errors.

UNIT 7:   Code optimization :
Principles sources of optimization , loop optimization , DAG representationof basic blocks, values numbers and algebraic laws, Global data-flow analysis.

UNIT 8:   Code Generation :
issues in the design of code generator, a simple code generator, register allocation and assignment.

References :
1)   Aho, Sethi & Ullman, "Compilers Principles & Techniques & Tools", AddisionWesley.
2)   Aho & Ulman, "Compiler Design, "Narosa Publishers, New Delhi.

CS-306 Interactive Computer Graphics   Credits 4(3-1 -0)

UNIT 1:   Introduction :
Origin of comiputer graphics, display devices, general purpose graphics software display of sqlid objects.

UNIT 2:   Display Techniques And Pevices :
Point plotting techniques, coordinate, systems and incremental metnods, line-drawing algorithm , circle generators, display devices, CRT, inherited memory devices, the storage tube display, refresh line-drawing display.

UNIT 3:   Graphic Packages And Display Files :
A simple graphics, segments, functions for segmenting the display files, posting and unposting, segment naming schemes. appending to segment refresh cdncurrent with reconstruction free storage allocation, display file structure, geometric models, defining symbols procedures, display procedure, structured display files

UNIT 4:   Two Dimensional Transformation:
Principle concatenation matrix representation, a line dipping algorithm, midpoitit division, dipping other graphic entities, polygon dipping, viewing transformation, tine windowing transformer.

UNIT 5:   Input Devices:
Pointing and oositioning devices, three dimensional input devies. graph input techniques.

UNIT 6:   Event Handling & Input Furtctions:
Introduction, polling, interrupts, the event queue, functions for handling eveifits, polling task design, light pen interrupts, dragging and fix, htt detection, on-Jine character recognizers.

UNIT 7:   Raster Graphics :
Introduction, generating a raster image, interactive faster graphics raster display hardware.

UNIT 8:   3-0 Graphics :
Realism of 3D Graphics, 3D Transformation, Projections and its types. Curves & surfaces, hidden line and surface elimination (Z-Buffer Algorithm).

UNIT 9:   Introduction To Virtual Reality

References:
1) Principles of interactive coinsurer graphics   by W. M. Newman & R. F. Sproull, Me Graw Hill.
2) Computer Graphics by R~y A. Plastick & Gorden Kalley, Schaum's Outline Series.
3)Computer Graphics by Donald Heam & Baker, PHI.

4) Computetr Graphics, harinqton, TMH
5) Mathematical Approach To Computer Graphics, Rodger,
6) Computer graphics, Folay Addison Wessley

CS-308 Distributed System   Credits 4(3-1-0)

UNIT 1:   **Introduction to distributed system :**
What is distributed system, Advantages of distributed systems over centralized systems and PCs, Disadvantages of distributed system. Hardware concepts: Bus based multiprocessors, switched Multiprocessors, Bus based multi computer, Switched multi computers. Software Concepts: Network OS, true distributed systems, Multiprocessor time sharing system.

UNIT 2:   **Architecture of Distributed System:**
Motivation of distributed operating system, System Architecture types, Various issues in distributed operating system: Global Knowlege, Naming,Scalability, Compatibility, Process Synchronization, Resource Management, Security, Client-Server computing model. Communication Network (WAN and LAN), Communication Primitives, The Massage Passing Model, Re mote procedural calls.

UNIT 3:   **Theoretical Foundations of Distributed Operating system:**
Inherent limitation of distributed system, absence of global clock, Absence of shared memory, Lamport's Logical clock, Global State Chandy-Lamport's global state recording algorithm, termination detection.

UNIT 4:   **Distributed deadlock, Distributed Mutual Exclusion and Agreement Protocol :**
Mutual Exclusion: Centralized Algorithm, Distributed algorithm, Token ring algorithm.Deadlock in distributed system. Distributed deadlock detection, Distributed deadlock prevention., Introduction to Agreement protocols, System models: Asynchronous Vs Synchronous Computation, Model od processor failure, Authenticated Vs Non-Authenticated Massages, Perfor-mance Aspects.

UNIT 5:   **Distributed data storage and distributed Query Processing :**
Data Replication, Data Fragmentation (horizontal, vertical and mixed), Data replication and fragmentation, Query Transformation, Simple join Processing. Semijoin strategy. Join strategy that exploits parallelism, Distributed transaction model.

UNIT 6:   **Commit protocol, Concurrency control and deadlock handling :**
Commit protocols-two phase commit and three phase commit, Concurrency control-locking protocol and time stamping, Deadlock handling - centralized and distributed approaches.

References:
1) Advanced Concepts in operating system by Mukesh Singhal and Niranjan G. Shivaratri.
2) Distributed operating system by Andrew S.Tanenbaum.

CS-310 Programming in java   Credits 4(3-1-0)

UNIT 1:   **An overview of JAVA:**
Object Oriented programming (Two paradigms Abstraction, The Three OOP principles0, Entering the program, Compiling the program, Lexical Issues(white space identifiers, literals, comments, separators, keywords

UNIT 2:   **Data Type and Operators:**
Variables and Arrays, the simple type, integers (byte,short, int, long), floating point types(float, double, characters, booleans),a closerlook at literals, integer literals, floating point literals, string literals), variable(declaring a variable, dynamic initialization, the scope and life time of variable),Type conversion and Casting, arrays(one dimensional array, multi-dimensional arrays), Arithmetic operators(the basic operators, the modulous operators, arithmetic assignment operators, increment and decrement operators) .

UNIT 3:   **Control Statement:**
JAVA's selection statement(if, switch), iteration statements, while, do while, for, sum for loop(nested loops), jump statements(using break, using continue, return)

UNIT 4:   **Classes and Methods:**
class fundamentals(the general form of the class, a simple class), declaring objects(a close look at new), assigning a object reference variable, introducing method(adding a method to the box class, return a value, adding a method that takes parameters), constructors, this keyword, overloading methods(overloading constructors), using objects a s parameters, a close look at argument passing, returning objects, recursion, introducing access control, understanding static, introducing final, introducing nested and inner class, exploring the string class.

UNIT 5:   **Inheritance:**

Inheritance basics (member access and Inheritance), using super, to call super class constructors, creating a multilevel hierarchy, when constructors are called, method overriding.

UNIT 6:   Packages and Interfaces:
Packages(defining a package, understanding a class path), access protection, importing packages, interface(defining an interface, implementing an interface, applying interface, variable interface, interface can be extended).

UNIT 7:   Exception and String handling:
Exception handling fundamentals, exception types, uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws, finally, string length, character extraction(charAt(), getChars(), getBytes(), toCharArray()), String comparison(equals(),compareTo()), modifying a string(substring(), concat(), replace()), data conversion using value, stringBuffer(length(), and capacity(), ensure capacity(), setLength(), charAt(), setCharAt(), getChars(), append(), insert(), reverse(), delete(), and deleteCharAt(), replace()).

UNIT 8:   Mutithreaded programming :
Java thread model (thread priorities, synchronization, messaging the thread class and the runnable interface), the main thread, creating a thread(implementing runnable, extending thread), creating multiple threads, thread priorities(using synchronized methods, the synchronized statements), suspending, resuming, and stopping threads.

UNIT 9:   Input output:
Exploring java i/o, the java i/o classes and interfaces, file(directories, using file name filter, the list files(), alternative, creating directories), the stream classes, the byte Streams(input streams, output stream, file input stream, file output stream, byte array, input stream, byte array output stream), the character streams (reader, writer, file reader, file writer, char array reader, char array writer, buffer reader, buffer writer).

References:
1) The complete refrence by Patrck Naughton, Schieldt
2) Programming in Java by E. Balaguruswamy

CS-312 Data Mining Techniques   Credits 3(2-1-0)

UNIT 1:   What is learning :
Introduction, What is learning, Self learning computer systems, Machine learning & Methodology of science, Ex:- A kangaroo in mist. Data Mining: Definitions, Challenges, The knowledge discovery process in detail (Data selection, Cleaning, Enrichment, Coding process) KDD (Knowledge Discovery in Database) v/s Data Mining, DBMS v/s Data Mining, Golden rules to setup KDD environment

UNIT 2:   DSS:
Characteristics, Definitions for DSS, Why Decision DSS, Benefits, DSS Architecture.Dss-Uses, definition, Operational Database. Introduction to DATA Warehousing. why do we need it & Integration with Data Mining, Data-Mart, Concept of Data-Warehousing, Multi Dimensional Database Structures. Client/Server Computing Model & Data Warehousing.

UNIT 3:   DATA Warehousing:
DATA Warehousing. Data Warehousing Components. Building a Data Warehouse. Warehouse Database. Technical considerations & Implementation considerations of data warehouses, 3-level architecture of data warehousing.

UNIT 4:   Data Mining Techniques :
Preliminary Analysis of data set using traditional Query rules, Visualization techniques, Likelihood & distance, OLAP Tools, K-nearest neighbor, Decision Trees. Association rules, Neural Networks, Genetic algorithm.

UNIT 5 :   Association Rules :
What is an Association rule, Methods to discover Association Rules, A Priori algorithm, Partition algorithms, Pincer search algorithms, Discussion on different algorithms, Incremental algorithms, Border algorithm, Generalized association rule.
Decision Trees :
What is a decision tree, Tree construction principle, Web-split, Splitting Indices, Splitting Criteria, Decision tree construction algorithm(brief description only)

UNIT 6:   Web Mining :
Web mining, Web content mining, Web structure mining, Web users mining, Text mining, Unstructured text, Episode Rule Discovery for Text, Hierarchy of Categories, Text-Clustering.

References :

1) Data Mining techniques by Arun Pujari, Universities Press.
2) Data Mining by Pieter Adriaans, Dolf Zantinge, Addison-Wesley.
3) Datawarehousing, Datamining, OLAP, by Alex Berson & Stephen J. Smith, TMH Edition
4) Berson, "Data Warehousing, Data-Mining & OLAP", TMH
5) Mallach, "Decision Support and Data Warehousing System", TMH
6) Bhavani Thura-is-ingham, "Data-Mining Technologies, Techniques Tools & Trends", CRC Press
7) Navathe, "Fundamental of Database System", Pearson Education
8) Margaret H. Dunham, "Data-Mining. Introductory & Advanced Topics", Pearson Education

EC-302 Digital Signal Processing (D.S.P.)   Credits 4(3-1-0)

UNIT 1:   Discrete time signals & systems :
Discrete-time signals, discrete time systems, analysis of discrete-time linear system-invariant systems.

UNIT 2:   The Z-transform :
The Z-transform, properties of Z-transform, Inversion of Z-transform, one sided Z transform.

UNIT 3:   Discrete fourier transform :
Its properties & applications: Discrete fourier transform, properties of discrete fourier transform, linear filtering methods based on DFT.

UNIT 4:   Efficient computation of the DFT:
Fast fourier transform : FFT algorithms, application of FFT algorithms.

UNIT 5:   Implementation of discrete-time systems:
Structures of the realization of discrete-time sytems, structures of FIR systems, stsructures of IIR systems.

UNIT 6:   Design of digital Filters:
General considerations, design of FIR filter, design of IIR filters from analog filters.

References:

1. Digital signal processing (principles, algorithms and applications) by john G.Proakis & Dimitris G. Manolakis, PHI
2. Digital signal processing by Alan V. Oppenheim and Ronald Schafer
3. Introduction to digital system Processing by Roman Kuc. Mcgraw hill international editions.

FOURTH YEAR (SEVENTH SEMESTER)

CS-401 Advanced Computer Architecture   Credits 4(3-1-0)

UNIT 1:   **Introduction to Parallel Processing :**
Parallelism in uniprocessor systems; Parallel computer structures; Architectural classification schemes. Data driven computing and languages; Control Flow versus Data Flow Computers.

UNIT 2:   **Memory Input-Output subsystems:**
Memory Hierarchy, Addressing Schemes for Main Memory, Characteristics of cache memory ; Cache Memory Organization; Characteristics of inputoutput subsystems.

UNIT 3:   **Pipelining and Vector Processing :**
Pipelining: Principles of Linear Pipelining, Classification of Pipeline Processors, General Pipelines and Reservation Table Design of instruction pipelined units; Arithmetic Pipeline Design Examples, Job sequencing and collision prevention; Characteristic of Vector Processing, Vector supercomputers; Scientific attached processor; Architecture of star-100 and TI-ASC.

UNIT 4:   **Structures and Algorithms for Array Processors :**
SIMD array processor, SIMD interconnection networks: Illiac, Cube, Shuffle Exchange, Omega, Modified Omega, Barrel Shifter, Parallel algorithms for array processor: SIMD Matrix Multiplication, Parallel sorting on Array Processor.

UNIT 5:   **Multiprocessor Architecture and Programming :**
Functional structures : Loosely Coupled Multiprocessors, Tightly Coupled Multiprocessors; Interconnection Networds : UMA, MUMA, COMA, Time shared, Crossbar switch and Multiport Memories; Multiprocessor Operating Systems: Classification of Multiprocessor Operating Systems, Exploiting Concurrency for multiprocessing : Language features, Matrix multiplication on concurrent processor; Multiprocessor Scheduling Strategies: Dimensions of Multiple processor Management.

UNIT 6:   **RISC and Superscalar Architecture :**
Instruction set architectures, RISC Scalar processors; SPARC rchitecture, window register concept, Superscalar processors

References:
1) K. Hwang and F.A. Briggs, "Computer Architecture and Parallal processing" McG raw Hill Book Co. NY.
2) M.J. Flynn, "Computer Architecture : Pipelined And Parallel Processor Design". Naros Publishing Co.
3) K. Hwang "Computer Architecture" Mc Graw Hill Co. NY.

CS-403   Modeling & Simulation   Credits 4(3-1-0)

UNIT 1:
System definition and components, stochastic activities, continuous and discrete systems, System modeling, Types of models, static and dynamic physical models, static and dynamic mathematical models, full corporate model, types of system study.

UNIT 2:
System simulation, Need of simulation, Basic nature of simulation, techniques of simulation, comparison of simulation and analytical methods, types of system Simulation, real time simulation, hybrid simulation, simulation of pursuit problem, single-server queuing system and an inventory problem, Monte-Carlo simulation, Distributed Lag model, Cobweb model.

UNIT 3:
Simulation of continuous Systems, analog vs digital simulation, simulation of water reservoir system, simulation of a servo system, simulation of an auto-pilot. Discrete system simulation, fixed time-step vs event-to-event-model, generation of random numbers, test of randomness, Monte-Carlo computation vs stochastic simulation.

UNIT 4:
System dynamics ,exponential growth models, exponential decay models, logistic curves, system dynamics diagrams, world model.

UNIT 5:
Simulation of PERT networks, critical path computation, uncertaintities in activityduration, resource allocation and consideration, Simulation languages, object oriented simulation.

Reference Books:

1) Geoftrey Gordon, "System Simulation", PHI

2) Narsingh Deo, "System Simulation with digital computer", PHI.

3) Averill M. Law, W. David Kelton, "Simulation Modelling and Analysis",TMH.

FOURTH YEAR (EIGHT SEMESTER)

CS-402 Advanced Computer Networks   Credits 4 (3-1-0)

UNIT 1:   Introduction and Overview :
TCP/IP, Internet, Internet services, Internet protocol and standardization, Approaches to network communication ,WAN & LAN Ethernet Technology, FDDI, ATN.

UNIT 2:   Internetworking concept and Architectural Model, Internet Addresses:
Application label interconnection, Network label Interconnection, Properties of Internet Internet Architecture, Interconnection Through IP Routers, Universal Identifiers, Classes of IP Addresses, Network and Broadcast services, weaknesses in internet addressing, dotted decimal notation, loop back address, summary of special address conventions.

UNIT 3:   Mapping Internet Address to physical Addresses (ARP) :
The address resolution problem, Two type of physical addresses, Resolution through Direct mapping and dynamic binding, ARP refinement, relationship of ARP to other protocols, ARP Implementation, ARP protocol format, Determining an internet Address At startup (RARP)

UNIT 4:   Internet Protocol :
Connectionless Datagram delivery : Virtual network, internet architecture & Philosophy, Concept of Unreliable delivery, connectionless delivery system, Internet datagram and its options, Routing IP Datagrams: Routing in Internet, Direct and Indirect delivery, Table-Driven IP & Next-Hop Routing, Default and Host-specific routers, IP routing algorithm, routing with IP addresses, Handling incoming datagrams, establishing routing tables.

UNIT 5:   Reliable Stream Transport service (TCP) :
Need for stream delivery, properties of reliable delivery service, providing reliablity, TCP, ports, connections and endpoints, passive and active opens, segments and sequence numbers, TCP segment   format , TCP   checksum   computation , acknowledgement, timeout and retransmission, Karn's algorithms and timer back off, response congestion,establishing and closing a TCP connection, TCP state machine, TCP performance, silly window syndrome and avoiding silly window syndrome.

UNIT 6:   TCP/IP over ATM Networks:
ATM hardware, logical view of ATM network, two ATM connection paradigms, ATM cell transport, Packet type and multiplexing, IP address binding in ATM network, Connection management, address binding with in an logical IP subnet, ATM ARP packet format, use of ATP ARP packet to determine an address.

UNIT 7:   Bootstrap and autoconfiguration (BOOTP, DHCP), DNS and Application:
BOOTP message format and retransmission policy, two step Bootstrap procedure, Dynamic Host configuration and IP address assignment, obtaining multiple addresses, address acquisition and lease renewal state, DHCP message format, option and message type, DSCP and Domain name, TCP/IP internal Domain names, mapping domain name to addresses, Domain name resolution, domain server message format,compressed name format, abbreviation of domain names, inverse mapping, obtaining authority for subdomain, Applications : File access and transfer sharing by file transfer, TCP/IP file transfer protocol (FTP), FTP features, FTP process model, TCP port number assignment, TFTP, NFS, Remote procedural call (RPC), Electronic mail (822, SMTP, MIME.)

References:
1) Internetworking with TCP/IP Vol I by corner & Stevews Estern Economy

CS-431 Network management Systems   Credits 4(3-1-0)

UNIT 1:

Data communications and Network Management Overview : Analogy of Telephone Network Management, Communications protocols and Standards, Case Histories of Networking and Management, Challenges of Information Technology Managers, Network Management: Goals, Organization, and Functions, Network and System Management, Network Management System Platform, Current Status and future of Network Management.

UNIT 2:

SNMPV1 Network Management : Organization and Information and Information Models. Managed network : Case Histories and Examples, The History of SNMP Management, The SNMP Model, The Organization Model, System Overview, The Information Model. SNMPv1 Network Management : Communication and Functional Models. The SNMP Communication Model, Functional model. SNMP Management: SNMPv2 : Major Changes in SNMPv2, SNMPv2 System Architecture, SNMPv2 Structure of Management Information, The SNMPv2 Management Information Base, SNMPv2 Protocol, Compatibility With SNMPv1.

UNIT 3:

SNMP Management : RMON : What is Remote Monitoring? , RMON SMI and MIB,RMON1, RMON2, ATM Remote Monitoring, A Case Study of Internet Traffic Using RMON

UNIT 4:

Telecommunications Management Network: Why TMN? , Operations Systems, TMN Conceptual Model, TMN Standards, TMN Architecture, TMN Management Service Architecture, An Integrated View of TMN, Implementation Issues.

UNIT 5:

Network Management Tools and Systems: Network Management Tools, NetworkStatistics Measurement Systems, History of Enterprise Management, Network Management systems, Commercial Network management Systems, System Management, Enterprise Management Solutions.

UNIT 6:

Web-Based Management: NMS with Web Interface and Web-Based Management, Web Interface to SNMP Management, Embedded Web-Based Management, Desktop management Interface, Web-Based Enterprise Management, WBEM:Windows Management Instrumentation, Java management Extensions, Management of a Storage Area Network,Future Directions.

Text Book:

1) Network Management, Principles and Practice, Mani Subrahmanian, Pearson Education.

References:

1) Network management, Morris, Pearson Education.
2) Principles of Network System Administration, Mark Burges, Wiley Dreamtech.
3) Distributed Network Management, Paul, John Wiley.

CS-432 Object Oriented Analysis and Design   Credits 4(3-1-0)

UNIT 1: Introduction:

object oriented themes, object oriented development, object oriented paradigms encapsulation, abstraction, binding, polymorphism, inheritance, message passing), the object modeling techniques, impact of an object oriented approach.

UNIT 2:   Modeling:

The object modeling techniques, object and classes, link and association, advance link and association concepts, elements of object model, aggregation, abstract classes, multiple inheritance, candidate key.

UNIT 3:   Dynamic and functional modeling:

Events and states, operations, concurrency, object oriented developments, functional model, data flow diagram, specifying operations, constraints.

UNIT 4:   Analysis and system design:

Overview of analysis, principles of system design, object design, breaking of a system into subsystem.

UNIT 5: **UML (Unified Modeling language):**
Introduction to UML, importance and principles of modeling, A brief introduction to conceptual model of UML, architecture of UML, case study: Elevator problem

Reference Books:

1) James Rumbaugh etal, "Object Oriented Modeling and Design", PHI

2) Booch Grady, "Object Oriented Analysis & Design with application 3/e", Pearson Education, New Delhi.

3) James G. Booch, J. Rambaugh "The Unified Modeling Language".

CS-433 Artificial Neural Networks   Credits 4(3-1-0)

UNIT 1:

Introduction to neural nets, Perceptrons and the LMS Algorithm. Back propagation Learning, Visually-Guided Robot Control.

UNIT 2:

Optimization Techniques, Overfitting, Cross-Validation, and Early Stopping, Simple Recurrent Networks, Pattern Classification, Language Processing Models.

UNIT 3:

Radial Basis Functions, The EM (Expectation-Maximization) Algorithm, Neural Networks for Control, Support Vector Machines, Time Series Prediction.

UNIT 4:

Shared Weight Networks, Competitive Learning and Kohonen Nets, Hebbian Learning and Principal Components Analysis, Hopfield Nets and Boltzmann Machines.

UNIT 5:

Mean Field Approximation, Helmholtz Machines; Minimum Description Length, Bayesian Networks, Computational Learning Theory, Connectionist Symbol Processing, Reinforcement Learning, Neurophysiology for Computer Scientists.

References:

1) Bishop, C. M. (1995) Neural Networks for Pattern Recognition,. Oxford University Press.

2) Optional enrichment: Anderson, J. A., and Rosenfeld, E.

3) Handout: Derivation of the backprop learning rule

4) Haykin, S. Neural Networks: A Comprehensive Foundation, 2nd edition.

5) Kearns, M. J., and Vazirani, U. V. An introduction to Computational Learning Theory,. Cambridge, MA: MIT Press.

6) Churchland, P.S. (1986) Neurophilosophy: Toward a Unified Science of the Mind-Brain.. Cambridge, MA: MIT Press.

CS-435 Parallel Computing and Algorithms   Credits 4(3-1-0)

UNIT 1:

Sequential model, need of alternative model, parallel computational models such as PRAM, LMCC, Hypercube, Cube Connected Cycle, Butterfly, Perfect Shuffle Computers, Tree model, Pyramid model, Fully Connected model, PRAM-CREW, EREW models, simulation of one model from another one.

UNIT 2:

Performance Measures of Parallel Algorithms, speed-up and efficiency of PA, Costoptimality, An example of illustrate Cost-optimal algorithms- such as summation, Min/Max on various models.

UNIT 3:

Parallel Sorting Networks, Parallel Merging Algorithms on CREW/ EREW/MCC, parallel Sorting Networks on CREW/EREW/MCC, linear array

UNIT 4:

Parallel Searching Algorithm, Kth element, Kth element in X+Y on PRAM, Parallel Matrix Transportation and Multiplication Algorithm on PRAM, MCC, Vector-Matrix Multiplication, Solution of Linear Equation, Root finding.

UNIT 5:

Graph Algorithms - Connected Graphs, search and traversal, Combinatorial Algorithms-Permutation, Combinations, Derrangements.

References:

1) M.J. Quinn, "Designing Efficient Algorithms for Parallel Computer" by Mc Graw Hill.
2) S.G. Akl, "Design and Analysis of Parallel Algorithms"
3) S.G. Akl, "Parallel Sorting Algorithm" by Academic Press.

CS-438 Fault -Tolerance Computing   Credit: 4(3-1-0)

UNIT 1:   INTRODUCTION:
Fundamental terminology, Objective of Fault Tolerance, Applications of Fault-Tolerant computing, Reliability, Safety, Availability and Maintainability Modeling using Markov chain, Dependability Evaluation technologies, Failure rate, reliability function.Mean time to Failure (MTTF), Mean Time between, failures (MTBF) Mean time to Repair (MTTR)

UNIT 2:   Architecture of Fault Tolerant Computer:
Taxonomy, Fault Avoid ance Techniques, Fault Detection at IBM, Dynamic redundancy in multiple computer system & Recovery on Time and Space, Fault, Detection Techniques, Detection of errors in Data Management,
Component Fault Detection, Detection Tests at System level.

UNIT 3:   Reliable Design and Fault Diagnosis:
Hazard,Fault Detection in Combinational circuits, fault location Experiments, Boolean Differences, Fault Detection by Path Sensitizing.

UNIT 4:   Coding Theory For Fault-Tolerant System:
Error models, Basic structural properties of parity check codes, Matrix description of parity check codes, vector-space properties of parity check codes Error checking the syndrome, Group properties of Parity check codes, Distance properties of parity check codes Polynomial algebra and cyclic codes, Hamming single error correcting codes, Unidirectional error correcting and Detecting codes, Asymmetric Error- correcting codes, single-Asymmetric error correcting code.

UNIT 5:   Software Design Faults:
Approaches for uniprocess software: Exception Handling Framework, Recovery Block Approach, N-version Programming. Backward Recovery in Concurrent systems: Domino Effect, Conversations, and FT-Actions, Conversation using monitors, Using Distributed-Action. Forward recovery in concurrent Systems: Exception Resolution, Exception Handling with FT-Action.

References:

1) D.K. Pradhan, Fault Tolerant Computer System Design, Prentice Hall PTR New Jersey.
2) Uvi S.T. Agrawale: Fault Tolerant System Design, Me GrawHill, International Ed.
3) Zvi Kohavi, Switching and finite Automata Theory, TMH.

CS-439 Artificial Intelligence & Expert system Credits 4 (3-1-0)

UNIT 1:   Introduction :
Overview, The AI proglems, AI techniques, applications of AI, Introduction to LISP

UNIT 2:   Problem spaces and search techniques :
Defining the problem, production system, problem charactersits, Henriste search techniques : Hill chimbing, BFS, DFS, A*, AO* altorithm admissibility, monotonicity.

UNIT 3:   Knowledge representation :
Issues, predicate logic and calculus, role based system, symbolic reassning, Frames, conceptual graphs.

UNIT 4:   Advanced Topics :
Planning understanding, Natural language processing parallel 7 distributed AI, Learning neural network Genedic learning, patern, recognition.

UNIT 5:   Expert system archicture :
Representing and using down aim knowledge, Expert system shells, knowledge acquision, applications, case study of mycin.

Reference:

1) E. Rich & K. Knight, "Artificial Intelligence," TMH.
2) D.W. Patterson, "Introduction to Artificial Intelligence"

CS-441 Advanced Data Base Management System Credit 4(3-1-   0)

UNIT 1:
Introduction to distributed data base systems, transaction

processing Concurrency control techniques, security, Distributed Data Base architecture.

UNIT 2:

Introduction to object oriented database system, Definition of Objects, Review of Key Object-oriented programming concepts, Object Orientation for Database Systems, Relational Extensions to Object-oriented Database Systems, Object Orientation in Relational Databases, Uses for Object-oriented Database.

UNIT 3:

Introduction to data mining, Self-learning, What is data warehouse and why do we need, Designing decision support systems, Integration with data mining.

UNIT 4:

Introduction to knowledge discovery process, Data selection, cleaning. Enrichment coding data mining, Preliminary analysis of the data set using traditional query tools, Decompose trees, Association rules, Neural networks, Genetic algorithms Introduction to setting up a KDD environment.

UNIT 5:

Advanced Transaction processing: Remote Backup systems, Transaction-Processing Monitors, TP-Monitor Architectures, High-Performance Transaction systems. Long Duration Transactions, Transactional Workflows, Query Optimization security and production, Encryption, Statistical Database.

UNIT 6:

Data base triggers, functions, procedures, packages and forms with respect to existing database.

References:

1) Stegano Ceri and qiuseppe Pelagati : Distributed Data base system, Mc-Graw Hill Book Company. 1984. OR (Advance version)
2) Prabhat K. Andleigh, Michacl R. Gretzinger : Distributed Object - Oriented Data-Systems Design, PTR Prentic- Hall Inc., 1992.
3) Pieter Adriaans Dolf Zantinge : Data Mining, Addison, Wesley, Longman Ltd., 1997.

CS-442 Fuzzy Sets And Applications   Credits 4(3-1-0)
Note : syllabus is not available.

CS-443 Network Security and Cryptology   Credits 4(3-1-0)

UNIT 1: Introduction:
Terminology, Substitution ciphers and Transposition ciphers, Simple XOR, One-Time Pads, Computer Algorithms. Cryptographic Protocols

UNIT 2: Protocol Building Blocks:
Introduction, Communication using Symmetric Cryptography, One-Way Hash Functions, One-Way Hash Functions, Communication using Public-Key Cryptography, Digital Signatures, Digital Signatures with Encryption.

UNIT 3: Protocols: Authentication and Key exchange, Key Exchange, Authentication, Multiple key public key cryptography, Secret splitting, Secret Sharing, Cryptographic protection. Zero-Knowledge Proofs, Zero-Knowledge Proofs of Indentity, Blind Signatures, Obilivious Transfer, oblivious signature, Simultaneous contract singing Cryptographic Techniques

UNIT 4: Key Management :
Generating Keys, Nonlinear Keyspaces, Transferring Keys, Verifying Keys, Using Keys,

UNIT 5: Using Algorithms:
Choosing an Algorithm, Public-Key cryptography versus Symmetric cryptography, Encrypting Communication Channels, Encrypting data for Storage.

UNIT 6: Cryptographic Algorithms:
RSA, DES

References:

1) Applied Cryptography by Bruce Schneier, John Viley & Sons.
2) Network Security and Cryptography by Willam Stalling
3) Concept of Network Security and Cryptography by Frozen

CS-444 VLSI Design & Circuits   Credits4(3-1-0)

UNIT 1:

MOS transistor, Depletion MOS Transistor, Enhancement MOS Transistor, basic Inverter device, Sizing, Enhancement load verses load inverters, basic NMOS NOR Logic circuit, basic NMOS NAND logic circuit, multi input NAND & NOR logic circuit.

UNIT 2:

A Basic CMOS Inverter, CMOS Inverter logic levels, Inverter device sizing. CMOS NOR logic gate, CMOS NAND logic gate, Multi-input CMOS logic gate. NMOS pass transistor, CMOS Transmission gate.

UNIT 3:

Ratio logic model, Process characteristics time const, inverter pair delay, super Buffer NMOS NAND & NOR DELAY, Enhancement v/s depletion load, CMOS logic delay, interconnection Characteristics, capacitive loading, logic fan out delay, distributive drivers, NMOS power dissipation, CMOS

UNIT 4:

Structured gate layout, logic gate arrays, Dynamic MOS storage circuit,Simple shift register, other shift register, clock CMOS logic, Evalute logic,Domino CMOS.

UNIT 5:

Semiconductor memory, memory organization, ROMDesign, EPROM,EEPROM, Static RAM, Storage cell, decode and selector circuit, selecttime delay calculation, optimum precharge voltage concept, dynamic RAM cell, sense amplifier, Stick rules & diagrams.

References:
1) VLSI Design & circuits by Geige: Publisher Mc. Graw Hill
2) VLSI Design & circuits by Shoji
3) VLSI Design by Puknill.
4) Design technique for Analog and digital circuits by L.Geizer, Philip E.Allen, Noel R.starder.

CS-445 Stochastic Models for Computer Applications Credits 4(3-1-0)

UNIT 1: Bavariate Distribution, One function of two Random variables, two functions of two Random variables, Problems.

UNIT 2: Expectation:
Introduction, Moments, Expectation of function of more than one random variable, Transform Methods, Moments & Transforms of some important distributions, Computation of mean time to failure, Inequalities & Limit Theorems.

UNIT 3: Conditional Expectation:
Introduction, Mixture distribution, Conditional Expectation, Imperfect Fault Coverage & Reliability, Random Sums.

UNIT 4: STOCHASTIC Process:

Introduction, Classification of Stochastic Process, the Bernoulli Process, the Poisson Process, Renewal Processes, Availability Analysis, Random Incidence, Renewal model of Program Behavior

UNIT 5: Discrete Parameter Markov Chains:
Introduction, Computation of n-step transition Probabilities, State Classification & Limiting Distributions, Distribution Between State Changes, Irreducible Finite Chains & A periodic States, The Queuing System, Finite Markov Chains With Absorbing States.

UNIT 6: Continuous Parameter Markov Chains:
Introduction, The Birth & Death Process, Non Birth & Death Processes, Markov Chains with Absorbing States.

Reference:-
1) Probability & Statistics with Reliability, Queuing & Computer Science Application: R. S. Trivedi, John Wiley & Sons.
2) Probability, Random Variables & Stochastic Processes: A. Papoulis, TMH -

CS-448 Distributed Data Base System   Credits4 (3-1-0)

UNIT 1:

Introduction to Distributed Data system, Distributed Database Architecture, Distributed Data base Design,Transaction processing Concurrency Control techniques, Security.

UNIT 2:

Types of Data Fragmentations, Fragmentation and allocation of fragments, Distribution transparency,access primitives, integrity constraints.

UNIT 3:

Grouping and aggregate function, Query processing , Equivalence transformation of queries.

UNIT 4:

Evaluation, parametric queries, Query optimization, Join and general queries.

UNIT 5:

Management of Distributed transaction and concurrency control: Dis-

tributed Date baseAdministration, Catalouge Management Authorisation, Security and protection.

References:

1) Ceri & Palgathi, "Distributed Database System", McGraw Hill.
2) Raghu Rama Krishnan and Johannes Gechrib, "Database Management Systems", Mc Graw Hill.
3) Date C. J, "An Introduction to Database System, Vol1 & II", Addition Wesley.
4) Korth, Silbertz, Sudarshan , "Database Concepts", McGraw Hill.
5) Elmasari , Navathe, "Fundamentals of Data Base Systems", Addition Wesley.
6) Data C. J "An Introduction to Database System" , Addition Wesley

CS-449 Embedded Systems   Credits 4(3-1-0)

UNIT 1: Introduction to embedded systems: Classification, Characteristics and requirements
UNIT 2:
Timing and clocks in Embedded systems, Task Modeling and management, Real time operating system issues.
UNIT 3:
Signals, frequency spectrum and sampling, digitization (ADC, DAC), Signal Conditioning and Processing.Modeling and Characterization of Embedded Computation System.
UNIT 4:
Embedded Control and Control Hierarchy,Communication strategies for embedded systems: Encoding and Flow control.
UNIT 5:
Fault-Tolerance Formal Verification.

Books:

1) H.Kopetz, "Real-Time Systems", Kluwer, 1997.
2) R.Gupta, "Co-synthesis of Hardware and Software for Embedded Systems", Kluwer 1995.

CS-446 Digital Image Processing   Credits 4(3-1-0)

UNIT 1:   Introduction:
what is digital image processing ? origin of digital image processing. Use of digital image processing. Fundamental steps in digital image processing, components of an digital image processing.
UNIT 2:   Digital image fundamentals:
Elements of visual perception, brightness adaption and discrimination, image sensing and acquisition, image sampling and quantization, some basics on pixel, relationships between pixel,
UNIT 3:   Image enhancement:
In spatial domain: basic gray level transformations, Histogram processing enhancement using arithemetic/logic operations, basics of spatial filtering, sharpening spatial filters, combining spatial enhancement methods.
UNIT 4:   Image enhancement in the frequency domain:
Introduction to the fourier transform and frequency domain., smoothing frequency domain filters, sharpening frequency domain filters, homomorphic filtering, implementation.
UNIT 5:   Image restoration:
A model of the image degradation/restoration process. Noise model, restoration in the presence of noise only, spatial filtering, mean filters, order statistics, filters, adaptive filters, periodic noise reduction by frequency domain filtering: band reject filters, band pass filters, notch filters, optimum notch filters, linear, position invariant degradations, estimating degradation function inverse filtering, wiener filtering, geometric mean filters, geometric transformation.
UNIT 6:   Image compression:
Fundamentals of image compression models, error free compression: variable length coding, LZW coding, bit plane coding, lossless predictive coding, lossy predictive coding, transform coding, wavelet coding, image compression standard.
UNIT 7:   Image segmentation:
Detection of discontinuities, edge linking and Boundary detection, threshold, region based segmentation.
UNIT 8:   Representation and description:
Chain codes, polygonal approximations, signatures, boundary segments, skeletons, and boundary descriptors, shape numbers, Fourier descriptors, statistical moments, regional descriptors, texture 2d moments.

Reference books:
1) R. C. Gonzalez, R.E. Woods, "digital image processing", Pearson education.

2) R. C. Gonzalez "digital image processing using MATLAB", Pearson education.

3) W. K. prett, "digital image processing", Addison Wesley.

CS-447 Web Technology   Credits 4(3-1-0)

UNIT 1:

History of the Internet and World Wide Web, Growth of the Web, Protocols -HTTP, FTP, SMTP, POP3, MIME, IMAP. Choosing an ISP, Introduction to Internet Services, E-Mail concepts, Sending and Receiving secure E-Mail .

UNIT 2:

Web project, Web Team, Communication Issues, the Client, Multi-departmental & Large scale Websites, Quality Assurance and Testing, Technological advances and Impact on Web Teams, Overview of Static or Dynamic Web page, Portal, Search Engine.

UNIT 3:

HTML: Concept of Hypertext, Versions of HTML, Elements of HTML, Formatting Tags, Links, Hyperlinks, Image & Image map, List, Tables, Frames, Forms, Style Sheets, Background and Color Controls. DHTML: Introduction to DHTML. Advanced Netscape DHTML, Advanced Microsoft DHTML & Cross browser DHTML JavaScript: Introduction, Statements, Functions, objects in JavaScript, Events and Event Handling, Arrays, FORMS, Buttons, Checkboxes, Text fields and Text areas.

UNIT 4:

XML: Introduction, Problems with HTML & SGML, Types of XML Markup, Displaying an XML Document, Document Type Definitions (DTD), Linking, Using Style Sheets with XML. Data Interchange with an XML document, Document type definitions, Client-side usage, Server Side usage.

UNIT 5:

ASP.NET, Features of ASP.NET, Differences between ASP and ASP.NET. Create an ASP.NET web application, ASP.NET web forms, ASP.NET controls-validation contraols, web server controls. Web database tools: overview of ADO.NET, difference between ADO and ADO.net ADO.NET architecuture , Accessing data adapters and datasets, SQL server and AMS-ACCESS.

Text books:
1) Burdman, "collaborative web development" addision Wesley
2) ASP.NET 21 days, TMH

3) "magic with HTML, DHTML, Javascript", laxmi publication.
4) "web technology", laxmi publication

CS-450 Internet programming with .net framework
Credits 4(3-1-0)

UNIT 1: The .NET Framework:
Introduction, Common Language Runtime, Common Type System,Common Language Specification, The base class library, The .Net Class Library Intermediate Language, Just In Time Compiler, Garbage Collection, Assemblies

UNIT 2: C# Basics:
Introduction., .Data Type, Identifiers, Variabes & Constants, C# Statements, Object Oriented Concepts, Object & Classes, Arrays and Strings, System Collections, Delegates

UNIT 3: Developing ASP.NET Applications:
Namespace System, Window Forms, C# in Web Application, Web Form Fundamentals, Validation and Rich Controls, Master Pages and Themes

UNIT 4: Working With Data:
ADO.NET Fundamentals, Reflection, State Management, Website Navigation

UNIT 5: Advanced ASP.NET:
Error Handling,Security Fundamentals,Web Services, Unsafe Mode

Reference Books:
1) 'Beginning ASP.NET 2.0 in C# 2005' by Apress
2) 'C# with .NET Framework ' by Shibi Pannikar & Kumar Sanjeev
3) 'Undestanding .NET Framework ' by Tonybaer

CS-451 Wireless Network and Mobile Computing   Credits 4(3-1-0)

Unit-I

Overview of wireless communication: History, Different Generations, General characteristics of mobile devices, Electromagnetic spectrum, Radio propagation mechanisms, characteristics of wireless medium, wireless topology, cellular system (cell concepts, cell hierarchy, cell fundamentals).

Issues in mobile computing: Introduction, functions, 3-Tier architecture, applications and services.

GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling Handover, Security.

Unit-II

WLAN: Technical issue (uses, design goal, types, components and services offered by a typical IEEE 802.11 network), IEEE 802.11 standard (physical layer, MAC layer mechanism & functionalities, CSMA/CA mechanism).

HIPERLAN: HIPERLAN standard, HyperLAN/1 (physical layer, DLC & RLC layer, MAC sub-layer), HyperLAN/2 (Physical layer, MAC sub-layer, power conservation issues)

BLUETOOTH: Specifications, transport protocol group, middleware protocol group, profile.

Unit-III

Medium access control (wireless):

Motivation for a specialized MAC (hidden and exposed terminals, near and far terminals), SDMA, FDMA, TDMA and CDMA.

Unit-IV

Mobile Network layer:

Mobile IP: Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations, and dynamic host configuration protocols (DHCP).

Mobile Transport layer: Traditional TCP, Indirect TCP, Snooping TCP,, Mobile TCP, Fast retransmission/ fast recovery, transmission/ time-out freezing, selective retransmission, transaction oriented TCP.

Wireless Application Protocol WAP: Introduction, protocol architecture and treatment of protocols of all layers.

Unit-V

Introduction & issues in Ad Hoc wireless networks: introduction (cellular vs ad hoc wireless networks and applications), Medium Access Scheme, Routing, Multicasting, transport layer protocols, Pricing Scheme, QoS provisioning, Self-organization, security, addressing and service

discovery, energy management, Scalability, deployment considerations, Issues in designing a routing protocol for ad hoc wireless Networks (Mobility, Bandwidth constraint, Error prone shared broadcast radio channel, Hidden & exposed Terminal Problems, Resource Constraints, characteristics of idle routing protocol), Classification of routing protocols: Table-driven routing protocols (DSDV,WRP), On-demand routing protocols (DSR, AODV, LAR).

Text Books:
1. J.Schiller, Mobile Communications, Pearson Education publication.
2. Murthy and Manoj, Ad Hoc Wireless Networks, Pearson Education publication.

Reference Books:
3. Talukder and Yavagal , Mobile Computing, TMH publication.
4. Pahlavan and Krishnamurthy, Principles of Wireless Networks, PHI publication.
5. Stomenovic and Cacute. " Handbook of Wireless Networks and Mobile Computing", Wiley,2002.

CS- 452 Real Time Systems   Credits 4(3-1-0)

UNIT 1: Introduction:

Definition, Typical Real Time Applications: Digital Control, High Level Controls, Signal Processing etc., Release Times, Deadlines, and Timing Constraints, Hard Real Time Systems and Soft Real Time Systems, Reference Models for Real Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency.

UNIT 2: Real Time Scheduling

Common Approaches to Real Time Scheduling: Clock Driven Approach, Weighted Round Robin Approach, Priority Driven Approach, Dynamic Versus Static Systems, Optimality of Effective-Deadline-First (EDF) and Least-Slack-Time-First (LST) Algorithms, Offline Versus Online Scheduling, Scheduling Aperiodic and Sporadic jobs in Priority Driven and Clock Driven Systems.

UNIT 3: Resources Access Control

Effect of Resource Contention and Resource Access Control (RAC), Non preemptive Critical Sections, Basic Priority-Inheritance and Priority-

Ceiling Protocols, Stack Based Priority-Ceiling Protocol, Use of Priority-Ceiling Protocol in Dynamic Priority Systems, Preemption Ceiling Protocol, Access Control in Multiple-UNIT Resources, Controlling Concurrent Accesses to Data Objects.

UNIT 4:   Multiprocessor System Environment

Multiprocessor and Distributed System Model, Multiprocessor Priority-Ceiling Protocol, Schedulability of Fixed-Priority End-to-End Periodic Tasks, Scheduling Algorithms for End-to-End Periodic Tasks, End-to-End Tasks in Heterogeneous Systems, Predictability and Validation of Dynamic Multiprocessor Systems, Scheduling of Tasks with Temporal Distance Constraints.

UNIT 5:   Real Time Communication

Model of Real Time Communication, Priority-Based Service and Weighted Round-Robin Service Disciplines for Switched Networks, Medium Access Control Protocols for Broadcast Networks, Internet and Resource Reservation Protocols, Real Time Protocols, Communication in Multicomputer System, An Overview of Real Time Operating Systems.

Books:

1) Real Time Systems by Jane W. S. Liu, Pearson Education Publication.

2) Real-Time Systems: Scheduling, Analysis, and Verification by Prof.   Albert M. K.Cheng, John Wiley and Sons Publications.

ELLECTIVE SUBJECTS (from other Department)

HU -402 Engineering Economics

UNIT 1: **Economics Micro and Macro -**
Definition, Importance and Uses, Interdependence between Micro and Macro Economics

UNIT 2 : **Concept in Economics-**
Law of Demand, Law of Diminishing Marginal Utility, Law of Equi-marginal Utility, Elasticity of Demand, Indifference Curve Analysis- Price effect. Income effect and Substitution effect.

UNIT 3 : **Theory of Production -**
Production Function, Laws of Variable Proportions, Laws of Returns to Scale, Cost Function Meaning of Fixed Cost and Variable Cost, Location of Firms, Wabers Theory of Location of the firms.

UNIT 4: **Theory of The Firm-**
Perfect Competition, Monopoly and monopolistic Competition:- Meaning, Assumptions, Equilibrium of the Firm in Short run and Long run period of time.

UNIT 5 : **International Trade :-**
Meaning, Nature and Scope of International Trade, Types and Effects of Tariffs and Quotas, Objective and Functions of international Monetary Fund(I.M.F.)

ME-473 WORK STUDY   Credits:4(3-1-0)

UNIT 1: (10)
Productivity: Factors affecting productivity, causes of low productivity, remedies to increase productivity in brief. Work study and productivity. Work study techniques and their comparison.

UNIT 2: (10)
Work study- definition, purpose & scope, value of work study, human aspectsin work study, basic approach.

UNIT 3: (20)
Method study- definition, purpose and scope, basic approach or procedure, recording techniques, outline process charts, flow process charts, their construction and analysis flow diagrams, string diagram photographic aid, models.

UNIT:4 (10)
Critical examination techniques, primary and secondary questions, development, installation and maintenance of improved methods.

UNIT:5 (10)
Motion Economy Principle- Micro motion study, therbligs, and motion analysis simo charts, motion study.

UNIT:6 (10)
Work Measurement definition, purpose & scope, basic procedure, work measurement techniques, introduction to stop watch time study, work sampling & predetermined motion time standards.

UNIT:7 (10)
Rating its techniques & scope, application of rating normal time, standardtime calculation using rating.

Text Book: Work study by ILO.

EC-403 VLSI Design & Circuits   Credits4(3-1-0)

UNIT 1:
MOS transistor, Depletion MOS Transistor, Enhancement MOS Transistor, basic Inverter device, Sizing, Enhancement load verses load inverters, basic NMOS NOR Logic circuit, basic NMOS NAND logic circuit, multi input NAND & NOR logic circuit.

UNIT 2:
A Basic CMOS Inverter, CMOS Inverter logic levels, Inverter device sizing. CMOS NOR logic gate, CMOS NAND logic gate, Multi-input CMOS logic gate. NMOS pass transistor, CMOS Transmission gate.

UNIT 3:
Ratio logic model, Process characteristics time const, inverter pair delay,

super Buffer NMOS NAND & NOR DELAY, Enhancement v/s depletion load, CMOS logic delay, interconnection Characteristics, capacitive loading, logic fan out delay, distributive drivers, NMOS power dissipation, CMOS power dissipation, Resistive noise coupling, capacitive noise coupling, NMOS noise margin, CMOS noise margin.

UNIT 4:

Structured gate layout, logic gate arrays, Dynamic MOS storage circuit,Simple shift register, other shift register, clock CMOS logic, Evalute logic,Domino CMOS.

UNIT 5:

Semiconductor memory, memory organization, ROMDesign, EPROM,EEPROM, Static RAM, Storage cell, decode and selector circuit, selecttime delay calculation, optimum precharge voltage concept, dynamic RAM cell, sense amplifier, Stick rules & diagrams

References:

1) VLSI Design & circuits by Geige: Publisher Mc. Graw Hill

2) VLSI Design & circuits by Shoji

3) VLSI Design by Puknill.

4) Design technique for Analog and digital circuits by L.Geizer, Philip E.Allen, Noel R.starder.

EC-433 Digital System Design   Credits 4(3-1-0)

UNIT 1:   DIGITAL DESIGN FUNDAMENTALS:
Hardware Aspects Related to ASSERTED and NOT-ASSERTED Conditions, Concepts of gates.
UNIT 2:   MINIMIZATION AND DESIGN OF COMBINATIONAL CIRCUITS:
Introduction, Minimization with Theorems, The Karnaugh Map, Plotting a Karnaugh Map, Labeling a K-Map. Five and Sis Variable Maps, Prime and Essential Implicants, Don't Care Map Entries, Map Reduction Resulting in Product-of-sum Expressions, Using the Map for Simplifying Partially Simplified Expressions, Variable-Entered Mapping, VEM Plotting Theory, VEM Reading theory.

UNIT 3:   SEQUENTIAL MACHINE FUNDAMENTALS :
Introduction, The Need for Sequential Circuits, Basic Architectural Distinctions between Combinational and Sequential Circuits, Concept of Memory, The Binary Cell, Fundamental Differences between sequential Machines, Fundamentals of Sequential Machine Operation, Using Variations of the General Model to Classify Sequential Maachines, The SET/Flop,CLOCK and OSCILLATORS, Types of Traditional Clocked Flip-Flops,The SET/RESET Flip-Flop, The "D" Latch Flip-Flop, The CLOCKED "I" Flip- Flop, The CLOCKED JK" Flip-Flop, The Design of a Clocked Flip-Flop Conversion from one type to another.
UNIT 4:   TRADITIONAL APPROACHES TO SEQUENTIAL ANALYSIS AND DESIGN:
The State Diagram, Analysis of Synchronous Sequential Circuits, A Synchronous Analysis Process, Approaches to the Design of Synchronous Sequential Finite State Machines, Design Steps for Traditional Synchronous Sequential Circuits, State Reduction, Minimizing the Next State Decoder,
UNIT 5:   ASYNCHRONOUS FINITE STATE MACHINES:
Introduction, Why Asynchronous Circuits, Scope, Asynchronous Analysis. Design steps Leading to Next State Decoders, Trying a JK or T Flip-Flop, OutputDecoder Design, Counters, Design of Single-Mode Counters, Multi-Mode Counters, Design of Specialized Multi-Mode Counters, RippleCounters, MUlti-ModeCounters, Design of Specialized Multi-Mode Counters,Ripple Counters, Ring Counters, Applications of Ring Counters, ShiftRegister, Shift Register Sequences, Ring Counters Using Shift Register, Shift Registers and Memory.

References:
1)   An Engg Approach to Digital Design: William I. Fletcher (PHI)
2)   Digital Design: Morris Mano (PHI)

EC-435 Optical Fiber Communications   Credits 4(3-1-0)

UNIT 1:   Introduction:
Historical development, The general system, Advantage of optical fibre communication.
UNIT 2:   Optical fiber waveguides :
Total internal reflection, Acceptance angle, Numerical aperture, Skew rays, modes in planer guides, phase and group velocity. Cylindrical fiber Modes, Mode coupling, Step index fibers, Graded index fibers.
UNIT 3:   Transmission Characteristics of optical fibers:

Attenuation, Intrinsic absorption, Intrinsic & Extrinsic absorption, Linear & non-linear scattering, Rayleigh scattering, Mie scattering, Stimulated Brillouin scattering, stimulated Raman scattering, Fiber bend loss, Mid infrared and far infrared transmission, disporsion.

UNIT 4: **Optical fibers and cables:**
Preparation of optical fibers, Liquid phase (melting) techniques, Vapour phase deposition techniques, Fluoride glass fibers, optical fiber, optical fiber cable, Stability of the fiber transmission characteristics.

UNIT 5: **Optical sources:**
Laser, Basic concepts of laser, Optical emission from semiconductors,Injection laser characteristics, LED characteristics, Modulation.

UNIT 6: **Optical detectors:**
Device types, Optical detection principles, Quantum efficiency, semi conductor photodiode, Midinfrared photo diodes, photo transmitter, photo conductive detectors.

UNIT 7: **Optical fiber systems:**
Basic system, Modulation formats, Demodulation schemes, optical transmitter, optical receiver, optical power budgeting.

UNIT 8: **Optical Fiber Measurements:**
Fiber numerical aperture measurements, Reflection and optical return loss,Field measurement, fiber attenuation measurements.

UNIT 9: **Applications and future developments:**
Military applications, Computer applications, Local area networks, Public Network application, medical applications.

Text Book/Main Book:
Optical fiber communication by John M. Senior Publisher-Prentice Hall
Reference Books:
1) Optical fibres and fibre optic communication systems by Subir Kumar Sarkar Publisher-S.Chand &Company Ltd.
2) Optical fiber communication by Keiser Publisher Mc. Graw hill.
3) Optical communication systems by J. Franz V.K. Jain Publisher- Narosa Publishing house

EC-454 Digital and Non-Linear Control System   Credits 4(3-1-0)

UNIT 1: **Digital Control Systems**
Introduction, comparison with analog control systems, advantages of digital control system, Mathematical treatment of sampling, sampler, Ideal sampler, Laplace transform of sampled function, z transform : Definition, propertis, Final value and initial value theorem, pulse transfer function, State-space modeing of continuous and discrete systems, conversion of state space model to TF, Conversion of TF to state space model : I,II cannonical form- Jordan Cannonical form.

UNIT 2: **Methods of discretization**
Discretization of a continuous system (ZOH equiv, model of a system) : Various approach to design a digital control system, Design directly in Digital form. Design in analog form then convert it into digital form : Impulse Invariant transformation, impulse invariant transformation and artificial hold, Mapping of difference, Bilinear transformation, Binear transformation and freq. prewarping., matched 2- Transformation.

UNIT 3: **Stability**
Stability of digital system: Schur cohen and Jury stability criteria, controlability of discrete systems, transformation of a controllable system to controllable canonical form, Observability of discrete systems, solution to homogeneous and non-homogeneous state eqn. Digital controller design using root locus method.

UNIT 4: **Non-linear control**
Non-linear systems, stability criterion of nonlinear control systems : Lyapunov's and popov's criterion.

UNIT 5: **Microprocessor based control system:**
Introduction, General description of microprocessor based control system Control System. Case study of microprocessor based position control system : Hardware mechanization, Digital measurement of shaft position/ speed, control algorithm.
Case study of microprocesser based temperature control system. Hardware description, Control Algorithms, A realization scheme for the PID Controller.

References:
1) Digital control systems by Kuo, B.C., (2nd edition Orlando Florida : Saunders college publishing-1992.
2) Digital control engineering by M.Gopal.
3) Applied Non-linear control by slotine J.J.E. & W,LI Englewood clififis; New Jersey : Printice Hall-1991

EE-411 NON CONVENTIONAL ENERGY SOURCES Credits4 (3-1-0)

UNIT 1: **Introduction:**
Energy Sources, Renewable Energy Sources, and Prospect of Renewable Energy Sources.

UNIT 2: **Solar Energy:**
Solar Radiation, Solar Radiation Measurement and Conversion of Solar Radiation into Heat, Collection and Solar Energy Storage, Application of Solar Energy.

UNIT 3: **Wind Energy:**
Principle of Wind Energy Conversion System (WEC), Wind Machines, Generating Systems, Energy Storage.

UNIT 4: **BioMass Energy:**
BioMass conversion Technology, Photosynthesis, Biogas plants

UNIT 5: **Geothermal Energy:**
Estimate of Thermal Energy, Sources, Geothermal Plants.

UNIT 6: **Ocean Energy:**
Ocean Thermal Conversion Electric Conversion (OTEC), Methods of Conversion, Heat Exchanger, Energy From Tides, Tidal Plants, Prospects.

UNIT 7: **Chemical energy Sources:**
Fuel cells, Classifications, hydrogenProduction hydrogen energy, utilization of hydrogen gas, hydrogen as afuel for motorcars.

UNIT 8: **Magneto hydrodynamic (MHD):**
Principle MHD system, advantages.

UNIT 9: **Thermoionic generator:**
Principle Basic Thermoionic generator

Books:

1)Non-conventional energy sources by G.D. Rai, Khanna Publisher

EE-413 NEURAL NETWORKS AND FUZZY LOGIC Credits 4(3-1-0)

UNIT 1: **Neural Networks:**
Introduction to neurons, classification of neurons,
Introduction to neural networks, modeling of neural networks based on soft and hard neurons Different network configuration, Feed forward and recurrent network, Training algorithms, learning-supervised & unsupervised, N.N/W application in control, identification, pattern recognition system Modeling and state estimation, decision based on training of neurons.

UNIT 2: **Fuzzy Logic:**
Fuzzy logic concepts, Fuzzy sets, Fuzzy relations and membership functions, fuzzy network, defuzzification, Fuzzy controllers.

UNIT 3: **Genetic Algorithm:**
Introduction, Gene, Mutation, Genetic algorithm concepts, Application of genetic algorithm in solving the nonlinear equations, Schemata, coding, reproduction, cross-over, mutation, scaling and fitness, Mechanics, Types of Traction Service, Speed time Curve, Simplified Speed time Curve, Tractive effort with and without friction & resistance of Track, Power of Traction motor, Mechanics of train movement, Coefficient of adhesion, Factor affecting slip, Power supply arrangement, High voltage supply, Constituents of Supply System, Function of DC Traction ubstation, and it's major equipment's, Block diagram of AC Electric Locomotive, Breaking in Traction System.

Books:

1) Art and Science of Utilization of Electrical Energy by H.Pattab Pb. Dhanpat Rai & Co.
2) Utilization of Electrical Energy by O.E.Taylor A.H.Wheeler Pub.
3) Electric Traction by A.T.Dover A.H.Wheeler Pub.

EE-415 UTILIZATION OF ELECTRICAL ENERGY AND TRACTION Credits 4(3-1-0)

UNIT 1: **Electrical Illumination:**
Introduction, Nature of light, Definitions,
Principle of production of light, Discharge through gases, incandescence: sources of light-Filament, Hydrogen lamp, Cold lamp, Discharge lamp, sodium lamp, Mercury lamp, Dual lamp, Fluorescent lamp, Arc lamp; Inverse square law, Cosine law, lamp fittings, light fittings, lighting systems, Outdoor lighting systems, Flood lighting,

Design of lighting system..

UNIT 2: Electric Heating:
Advantages, Resistance Heating-Direct and Indirect,
Types of furnaces and their relative comparison, Electric Arc furnace-
Direct and Indirect and comparison, High frequency heating, Induction
Heating-Ajax Wyatt, Tama Furnaces, Core-less furnace, Skin
effect and it's application, Dielectric heating.

UNIT 3: Electric Welding:
Classification, Arc Welding, Electrodes, Electric Supply;
Projection, Seam, butt, Percussion Welding, Electron beam, Ultra-
sonic and Laser Weldings.

UNIT 4: Traction:
Types and relative comparison, Choice of Traction System,
Battery Drive, Hybrid Drive, Flywheel Drive, Tram Way Trolley Bus,
Electric Traction-Development in India, Types of Track electrification and their
relative study, Comparison of AC system to DC system,
TractionMechanics, Types of Traction Service, Speed time Curve,
Simplified Speed time Curve, Tractive effort with and without friction &
resistance of Track, Power of Traction motor, Mechanics of train
movement, Coefficient of adhesion, Factor affecting slip, Power
supply arrangement, High voltage supply, Constituents of Supply
System, Function of DC Traction Substation, and it's major
equipment's, Block diagram of AC Electric Locomotive, Breaking in
Traction System.

Books:
1) Art and Science of Utilization of Electrical Energy by H.Pattab Pb.
Dhanpat Rai & Co.
2) Utilization of Electrical Energy by O.E.Taylor A.H.Wheeler Pub.
3) Electric Traction by A.T.Dover A.H.Wheeler Pub.

EI-435 Antenna Engineering   Credits 4(3-1-0)

UNIT 1: Elements of Antenna Theory :
Antenna action, antenna parameters, gain, power gain, directive gain,
antenna resistance and its efficiency, radiation from a short dipole, half
wave dipole, short monopole, Hertizen dipole, pointing vector & power flow,
power & field pattern, antenna aperture.

UNIT 2: Types of antennas :
Folded dipole, loop & bicanonical antenna, rhombic antenna, turnstile an-
tenna, helical antenna, log periodic antenna & parabolic reflectors.

UNIT 3: Antenna arrays :
Two element array (broad side & end fire array), linear arrays multiplication
of patterns, bionomial array, chebyshev array & (Yagi-Uda array).

UNIT 4: Antenna measurements
Effective area, total resistance of ariel, effective height & radiation resistance.

Books:
1) Antenna & Wave propagation K D Prasad
2) Antennas J D Kraus
3) Electromagnetic Waves & radiating system Edward C. Jordan, Keith G.
Balmain

EI-452 PCB Design & Technology   Credits4(3-1-0)

PART 1: Design of Printed Circuit Boards
UNIT 1: Introduction:
Types of PCB: Single side and double side, General considerations
Layout scale, Grid system, Board types, Standards.

UNIT 2: Layout approaches:
Materials & Aids: simple approach with sketching of compo-
nents, Layout sketching with Puppets, Procedures, etc.

UNIT 3 : Layout General rules and parameters:
Resistancae in general, Resistance & temp, Capacitance: capacitance
between conductors on opposite sides of the PCB, Inductance of PCB
conductors.

UNIT 4: Design Rules for analog circuits PCB:
Placing of heat producing and heat sensitive components: Signal
conductors high freq. amplifiers/oscillators,multistage amplifiers
especially with high power output stage, High gain
DC amplifiers (Thermal effects).

UNIT 5: Design Rules for Digital Circuit PCB's:
Main problem:Reflection, cross talk, ground and supply line noise,
Electromagnetic interference from pulse type E.M.Field.

**UNIT 6: Design Rules for PCB's in High Frequency and Fast Pulse type
Applications:**
Matching of conductors, effect of mismatch in the different cases: Effect
of Mismatch in the Fast-Pulse case, in High freq. case.

UNIT 7: Computer Aided Design of PCB's:
Input data, component Placement, conductor Routing, checking,
scope, etc.

PART 2: **Technology of Printed Circuit Board**
UNIT 8: **Film Master Production:**
Introduction, Emulsion Parameter, Film Emulsion, Increasing
And Decreasing Line Width,
UNIT 9: **Photo printing:**
Basic properties for double-sides PCB's(Print-and-each process,
Pannel plating process, Pattern plating process, Tenting process)
Photoresist, in General (desirable feature
of Photoesist), Wet-film Resist, Dry film resist,
UNIT 10: **Screen printing:**
scope of screen-printing, Screen fibers, Patterns transfer onto the
screen, (Direct method, Indirect method)
UNIT 11: **Plating:**
Introduction, Immersion plating, Tin immersion plating, Electro less
plating, Electro plating
UNIT 12: **Etching:**
Introduction, Under etching, Overhang, Etchant system, (Ferric
chloride,Cupric chloride and chromic Acid)
UNIT 13: **Fabrication process of P.C.B.'s:**
Single side, double side PTH and multilayer PCB's Soldering
UNIT 14: **Solders & soldering techniques:**
Iron soldering, Mass soldering, Flux removal After soldering, PCB
cleaning after soldering.

Reference:
1)PCB design and technology by Walter C Boschart Tata McGraw-
Hill publishing company Ltd., New Delhi.

EI-458 Digital Image Processing   Credits 4(3-1-0)

UNIT 1:

Introduction to Digital Image Processing- Image enhancement, Image rep-
resentation and modelling, Image Reconstruction, Z-transform and fourier
transform, Optical and modulation transfer function, Matrix theory.

UNIT 2:

Image sampling and quantization, Two dimensional theory Reconstruc-
tion, Nyquist rate, Aliasing, foldrer Ineq., Hexagonal sampling, Optimum
Sampling, compounder designing, visual quantization.

UNIT 3:

Image transforms: orthogonal and UNITary transforms, transform freq.,
optimum transform, properties of UNITary transforms, DFT, Dimensional and
2 Dimensional, Cosine transform, fine transform Hadamard. Harr, Slant,
KL transforms and properties.

UNIT 4:

Image enhancement: point operation, Histogram modelling, spatial opera-
tion, Multispectral image enhancement, false color and pseudocolor, color
image enhancement,
Image filtering: Inverse and wiever filtering, FIR filters, filtering using image
transforms, casual models and recursive filtering.

UNIT 5:

Image Reconstruction: Tomographies, Radon transform, Back projection
operator, Projection theorem, Image data compression: Pinel coding, pre-
dictive techniques, Transform calling theory, Hybrid coding and vector
DPCM, Interframe coding.

Reference books:
Fundamentals 0f DIP By Anil K. Jain. PHI India Ltd.

Open Elective SYLLABUS

HU-449 PRINCIPLE OF MANAGEMENT   Credits 4(3-1-0)

UNIT 1:
Management as a discipline : Definition, nature, scope, functions, managerial Skills, Management . Thought - Historical Prospective, Social Responsibility, of Business.

UNIT 2:
Planning : Concept and purpose, planning process, Management, By Objectives(MBO), Decision making.

UNIT 3:
Organization: Concept and purpose of organisation, types of organisation, bases of Departmentation, concept of Authority and Responsibility, Span of Management, Line and Staff Authority, Functional Authority, Delegation of Authority, Centralization and Decentralization of Authority, Coordination Staffing.

UNIT 4:
Directing: Leadership Concept, Ingredients, Traits, Styles, Roles Communication Concept. Types, Process Barriers, Making Communication effective, Importance.

UNIT 5:
Controlling: Concept, Provides, Requirements, for adequate control, controlling and earning, Budgeting control Importance, Management Audit, Management in future.

HU-407 Foregin Trade   Credits 4(3-1-0)

UNIT 1:
Nature of foreign Trade-Meaning,Nature, Scope and Distinct Features of International Tansactions.

UNIT 2:
Theories of International Trade-The Classical Theory:- Absolute Advantage Model of Adam Smith,Comparative Advantage Model of David Ricardo, The Neo-Classical Analysis:- International Trade Equilibrium under Constant Cost, Increasing Cost and Decreasing cost Conditions.

UNIT 3:
Tariffs and Quota-Types and Effect of Tariffs and Quotas, Quota vs. Tariff.

UNIT 4:
International Monetary Fund [I.M.F]-Nature,Objectives and Functions of I.MF., International Monetary System Since the demise of Bretton Woods System.

UNIT 5:
International financial Institutions-world Bank (IBRD), International Financial Corporation (I.F.C.) Internationl Developement Association(I.D.A.)

UNIT 6:
India's Trade Policy Trends of Exports and Imoports of India since independence, Composition of India's Foreign Trade.

HU-409 Quantitative Methods in Economics   Credits 4(3-1-0)

UNIT 1: Statistics:
Definition, Importance, Scope and Limitations of statistics, Primary and Secondary data. Classification of data Meaning Objectives and Types of Classification. Frequency Distribution- Discrete, Grouped and Continuous frequency distributions. Fundamentals of frequency distribution.

UNIT 2: Measures of Central Tendencies:
Arithmetic Mean, Median, Mode, Geometric Mean and Harmonic Mean, De-merits and Uses of all Methods.

UNIT 3: Measures of Dispersion:
Mean Deviation Method about Mean, Median and Mode, Merits and Demerits of Mean Deviation. Coefficient of M.D. Standard Deviation(S.D.) Method with Simple Short-cut and Step Deviation Methods. Merits and Demerits of S.D. Coefficient of S.D.

UNIT 4: Correlation-Introduction:
Types of Correlation, Karl Pearson's Coefficient of Correlation. Interpretation of 'r'. Probable Error. Uses of Probable Error.

UNIT 5: Linear Regression Analysis-
Introduction. Two method of Linear Regression Analysis:- (1) Line of Regression of Y on X and (2) Line of Regression and X on Y. Why two lines of Regression" Coefficient of Regression. Relation between the Coefficient of Correlation and Regression.

UNIT 6: Index Number-
Definition. Uses and Types of Index Numbers, Methods of Construction index Numbers-(1) Simple Aggregate Method(2) Weighted Aggregate Method (3) Fisher's Ideal Index Numbers (4) Const of living Index Numbers (5) Chain Base and Fixed Base Index Numbers. Base Shifting. Limitations of Index Numbers.

PH 419 Futuristic Materials   Credits 4(3-1-0)

UNIT 1:   Semiconductors :
Introduction of semiconductors. intrinsic and extrinsic, II-VI and III-V semiconductors and its alloys, Advantages and necessity of the tailoring of semiconductor, Semiconductors and it alloys used of LED and other devices, Utility of semiconducting alloys like GaAIAs, GaAIN, GaAIP etc.

UNIT 2:   Superconductors:
Fundamenal Phenomena associated with sumerconductors. Type I & II superconductors, Meissner Ochenfeld effects, Josephon effects, fundamental of BCS theory. Novel High Temperature Superconductors. Hole superconductors, TIBa CaCuO single and bilayer. Electron superconductors NdCuO etc. Doping effects in superconductors, Organic superconductors, fullerenesl. Application of the superconductors in science, medical and commercial sectors.

UNIT 3:   Material for Magnetic media:
Material useful for magnetic recording head, magnetic disk, magnetic tape media, Magneto optic recording materials. Holography, data storage materials.

UNIT 4:   Holography:
Fundamentals of holography, Difference between conventional photography and holography. Techniques to make a hologram. Advantages of holography over other techniques.

UNIT 5:   Introduction of following with applications :
Fibre optics, Lasers,Ceramics, Dielectric Chactrization of Materials

Books:
1) Superconductivity Today: T.V. Ramakrishnan & C.N.R. Rao Wiley astern Pvt. Ltd, New Delhi, 1992
2) Solid State Physics: Ashcrost/Mervin

PH-429 Material Imperfection and Applications Credits 4(3-1-0)

UNIT 1:   Structure of Crystalline Solids:
Fundamental concepts, UNIT cell, crystallographic directions and planes, crystal systems, metallic crystal structures.

UNIT 2:   Imperfections in Solids:
Introduction, Point defects: Vacancies and self- intestitials colour centres, inpurities is solids, Linear defects dislocations, Interfocial efects, Bulk or volume defects

UNIT 3:   Diffusion in Solids :
Diffusion, diffusion mechanisms: vacancy diffusion, intertitial diffusion, steady state diffusion : Fick's first law, non-steady state diffusion:Fick's second law, Factors that influence diffusion, Applications.

UNIT 4:   Amorphous Materials:
Definition, types, structure, methods of preparation of Amorphous materials, Applications: optical fibres, amorphous semiconductor, optical memories, solar cells

UNIT 5:   Plastic deformation and Strengthening Mechanisms:
Plastic deformation, the tensile stress- strain curve, modes of plastic deformation- slip and twinning, the shear strength of perfect and real crystals, the stress to move a dislocation, mechanisms of strengthening in metals -by grain size reduction, solid solution stregthening, strain hardening.

UNIT 6:   Lasers:
Principle, population inversion, Einstein's A and B coefficients, types: Ruby laser, He-Ne laser, semi conductor lasers.

Books:

Non Crystalline materials:	by Davis & Mott
Amorphous Solids	by S.R. Elliot
Solid State Physics	by M.A.Wahab

CY-401 Polymeric materials and their applications   Credits 4(3-1-0)

UNIT 1:   Basic Polymer Chemistry :
Definition, classification, Types of polymerization

UNIT 2:   Resins and plastics:
Thermoplastic and thermosetting resins, constituents of plastics, fabrication of plastic materials, Important resins, Cellulose derivatives, Polyethylene, Teflon, Polystyrene, Polyvinylacetate, PVC,

Nylons, Phenolic resins, Phenol-Formaldehyde, Urea and Malamine - Formaldehyde resins, Epoxy resins, Polyester, Silicones, Ion exchange resins.

UNIT 3: Rubbers/Elastomers :
Natural rubber, compounding of rubber, Properties, uses, reclaimed rubber, Synthetic rubber, Buna- S, Nitrile rubbers, Butylrubbers, Neoprene rubber, Thiokols, silicone rubbers, fibre reinforced plastics (FRP)

UNIT 4: Biopolymers:
Importance and applications of few important biopolymers eg. proteins, carbohydrates etc.

MA- 491 Mathematics (Operation Research)   Credits 4(3-1-0)

UNIT 1: Introduction:
Definition of O.R. and it's scope, modelling in O.R. General methods for solving O.R. models. The Montocarlo technique, main characterstic of O.R. main phases of O.R. Linear programming problems. Graphical method for solve L.P.P., Two phase Method, Big-M Method, problems of tie.

UNIT 2: Assignment Model :
Mathematical formulation of assignment model, Reduction theorem, problems of maximisation & minimisation. Hungarian process, travelling salesman problems.

UNIT 3: Transportation Model :
Mathematical formulation of transportation problem. Definition of BFS, IBFS, Optimum solution. Algorthim of N-W rule, Least-cost & VAM and their problem

UNIT 4: Sequencing :
Introduction, principle assumtions processing of jobs through two, three & m machine's.

UNIT 5: Game Theory :
Characteristic of Games. Basic definitions, minimax criterion and optimal strategy. Equavalence of rectangular Games, Dominance process, Arithmatic method for solving zero-sum-two person Games. Graphical and simplex methods for solving the games.

UNIT 6: Replacement :
Failure mechanism of items, replacement of item that detoriate.

Replacement of item that fail completely.

UNIT 7: Inventory :
Elementry Inventory Models, Inventory models with price breaks.

EI-452 P.C. Interfacing   Credits: 4(3-1-0)

UNIT 1:
Introduction of personal computer (PC). Hardware Organization of a PC. Memory organization of a PC, Memory devices ROM, SRAM, DRAM, SIMM, with timing diagram.

UNIT 2:
Personal computer I/O map; Basic I/o interfaces 8-bit to 32 bit wide I/o ports. DISK memory system: Floppy disk, Hard disk, Optical disk memory.

UNIT 3:
VIDEO display : TTL RGB monitor, analog RGB monitor, Generation of VGA video signal.

UNIT 4:
Bus Interface: ISA Bus, EISA bus & PCI Bus and Add OM cards like 32 bit parallel port interface, A to D and D to A & 32 bit events and general purpose counter. The serial I/o ports. The Parallel printer port LPT ports.

Reference:
1)   The intel microprocessors, architecture, Programming and interfacing by Barry B.Brey.
2)   Microprocessors and interfacing programming and Hardware by Douglas V.Hall.
3)   Hardware and software of personal ocmputers by Sanjay K Bose.

EI-456 Air-craft Instrumentation   Credits 4(3-1-0)

UNIT 1: Requirement and standards:
Location, visibility and grouping of Instruments, Instruments to be installed. Flight and navigational instruments. Power plant instruments.

UNIT 2: Instrument Panels, Displays and Layouts:
Director displays, Head up displays.

UNIT 3: Pitot static systems:
Probes Pressure (Position) error, measurement to altitude. Aneroid barometer. Air speed indicator vertical speed indicator.

UNIT 4: Primary Flight Instruments (Attitude indication):
The gyroscope and its properties. References established by gyroscopes.

Gyro horizon.

UNIT 5:   Heading Indicating Instruments:

        The directional gyroscope.

UNIT 6:   Measurement of fuel quantity and fuel flow:

    UNIT 7:   Integrated instruments and flight director systems.

    UNIT 8:   Flight data recording.

    TEXT BOOK:

        Air Craft Instruments by E.H.J. Pallet

  References Books:

      1)   Measurement Systems Application and Design.By:Ernest O Doebelin Publisher-McGraw Hill

      2)   Air Craft InstrumentsBy C.A. Williams

      3)   Air Craft Instrument Control Systems by C.A. Williams.

      4)   Air Craft Electronics and Electricity by Kroes, Bent.