BE (Information Technology)

BE (IT) - I SEMESTER

THORY			SESSIONAL		
CODE	TITLE	UNIT	CODE	TITLE	UNIT
HU 1101	Technical English	1.0	ME 1102	Engineering Graphics	1.0
PH 1101	Physics- I	1.0	CP 1202	Unix & C Programming	1.0
CH 1201	Engineering Chemistry	1.0	PH 1102/	Physics Lab./	
MA 1101	Mathematics- I	1.0	CH 1202	Chemistry Lab.	0.5
ME 1101	Engineering Mechanics	1.0	PE 1102	Work Shop Practice- I	0.5
			GA 1002	NCC/ NSS/ PT & Games/ Creative Arts	0.5

BE (IT) - II SEMESTER

MA 2101	Mathematics- II	1.0	ME 2102	Computer Aided Drafting	1.0
EE 2101	Basic Electrical Engineering	1.0	CH 1202/	Chemistry Lab./	
CP 2101	Data Structure in C++	1.0	PH 1102	Physics Lab.	0.5
CH 2103	Environmental Science	1.0	ME 2104/	Engineering Mechanics Lab./	
PH 2103	Physics- II	1.0	EE 3102	Basic Electrical Engineering Lab.	0.5
			CP 2102	Data Structure Lab.	0.5
			PE 2102	Workshop Practice- II	0.5
			GA 2002	NCC/ NSS/ PT & Games/ Creative Arts	0.5

BE (IT) - III SEMESTER

EC 3101	Basic Electronics	1.0	EC 3102	Basic Electronics Lab.	0.5
MA 3101	Mathematics III	1.0	EE 3102/	Basic Electrical Engineering Lab./	
EE 3101	Introduction to System Theory	1.0	ME 2104	Engineering Mechanics Lab.	0.5
CP 3101	Java Programming & Web Technology	1.0	CP 3102	Java Programming Lab.	0.5
CP 3103	Digital Logic Design	1.0	CP 3104	Digital Logic Design Lab.	0.5
ME 3207	Principle of Mechanical Engineering	1.0	GA 3002	NCC/ NSS/ PT & Games/ Creative Arts	0.5

BE (IT) - IV SEMESTER

IT 4001	Discrete Mathematics and Graph Theory	1.0	CP 4104	Scientific Computing Lab.	0.5
			CP 4106	Database Management System Lab.	0.5
CP 4103	Scientific Computing	1.0	CP 4108	Operating Systems Lab.	0.5
CP 4105	Database Management Systems	1.0	EC 4106	Integrated Circuits Lab.	0.5
CP 4107	Operating Systems	1.0			
CP 4109	Computer System Architecture	1.0			
EC 4105	Discrete and Integrated Analog Circuits	1.0			

BE (IT) - V SEMESTER

IT5101	Introduction to Analog Communication Theory	1.0	IT5102	Communication Lab. - I	0.5
			CP5106	Soft Computing Lab.	0.5
IT5103	Theory of Computations	1.0	EC5102	Microprocessor Application Lab.	0.5
CP5103	Fundamentals of Data Communications	1.0	EE5108	Digital Signal Processing Lab.	0.5
CP5105	Soft Computing	1.0			
EC5101	Microprocessor and Interfacing	1.0			
EE5107	Digital Signal Processing	1.0			

BE (IT) - VI SEMESTER

IT 6101	Introduction to Digital Communication Theory	1.0	IT 6102	Communication System Lab.- II	0.5
IT 6103	Computer Networks & Security	1.0	IT 6104	Multimedia Lab.	0.5
IT 6105	Principles of Multimedia	1.0	CP 6108	Computer Networking Lab.	0.5
IT 6107	Information & Coding Theory	1.0	CP 6110	Software Engineering Lab.	0.5
CP 6101	Design & Analysis of Computer Algorithms	1.0			
CP 6109	Software Engineering	1.0			

BE (IT) - VII SEMESTER

IT 7101	Modern Telecommunication Systems	1.0	IT 7104	Wireless Networking Lab.	0.5
IT 7103	Wireless Communications & Networks	1.0	IT 7106	Parallel & Distributed Computing Lab.	0.5
IT 7105	Parallel & Distributed Computing	1.0	CP 7104	Computer Graphics Lab.	0.5
CP 7103	Computer Graphics	1.0	IT 7112	Project	0.5
	Elective – I	1.0			
	Elective – II	1.0			

List of Electives

IT 7111	Software Reliability & Testing
IT 7113	Distributed Database Systems
IT 7115	Business Data Communications
IT 7117	E-Commerce
CP 7107	Digital Image Processing
CP 7115	Neural Networks & Applications
CP 7117	Optimization Techniques
CP 7123	Bio-informatics
CP 7125	Object Oriented Analysis and Design
CP 6103	System Programming
CP 6105	Compiler Design

BE (IT) - VIII SEMESTER

IT 8101	Data Mining & Warehousing	1.0	CP 8104	Simulation & Modeling Lab.	0.5
CP 8101	Artificial Intelligence & Expert Systems	1.0	CP 8110	Artificial Intelligence Lab.	0.5
CP 8103	Simulation & Modeling	1.0	IT 8112	Project	1.0
MB 6001	Principle of Management	1.0			
	Elective – III	1.0			
	Elective – IV	1.0			

List of Electives

IT 8111	Enterprise Resource Planning
IT 8113	Information System Project Management
IT 8115	Decision Support Systems & Intelligent Systems
CP 8105	Distributed Systems
CP 8115	Embedded System Design
CP 8119	Advance Computer Graphics
CP 8121	Pattern Recognition
CP 8123	Real Time Systems
CP 8127	Computing & Complexity Theory

FIRST SEMESTER

HU 1101	TECHNICAL ENGLISH	1.0

MODULE – I
Single word substitution, Idioms and phrases, Pairs of words, Common errors, Précis, Comprehension, Expansion.

MODULE – II
Official Correspondence - Memorandum, Notice, Agenda, Minutes, Circular letter, applying for a job, Resume, Demo-official letter.

MODULE – III
Business Correspondence-Types, sales letters; Social Correspondence- Invitation to speak, Congratulations; etc.

MODULE – IV
Report writing; general and technical report, Definition, Types, structure.

MODULE – V
Technical proposals, Definitions, types and format.

MODULE – VI
Research papers and articles.

MODULE – VII
Mechanics of manuscript preparation.

BOOKS FOR REFERENCE:

1. Blickle, Margaret D., and K.W.Houp.
2. Reports for Science and Industry, Henry Holt & Co. N.Y.
3. Duddy, E.A. & M.J. Freeman Written Communication in Business, Amercian book Co. N.Y.
4. Berry, Thomas Elliot, The most Common Mistakes in English Usage; Tata McGraw Hill.
5. Stevensin, B.W., J.R. Spicer and E.C. Ames, English in Business and Engineering. Prentice Hall, Eaglewood
6. Cliffs, N.J.
7. Raul, Asha, Effective Business Communication, Prentice Hall of India.
8. Singh B. Business Correspondence including Bank letters.
9. Singh B. Theory and Practice of Business Correspondence, HPJ Kapoor Publications.
10. Report Writing and Business Correspondence Mohan and Sharma, Tata McGraw Hill Publications, India.
11. Best, W.D. The Students companion, Rupa & Co. Publications.

PH 1101	PHYSICS- I	1.0

MODULE – I

Waves and Oscillations: (SS* : Wave motion: longitudinal and transverse waves, plane waves, phase velocity). Wave packets and group velocity, wave equation, superposition of waves (RHK-Ch-18), equation of motion of simple harmonic oscillator and solutions, damped harmonic motion and forced oscillations(RHK 17.2-17.4,17.7,17.8)

[6]

MODULE – II

Fields: Vector and scalar fields, physical and mathematical concepts of gradient, divergence and curl (Cartesian coordinates only), Gauss's theorem and Stokes' theorem (Statements only, SAD-Ch.3).

[5]

MODULE – III

Electromagnetic Theory: Gauss's law in integral and differential form, electric potential and relation with E(SAD 4.5-4.8),(SS*- capacitance(SAD-6.5) and electrostatic energy density (SAD 4.10)), dielectrics, three electric vectors, dielectric susceptibility boundary conditions on E and D(SAD 5.5-5.7, 5.9).

[5]

Amperes law in integral and differential form, applications.(SAD 7.1-7.4), Hall effect (RHK-32.4), three magnetic vectors (SAD 7.5), magnetic permeability and susceptibility, boundary conditions on B and H (SAD 8.5-8.7).

[5]

Faraday's law in integral and differential form(SAD 9.2-9.3), (SS - Inductance, magnetic energy density (SAD 8.8, 8.9)), continuity equation for charge (SAD 5.8), displacement current (SAD 9.4), Maxwell's equations in free space (SAD 9.5), electromagnetic wave equation for plane waves in dielectric medium and free space, relation between $\vec{E}$, $\vec{B}$ and $\vec{k}$, Poyinting vector (SAD 10.3-10.7).

[5]

MODULE – IV

Plasma Physics: Plasma state, types of plasma, applications of plasma(FFC-Ch-1,2)

[4]

MODULE – V

Physical Optics:

Interference: Two-Beam Interference(AG 12.1-12.6), interference in thin films and wedge-shaped layers(AG 13.8-13.9), reflection and anti-reflection coatings(AG 13.2-13.4), applications of interferometry: Newton's rings(AG 13.10), Michelson' Interferometer (AG 13.11)

[5]

Diffraction: Fraunhofer diffraction by single slit(AG 16.1-16.3) , double slit and grating (AG 16.6-16.8), limit of resolution, Rayleigh criterion(AG 16.5), Fresnel diffraction(Qualitative, AG 17.1-17.3)

[5]

Polarization : (SS- Polarization of light, Malus's law, polarization by reflection, Brewster's law, Double refraction) Analysis of linearly and circularly polarized light(RHK 44.1-44.5), Fresnel's equations and their applications (AG 21.1-21.2)

[5]

Text Books:

1. Mathew N.O. Sadiku (SAD), Elements of Electromagnetics, Oxford University Press
2. (2001)
3. A.Ghatak(AG), Optics, 3rd Edition, Tata Mcgraw Hill, 2005
4. Resnick, Halliday and Krane(RHK), Physics- Part-I & II, 5th Edition, John Wiley (
5. 2002)
6. F.F.Chen(FFC), Introduction to Plasma Physics, 2nd Edition, Plenum Press, 1994

References:

1. W.H.Hayt and J.A.Buck, Engineering Electromagnetics, Tata McGraw Hill (2006)
2. M.R.Srinivasan, Physics for Engineers, New Age International, 1996
3. S.N.Sen, Introduction to Plasma Physics, Pragati Prakasan, Meerut -1, India

MODULE – I

Chemical Bonding: Trends in periodic properties (ionization energy, electron affinity, electro negativity), VBT, VSEPR theory, MOT for diatomic molecules and polyatomic molecules, coordination complexes & ligands, CFT, colour and magnetism of coordination complexes, spectrochemical series

MODULE –II

Kinetics and catalysis: kinetics of chain reactions, parallel reactions, side reactions, fast reactions in solutions, flash photolysis, kinetics of catalytic action (acid base catalysis, biological catalysis), application of catalyst in industrially important processes (Haber's processes, Ostwald process, Bergius process)

MODULE – III

Thermo-chemistry and Fuels: Hess's law, entropy, enthalpy and combustion calculations, characterization and application of fossil fuels, solid fuel (carbonization & gassification), liquid fuels (refining, reforming, petrol & diesel, knocking characteristics, octane and cetane number) and gaseous fuels (water gas, producer gas, coal gas and biogas), lubricants and its properties

MODULE –IV

Electrochemistry and corrosion sciences: Redox process cell, potential and free energy, galvanic cells, electrolysis and Nernst's equation, Fuel cells, and its applications, chemical and electrochemical corrosion, general methods of corrosion prevention (with brief introduction to chemistry of paints, varnishes and enamel)

MODULE –V

Fundamentals of spectroscopic techniques: Basic principles of vibrational, rotational and Mossbauer spectroscopy

MODULE – VI & VII

Macromolecules: Classification, Addition and Condensation polymers, molecular weight of polymers (M_n, M_w, M_v), glass transition temperature (T_g), structure property relationship in polymers (chemical, electrical, optical and mechanical), examples and use of inorganic polymers, synthesis of some commercially important polymers and their use (Nylon 6, Nylon 6, 6, PE, PET, PS)

MODULE – VI & VII

An introduction to computational chemistry

Text Book:

1. Applied chemistry A text book for engineers and technologists, H. D. Gesser, Plenum publishers.
2. Inorganic chemistry: J. D. Lee.
3. Engineering chemistry: Sashi Chawla

Reference:

1. Fundamentals of molecular spectroscopy: C. N. Banwell, TMH publication
2. Computational chemistry: E. Lewars, Kluwer publication
3. Physical chemistry: P. W. Atkins

Analytical Trigonometry:

De-Moivre's Theorem and its applications. Expansion of Sinx and Cosx in powers of x. Complex arguments. Separation into real and imaginary parts Gregory's Result. Expansions. Summation of trigonometric Series. Hyperbolic functions.

(8L)

Differential Calculus:

Successive Differentiation. Leibnitz's Theorem. Rolle's Theorem. Lagrange's and Cauchy's Mean value Theorem. Generatalised Mean value Theorem. Taylor's and Maclaurin's infinite series. Cartesion and polar subtangenent and Subnormal. Pedal equations. Orthogonal intersection of curves. Curvature and radius of Curvature in case of Cartesian parametric, polar, pedal and trangential polar forms. Centre of curvature and evolute. Indeterminate forms L Hospital's Rule. Concavity, convexity and points of inflexion. Asymptotes (cartesian Co-ordinates only).

Functions of two variables. Partial derivatives. Euler's Theorem on Homogeneous functions. Its generalisation and extension. Total differential and derivatives. Errors and Approximations. Taylor's series in case of two variables. Maxima and Minima of two variables. Lagrange's method of Undertermined multipliers in case of two and three variables. Jacobians. Envelope of curves. Tangent planes and Normal lines.

(22L)

Integral Calculus:

Reduction Formula. Beta and gamma functions. Area, length, volume and surface area without the use of multiple integrals.

(9L)

Infinite series:

Convergency and Divergency of infinite series. Tests for Convergence. Comparison Test, p series test, Cauchy's root test. D' Alembert's ratio test, Razabe's Test, Gauss's Test, Logarithmic and Higher logarithmic ratio test (No proof). Leibnitz's Rule for alternating series test.

(6L)

Books Recommended:

1. Higher Trigonometry. Das and Mukherjee (U.N. Dhur & Co.)
2. Differential Calculus. Pran Nath and Agarwal. Tara Publications, Varanasi
3. Integral Calculus. Das and Mukherjee (U.N. Dhur & Co.)
4. Engineering Mathematics. H.K. Dass
5. Higher Engineering Mathematics B.S. Grewal (Khanna Publishers)

Equivalent Force System and Equilibrium: Principles of statics, laws of mechanics, freebody diagram, coplanar, non-coplanar and spatial force system and conditions of equilibrium, vector representation and analysis of forces and moments, Varignon's theorem.

Structural Mechanics: Analysis of simple plane truss by method of sections and methods of joints, analysis of frames and parabolic cables, cantilever and simply supported beams with concentrated, distributed and moment loads, shear force and bending moment diagrams, concept of stress and strain.

Interfacial Friction: Friction and impending motion, static, kinetic and rolling friction, application to inclined planes, wedges, screws jacks and belts.

Kinematics and Kinetics of Particle and Rigid Bodies: Conceptual framework and vector representation of displacement, velocity, acceleration, linear and angular momentum, rectilinear and curvilinear motion in two dimensions, centroidal and non-centroidal rotation, general plane motion, Newton's laws of motion, D'Alembert's principle, equilibrium of dynamic forces.

Work and Energy: Translation and rotation of rigid body about a fixed axis, conservation of energy, energy and work equations in translation and rotational motion, virtual work.

Impulse and Momentum: Impulse force and momentum, conservation of momentum, coefficient of restitution, momentum equation. Vibrating Systems: Inertia, features of a vibrating system, free vibration, systems with single degree of freedom.

Books Recommended:

1. Kumar, Engineering Mechanics
2. Shames, Engineering Mechanics

SECOND SEMESTER

MA 2101	MATHEMATICS- II	1.0

Integral Calculus:
Operations under the sign of integration, Multiple integrals, change of order of integration, Transformation of Co-ordinates, Area, Volume and Surface area of solids using multiple integrals.

(8L)

Ordinary Differential Equations:
Linear differential equations: Bernoulli's from Exact equations, Nonlinear equations, Clairaut's form, Higher order equations with constant coefficients. Cauchy's and Legendre's differential equations. Solution of higher order equation by the change of independent variable, Method of variation of Parameters in Simple cases,
Applications to Engieering problems.
Series solution of Differential equations by the method of Frobenius.(Roots differing by non integer and equal roots).

(14L)

Algebra of Matrices:
Rank of a matrix. Consistency and inconsistency of a system of linear equations. Eigen values and eigen vectors. Cayley Hamiliton Theorem.

(3L)

Vector spaces:
Definition, examples and some simple properties. Subspaces, linear combination, linear dependence and independence, Basis and dimension. Norm of a vector, Inner Product. Cauchy-schwartz inequality, orthogonal sets. Gram-schmidt process of construction of orthogonal sets. Parallelogram law and Pythagorian theorem.

(8L)

Vector Calculus and Tensor Analysis:
Differentiation of vectors, Radial and transverse, tangential and normal acceleration of a particle moving on a plane curve. Directional derivatives, Gradient, Divergence and Curl. Expansion Identities. Vector integration. Conservative system of forces. Solenoidal and Irrotational vectors. Theorems of Green, Stoke and Gauss and their applications,
Tensors, transformation of Co-ordinates, contravariant and covariant vectors and Tensors. Rank of a tensor. Addition and multiplication of tensors. Mixed tensors Contraction.

(10L)

Books Recommended:

1. Advanced Engineering Mathematics byE. Kreyszig
2. Advanced Mathematics for Engineers By Chandrika Prasad (Prasad Mudranalaya)
3. Advanced Engineering Mathematics By H.K. Das.

MODULE – I

Introduction: Importance of Electrical Engineering in day-to-day life. Electrical elements and their classification. KCL and KVL equations. Loop current and Node voltage method. D.C. Circuits: Steady state analysis with independent and dependent sources; Series and Parallel circuits; Star-Delta conversion. D.C. Circuit Theorems: Superposition theorem; Thevenin's & Norton's theorem; Maximum Power Transfer theorem.

(12)

MODULE – II

A.C. Single-phase Series Circuits: Common signals and their waveforms. RMS and Average value. Form factor & Peak factor of sinusoidal waveform. Impedance of Series circuits. Phasor diagram. Power. Power factor. Power triangle.

(5)

MODULE – III

A.C. Single-phase Parallel Circuits: Admittance method, Phasor diagram. Power. Power factor. Power triangle.

(5)

MODULE – IV

Resonance and Q-factor, A.C. Circuit Theorems: Superposition theorem; Thevenin's & Norton's theorem; Maximum Power Transfer theorem.

(7)

MODULE – V

Three Phase Circuits: Line and Phase relation for Star and Delta connection. Power relations. Analysis of balanced and unbalanced 3 phase circuits.

(7)

MODULE – VI

Magnetic Circuits: Introduction. Series-parallel magnetic circuits. Analysis of Linear and Non-linear magnetic circuits. Energy storage. A.C. excitation. Eddy currents and Hysteresis losses.

(5)

MODULE – VII

Coupled Circuits (Dot rule), Self and mutual inductances, Coefficient of coupling.
Basic Indicating Instruments: Moving coil and moving iron type instruments.

(4)

Books Recommended:

1. Nagrath and Grabel, Basic Electrical Engineering
2. Fitzzerald and Higinbotham, Basic Electrical Engineering

MODULE – I & II

Introduction to C++ and algorithm analysis: C++ classes, C++ details, Using matrics, Mathematical background for algorithm analysis, model and what to analyze, Running Time calculations.

MODULE – III

Lists, Stacks and Queues: Abstract Data Types, The list ADT, The Stack ADT, The Queue ADT

MODULE – IV

Trees: Preliminaries, Binary Trees, The Search Tree ADT – Binary Search Trees, AVL Trees, Splay Trees, Tree Traversals, B-Trees.

MODULE – V

Hashing and Priority Queues: Model and Simple implementations, Binary Heap, Applications of Priority Queues, d-Heaps, Leftist and Skew Heaps.

MODULE – VI

Sorting: Preliminaries, Insertion sort, A Lower Bound for Simple Sorting Algorithms, Shell sort, Heap sort, Merge sort, and Quick short.

MODULE – VII

Graph Algorithms: Definitions, Topological Sort, Shortest Path Algorithms, Network Flow Problems and Minimum Spanning Tree.

Text Books:

1. Mark A. Weiss – Data Structures & Algorithm Analysis in C++, 2nd Edition, Pearson Education, New Delhi – 2002.

Reference:

1. Gregory L. Heilean – Data Structures Algorithms, and Object Programming, Tata McGrow Hill, New Delhi – 2002.
2. Adam Drozdek – Data Structures and Algorithms in C++, Thomson Learning (Vikas Publishing House) New Delhi – 2001.
3. John R. Hubbard – Data Structures with C++, Tata McGraw Hill, New Delhi, 2004

MODULE– I

Environmental Awareness: Multidisciplinary nature of environmental Science, Definition, scope , importance and need for public awareness.

(2)

MODULE– II

Ecology and Environment: concept of an ecosystem ,structure and function of an ecosystem, producer ,consumer and decomposer, energy and nutrient flow biogeochemical cycles, food chain ,food web, ecological pyramid.

(3)

MODULE– III

Environmental Pollution : Segments of environment, sources, pathways and fate of environmental pollutants, causes of environmental pollution , physical ,chemical and biological transformation of pollutants , population explosion, environment and human health, human rights, value education ,women and child welfare.

(5)

MODULE– IV

Air Pollution: various segments of atmosphere and their significance,classification of air pollutants, toxic effects, sampling and analysis, stationary and mobile emission, sources and their control, photochemical smog ,sulphurous smog, green house effect, global warming, ozone depletion, Air (prevention and control of pollution) Act.

(10)

MODULE– V

Water Pollution: Water resources ,sources of water pollution ,various pollutants, their toxic effect, potability of water , municipal water supply , disinfection, characteristics of waste water, primary and secondary waste water treatment, BOD and COD measurement and their significance ,rain water harvesting ,water shed management,Water (pollution and control) Act.

(12)

MODULE– VI

Natural Resources and Biodiversity: Renewable and non renewable resources, Forest resource, consequences of deforestation, floods and draughts, equitable use of resources for sustainable development, Dams benefits and problems, Biodiversity: ecosystem diversity , threats to biodiversity, conservation of biodiversity**.**

(4)

MODULE– VII

A brief introduction to Noise Pollution, Soil Pollution, Solid Waste Management.

(4)

Books Recommended:

1. Sharma and Kaur, Environmental Pollution
2. De, Environment Chemistry

MODULE – I

Special Theory Of Relativity

Postulates, Galilean transformations, Lorentz transformations, length contraction, time dilation, velocity addition, mass change and Einstein's mass energy relation. (AB: 1.1,1.2,1.4,1.7,1.8,1.9, and Appendix to chapter-1

[6]

MODULE – II

Quantum Mechanics:

Planck's theory of black-body radiation (AB: 2.2, 9.5, 9.6), Compton effect (AB: 2.7), wave particle duality, De Broglie waves, Davisson and Germer's experiment(AB:2.4, 3.1, 3.2, 3.3, 3.4, 3.5), uncertainty principle(AB:3.7,3.8,3.9), physical interpretation of wave function and its normalization(AB:3.2), expectation value(AB:5.4).

[8]

Schrodinger equation in one dimension(AB:5.2), solutions of time-independent Schrodinger equation for free particle(AB:3.6, 5.5, 5.6), particle in an infinite square well, potential barrier and tunneling(AB:5.7, 5.8), hydrogen atom (qualitative)(HRW:40-8).

[8]

MODULE – III

Statistical Physics And Thermodynamics:

Elementary ideas, comparison of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics (AB: 9.1, 9.2, 9.3, 9.4).

[4]

Zeroth law, first law, second law, entropy, heat transfer, steady state one-dimensional heat conduction [(HRW:19-2, 19-9, 21-3, 19-11),(SS:14.2, 14.7)].

[6]

MODULE – IV

Lasers And Applications:

Emission of light by atoms, spontaneous and stimulated emission (AB: 4.9, and AG: 23.1), Einstein's A and B coefficients, laser: population-inversion (AG: 23.4), properties of laser radiation, Ruby & He-Ne lasers, applications of lasers (AB: 4.9) and AG: 23.1), elementary ideas of holography (AG: 18.1) and fiber optics (AG: 24.1-24.3).

[8]

MODULE – IV

Nuclear Physics:

Nuclear forces, binding energy, liquid drop model (AB: 11.1-11.6), fission, nuclear reactors, fusion, energy processes in stars, controlled thermonuclear reactions (AB: 12.9-12.12).

[5]

Text Books:

1. Arthur Beiser, Concepts of Modern Physics, 5th edition, Tata McGraw Hill, 1997.
2. Ajoy Ghatak, Optics, 2nd edition, Tata McGraw Hill, 1997.

Reference Books:

1. Jasprit Singh, Modern Physics for Engineers, John Wiley & Sons, 1999.
2. Kenneth Krane, Modern Physics, 2nd edition, John Wiley & Sons, 1998.
3. Wehr, Richards and Adair, Physics of the Atom, 4th edition, Addison Wesley.

THIRD SEMESTER

EC 3101	BASIC ELECTRONICS	1.0

MODULE – I

Introduction: Importance of Electrical Engineering in day-to-day life. Electrical elements and their classification. KCL and KVL equations. Loop current and Node voltage method. D.C. Circuits: Steady state analysis with independent and dependent sources; Series and Parallel circuits; Star-Delta conversion. D.C. Circuit Theorems: Superposition theorem; Thevenin's & Norton's theorem; Maximum Power Transfer theorem.

(12)

MODULE – II

A.C. Single-phase Series Circuits: Common signals and their waveforms. RMS and Average value. Form factor & Peak factor of sinusoidal waveform. Impedance of Series circuits. Phasor diagram. Power. Power factor. Power triangle.

(5)

MODULE – III

A.C. Single-phase Parallel Circuits: Admittance method, Phasor diagram. Power. Power factor. Power triangle.

(5)

MODULE – IV

Resonance and Q-factor, A.C. Circuit Theorems: Superposition theorem; Thevenin's & Norton's theorem; Maximum Power Transfer theorem.

(7)

MODULE – V

Three Phase Circuits: Line and Phase relation for Star and Delta connection. Power relations. Analysis of balanced and unbalanced 3 phase circuits.

(7)

MODULE – VI

Magnetic Circuits: Introduction. Series-parallel magnetic circuits. Analysis of Linear and Non-linear magnetic circuits. Energy storage. A.C. excitation. Eddy currents and Hysteresis losses.

(5)

MODULE – VII

Coupled Circuits (Dot rule), Self and mutual inductances, Coefficient of coupling.

Basic Indicating Instruments: Moving coil and moving iron type instruments.

(4)

Text Books:

1. Basic Electrical Engineering, Fitzgerald, Hinginbotham
2. Basic Electrical Engineering I.J. Nagrath and D.P. Kothari, 2nd Edition, TMH, Delhi.

Reference Books:

1. Electric circuits- Schaum Series
2. Electrical Engineering- Del Toro.
3. Basic Electrical Engineering- Mittle.

Special Functions:
Bessel's equation: solution and Bessel's function of the first kind, Recurrence relations. Orthogonality of Bessel's Functions. Generating function and Bessel's integral. Legendre's equation: solution and Legendre's polynomials, Rodrigue's Formula. Orthogonarity relations. Generating function and recurrence relation. Definition of Hankekl's function. Elliptic Integral of the first and second kind. Jacobi's form of elliptic integrals.

(8L)

Complex Variables:
Continuity, differentiability and analyticity of a function of a complex variable, Cauchy Riemann differential equations in Cartesian and polar forms. Harmonic functions, Bilinear and conformal transformations. Complex integration, Cauchy's integral theorem and formula. Derivatives. Taylor's and Laurent's Series. Poles and Singularities. Cauchy's Residue Theorem. Contour integration (Poles on real axis excluded)

(13L)

Partial differential equations:
Formation of partial differential equations. Lagrange's first order linear equations. Non linear equations. Higher order differential equations with constant Co-efficients. Non homogeneous equations: solution by separation of variables. Boundary value Problems. wave equation in one dimension and its solution. Derivation of one dimensional heat equation and its solution.

(10L)

Fourier Series and Fourier Transform:
Periodic functions Existence conditions Euler's formulae. Half range series. Fourier series of functions with arbitrary period.
Fourier Integral Formula, Fourier Transform, Inversion Theorem, Fourier sine and cosine transforms and inversion formulae, Linearity property, Convolution or Faltung theorem. Relationship between Fourier and Laplace transform. Finite Fourier Transforms. Heaviside, Unit step function and Dirac Delta Function

(10L)

Statistics:
Mean and variance. Moments. Concept of Random variable. Probability density and Distribution functions Problems, Elements of error analysis

(4L)

Books Recommended:
1. Engineering Mathematics – E. Kreyszig
2. Advanced Engineering Mathematics – C. Prasad
3. Fourier Transforms – I.N. Sneddon

MODULE – I

Introduction to signals and systems: Definition, Basis of classification, Representation of common signals and their properties, System modeling

(4)

MODULE – II

Analogous System: Introduction, D Alembert's Principle, Force-voltage and force-current analogies, Electrical analogue of mechanical, Hydraulic and thermal systems.

(5)

MODULE – III

Fourier Transform Method: Introduction, Fourier transform pair, Amplitude spectrum and phase spectrum of signals, Sinusoidal transfer function.

(3)

MODULE – IV

Laplace Transform Method: Introduction, Laplace transform pair, Laplace transformation of common functions, Gate function, Step function and impulse function, Laplace theorems shifting, initial value, final value and convolution theorems.
Inverse Laplace transform by partial fraction expansion and convolution integral method.

(12)

MODULE – V

System Analysis: System Analysis by Laplace Transform method, System response. Natural, forced, transient and steady state responses. Transfer function and characteristic equation, Superposition integral, Concept of poles and zeros, Nature of system response from poles and zeros.

(6)

MODULE – VI

System Stability: Concept of stability, Types, Necessary and sufficient conditions, Routh Hurwitz stability criterion, Limitations and its applications to closed loop systems.

(4)

MODULE – VII

State-Space Concept: Introduction, Definition: State, State variable, State vector and state space, State space representation, Derivation of State model from transfer function, Bush form and diagonal canonical form of state model, Non-uniqueness of state model, Derivation of transfer function from state model, Transition matrix and its properties, Solution of time invariant state equation.

(6)

Text Books:

1. Analysis of Linear Systems – D.K.Cheng.
2. Control System Engineering – Nagrath & Gopal
3. Control System – A. Anand Kumar

Reference Books:

1. Networks and Systems – D. Roy Choudhury
2. Signals and Systems - Basu & Natarajan

MODULE – I

Introduction to Java Applications, Memory Concepts, Arithmetic, Decision making, Equality and Relational Operators. Introduction to Java Applets, Drawing strings and lines.

Control Statements: if, if ... else, selection statements, while statement, compound assignment operators, increment decrement operators, for ... statement, do .... while, switch, break and continue, labeled break and continue, logical operators.

Methods in java: declarations, argument promotions, scope of declarations, method overloading, Recursion.

Arrays: declaring and creating references and reference parameters, passing arrays to methods, multi dimensional arrays.

MODULE – II

Object based programming, classes, class scope, controlling access to members, this keyword and its use, constructors, overloading constructors, composition, garbage collection, static class members, final instance variables, crating packages, package access, Data abstraction and encapsulation.

MODULE – III

Inheritance and polymorphism: super class and subclass, protected members, Relation ship between super and sub class. Inheritance hierarchy, abstract classes and methods, final methods and classes, nested classes, Type wrappers.

MODULE – IV

Exception handling: Java exception hierarchy, rethrowing an exception, finally clause, stack unwinding, chained exception, Declaring new exception types.

Multithreading: Life cycle of a thread, priorities and scheduling, creating and executing threads synchronization.

MODULE – V

Files and streams, hierarchy, files and streams, File class, Sequential access file manipulation, random access file handling, Introduction to String class and its members.

MODULE – VI

World Wide Web, Client / Server architecture, Web browser, Web server, creating a web site and mark up languages, HTML, document structuring tags in HTML, Special tags in HTML.

MODULE – VII

Introduction to DHTML, scripting languages, java script: objects, methods, events & event handling, Document object model.

Text Book:

1. Dietel,Dietel - Java How to program , 5th edition; Pearson Education , New Delhi.
2. S. Raj Kamal – Intrernet and Web Technology, Tata McGraw Hill, New Delhi, 2002.

Reference:

1. C. Horstmann, G. Cornell - Core Java 2 Vol I & Vol II; Pearson Education, New Delhi.
2. Balagurusamy -Programming in Java, 2nd Edition; Tata McGraw Hill Publication; New Delhi.
3. Patrick Naghton & H. Schildt – The Complete Reference Java 2, Tata McGraw Hill Publication, New Delhi.

MODULE – I

Number Systems and codes: Binary to Decimal Conversions, Decimal to Binary Conversions, Octal Number System, Hexadecimal Number System, BCD Code, Alphanumeric Codes, Parity Method for Error Detection.

Logic Gates and Boolean Algebra: Boolean Constants and Variables, Truth Tables, OR, AND, and NOT Operations, Description, Evaluation and Implementation of Logic Circuits, NOR and NAND gates and their universality, Boolean and DeMorgan's Theorem, Logic Gate Representations.

MODULE - II

Combinational logic circuits: Sum of Products From, Simplifying and Designing Logic Circuits, Karnaugh map Method Executive – OR and Excluxre NOR Circuits , Parity Generators and Checker Enable/Disable Circuits , Basic Characteristics of Digital ICS, Programmable Logic Devices

MODULE – III

Sequential Logic Circuits: Latches and Flip-flops , Asynchronous Inputs, Flip-flops Timing Considerations , Potential Timing Problem in FF Circuits, Flip-flop Applications and Synchronization, Data Storage and Transfer, Shift Registers, Schmitt – Trigger Devices.

MODULE – IV

Digital Arithmetic: Binary Addition, Subtraction, Multiplication and Division, BCD Addition, Hexadecimal Arithmetic, Arithmetic Circuits, Full Adder, Parallel Adder, ALU Integrated Circuits.

MODULE - V

Counter and Registers: Different Asynchronous and Synchronous Counters, Pre settable Counters, The 74AL S193/HC193, Decoding a Counter, Decoding Glitches, Cascading BCD Counters, Shift – Registers, Counters, Counter Applications, Integrated Circuit Registers, Parallel In / Parallel Out , Serial In /Serial Out, Parallel In/ Serial Out, Serial In / Parallel Out.

MODULE – VI

Integrated – Circuit Logic Families: Digital IC Terminology, TTL Logic Family and Data Sheets, TTL Characteristics, TTL Loading and Fan – Out, MOS Technology, Digital MOSFET Circuits, Complementary MOS Logic, CMOS Series Characteristics. Tristate Logic Outputs.

MODULE – VII

MSI Logic Circuits: Decoders, BCD – to – 7 Segment Decoders, Encoders, Multiplexes and Demultiplexers, Magnitude Comparator. Memory Devices : Memory Terminology and General Operation, ROM and its Architecture, Timing, Types and Applications of ROM, Semiconductor RAM and RAM Architecture, Static and Dynamic RAM.

Text Book:

1. Ronald J. Tocci and Neal S. Widmer - Digital Systems : Principles and Applications Pearson Education, 8th Edn. New Delhi, 2002

Reference Books:

1. M. Morris Mano- Digital Logic and Computer Design, PHI (Reprint). New Delhi 2004.
2. A.B. Marcovitz- Introduction to Logic Design, TMH, New Delhi - 2002.
3. S.P. Dondamudi- Fundamentals of Computer Organization and Design Springer (India) Pvt. Ltd. New Delhi – 2004

FOURTH SEMESTER

CP 4101	DISCRETE MATHEMATICAL STRUCTURES	1.0

MODULE – I & II

Logic and Mathematical Reasoning: Logic, Propositional Equivalences, Predicates and Quantifiers, Methods of Proof, Mathematical Induction, Recursive Definition and Algorithms, Program Correctness.

MODULE – III & IV

Functions and Relations: Functions, Sequences and Summations, The Growth Functions, Relations and Their Properties, Non- array Relations & Their Applications, Representing Relations, Closures of Relations, Equivalence Reloans, Partial Orderings.

MODULE – V

Graphs: Introduction to Graphs, Graph Terminology and Representation, Connectivity, Euler and Hamiltonian Paths, Shortest Path Programs.

MODULE – VI

Trees: Introduction and applications of trees, Tree Traversal, Spanning Trees, Minimum Spanning trees.

MODULE –VII

Semgroups, Groups and Coding: Binary Operations, Semigroups, Products and Quotients of Semigroups, Groups, Product and Quotients of Groups, Coding of Binary Information and Error Correction, Decoding and Error Correction.

Text Books:

1. B.Kolman et.al- Discrete mathematical Structures, 5th Ed^{n}, Pearson Education, New Delhi - 2004.
2. K.H. Rosen – Discrete Mathematics and Its Applications – 4th Ed^{n}, Tata McGraw Hill, New Delhi - 2001

Reference Books:

1. J.P. Tremblay et.al – Discrete Mathematical Structures with Applications to Computer Science, TMH, New Delhi – 2004.

A – NUMERICAL COMPUTING

MODULE - I

High Speed Computation: Introduction, Computer Arithmetic, Errors, Machine Computation.

Transcendental and Polynomial Equations: Introduction, Bisection Method, Iterative Methods, Rate of Convergence, Methods for Complex Roots, Polynomial Equations.

MODULE - II

System of Linear Algebraic Equations and Eigenvalue Problems: Introduction, Direct Methods, Error analysis, Iteration Methods, Eigenvalues and Eigen Vectors.

Interpolation and Approximation: Introduction to Lagrange and Newton Interpolations, Finite difference operators, Interpolating polynomial using finite differences, Hermite interpolations, Piecewise and spline interpolation.

MODULE - III

Differentiation and Integration: Introduction, Numerical differentiation, Numerical integration, Methods based on interpolation.

Ordinary Differential Equations: Introduction, Euler methods, Single and Multistep methods, Predictor-corrector methods.

B – STATISTICAL COMPUTING

MODULE - IV

Empirical and Probability Distributions: Basic Concepts, The Mean Variance, and Standard Deviation, Continuous-Type Data, Exploratory Data Analysis, Graphical Comparisons of Data Sets, Probability Density and Mass Functions.

Probability: Properties of Probability, Methods of Enumeration, Conditional Probability, Independent Events, Bayes Theorem.

MODULE – V & VI

Discrete, Continuos & Multivariable Distributions: Random Variables of the Discrete Type, Mathematical Expectation, Bernoulli Trials and the Binomial Distribution, The Moment-Generating Function, The Poisson Distribution, Random Variables of the Continuous Type, The Uniform and Exponential Distributions, The Gamma and Chi-Square Distributions, The Normal Distribution, Distributions of Functions of a Random Variable, Distributions of Two Random Variables.

Sampling Distribution Theory: Independent Random Variables, Distributions of Sums of Independent Random Variables, Random Functions Associated with Normal Distributions, The Central Limit Theorem, Approximations for Discrete Distributions, The t and F Distributions.

MODULE - VII

Estimation & Tests of Statistical Hypotheses: Point Estimation, Confidence Intervals for Means, Confidence Intervals for Difference of Two Means, Sample Size, Tests About Proportions, Tests of the Equality of Two Normal Distributions, Chi-Square Goodness of Fit Tests, Contingency Tables, Tests of the Equality of Several Means.

Text Books:

1. Jain,M.K., etal : Numerical Methods for Scientific and Engineering Computation, 3rd Edn. New Age Publication, New Delhi, 1999
2. Hogg, R.V. & Tanis E. A. : Probability and Statistical Inference, 6th Edn., Pearson Education, New Delhi , 2004.

Reference Books:

1. Sastrty, S.S. – Introductory Methods of Numerical Analysis, 4th Edn., PHI, New Delhi, 2005
2. Hines, W.W. et_al – Probability and Statististics in Engineering, 4th edn., John Witey, Singapore (Indian Reprint), 2003.
3. Veerarajan, T. – Probability, Statististics and Random Processes, 2nd Edn., TMH, New Delhi, 2003.

CP 4105	DATABASE MANAGEMENT SYSTEMS	1.0

MODULE – I

Introduction: Purpose of Database System; View of Data, Data Models, Database Languages, Transaction Management, Storage Management, Database Users Administrator, History of Database Systems.

MODULE – II

Database Design and Entity - Relational Model: Overview of design process, E-R model, Constraints, E – R Diagram, Weak Entity Sets, Extended E – R Features, Reduction to E – R Schemas.

MODULE – III

Relational Model: Structure of Relational Database, Fundamental Relational Algebra Operations, Additional Relational Algebra Operations, Domain Relational Calculus, Tuple Relational calculus, Query by Examples.

MODULE – IV

SQL & Advanced SQL: Data definition, Basic structure of SQL queries, Set Operations, Aggregate Functions, Null Values, Nested Sub Queries, complex queries, views, modification of database, SQL data types & schemas, Integrity constraints, authorization, Embedded SQL.

MODULE – V

Relational Database Design: Atomic domains & first normal form, Decomposition using functional dependencies, Functional dependency theory, Decomposition using functional dependencies, Decomposition using multivalued dependencies, more normal forms.

MODULE – VI

Query Processing: Measure of Query Cost, Selection Operation, Evaluation of Expressions.

MODULE – VII

Transaction & Concurrency Control: Transaction Concepts & ACID Properties, Transaction States, Concurrent Executions, Serializability & Its Testing, Recoverability, Introduction to Concurrency Control, Locked Base Protocol & Deadlock Handling.

Text Book:

1. A.Silberschatz et.al - Database System Concepts, 5th Ed^{n}, Tata Mc-Graw Hill, New Delhi – 2000.

Reference Books:

1. Date C.J.- An Introduction to Database System, Pearson Education, New Delhi- 2005
2. R. Elmasri, Fundamentals of Database Systems, Pearson Education, New Delhi, 2005.

MODULE – I

Introduction: What is an Operating System? Simple Monitor, Performance, Multiprogramming, time-sharing, Real Time systems, Protection.

(5)

File Systems: File Concept and support, Access and allocation methods, directory systems, File protection.

(3)

MODULE – II

CPU Scheduling: Scheduling concepts and algorithms, Algorithms evaluation, and Multiple processor scheduling.

(6)

MODULE – III

Memory Management: Preliminaries, Bare Machine, Resident Monitor, Swapping, Multiple partitions, Paging, Segmentation, Combined systems.

(8)

MODULE – IV

Virtual Memory: Overlays, Demand paging, Performance of demand paging, Page replacement, Virtual memory concepts, Page replacement algorithms, Allocation algorithms, and Thrashing.

(8)

MODULE – V

Disk Scheduling: Physical characterization, Disk Management, Swap-Space Management, RAID structure, FCFS scheduling and Shortest-Seek-Time-First.

(6)

MODULE – VI

Deadlocks: The deadlock problem, Deadlock characterization, Deadlock prevention, Deadlock avoidance; Deadlock detection, Recovery from deadlock, and Combined approach to deadlock handling.

(4)

MODULE – VII

Process Synchronization: Semaphors, OS Synchronization, Atomic Trancaction.
Security: The Security Problem, User Authentication, Cryptography.

Text Book:

1. Silver Schatz, A and Golvin, P.B. 'Operating System Concepts', 5th Edn. John Wiley, New Yark, 2000

Reference Books:

1. Deitel H.M., 'An Introduction to Operating System', Addison Wesley, Inc., London, 1995.
2. Mandinck S.E., 'Operating System' McGraw Hill., London, 1993.

CP 4109	COMPUTER SYSTEM ARCHITECTURE	1.0

MODULE- I

Design Methodology: System Design System Representation, Design Process, the Gate level The Register Level, Register- Level Components, Programmable Logic Devices, Register- Level Devices.

The Processor Level Processor- level Components, Processor-level Design

MODULE- II

Processor Basics: CPU Organization Fundamentals, Additional Floating-Point Numbers Data Representation Basic Format, Fixed-Point Numbers, Floating-Point Numbers Instruction Sets Instruction Formats and Types

MODULE- III

Datapath Design: Fixed-Point Arithmetic Addition, Subtraction, Multiplication and Division Arithmetic Logic Units Combinational ALUs, Sequential ALUs

MODULE- IV

Control Design: Basic Concepts Introduction, Hardwired Control Microprogrammed Basic Concepts, Multiplier Control Unit Control Pipeline Control Instruction Pipeline, Arithmetic Pipeline

MODULE - V

Memory Organization: Memory Technology Memory Device Characteristics, Random Access Memories, Serial Access Memories Memory Systems Multilevel Memories, Address Translation, Memory Allocation Cache Main Features, Address Mapping

MODULE- VI

System Organization: Communication Methods Basic concepts Bus Control System Control DMA and Interrupts

MODULE- VII

Advaced Topics: Pipeline Processing, Parallel Processing

Text Book:

1. Hayes, J.P., "Computer Architecture and Organization", 3rd ed McGraw-Hill, London, 2000

Reference Books:

1. Mano, M.M., "Computer System Architecture" , Prentice Hall of India, New Delhi, 1995
2. Heuring V.P., etal., " Computer System Design and Architecture", Addision Wesley Indian Reprint, 2000
3. Hamacher.V., etal, (Computer Organzation" ,4th edition, McGraw Hill, Singapore, 1996
4. Ram. B."Computer Fundamentals: Architecture and Organization",3rd ed New Age International Publication, New Delhi, 2000

EC 4105	DISCRETE AND INTEGRATED ANALOG CIRCUITS	1.0

MODULE – I

RC Filters: RC loss pass and high pass filters and their response to sinusoidal, step, pulse, square wave and ramp inputs.

(5)

MODULE – II

Transistors at high frequencies: Hybrid π model, Amplifier response at high frequencies, Gain- Bandwidth product, FET at high frequencies.

(5)

MODULE – III

Low frequency response of RC coupled stage and Multistage amplifiers, Single tuned amplifier, Cascode (CE-CB pair) amplifier.

(6)

MODULE – IV

Feedback amplifiers: Classification of amplifiers, Voltage series, Voltage shunt, Current series, Current shunt feedback.

(12)

MODULE – V

OP-Amp based Oscillators: Barkhausen criterion, Phase shift and Wein bridge oscillators, Hartley and Colpitt's oscillators, Crystal oscillators, Frequency stability.

(5)

MODULE – VI

Voltage and current time base generators: Exponential sweep, UJT as a negative resistances switch in sawtooth generators, Miller and Bootstrap time base generators, A simple current sweep, Linearity correction through adjustment of driving waveforms, A transistor current time-base generator.

MODULE – VII

A/D and D/A Converters: D/A converters – Binary Weighted D/A Converter, Ladder type D/A converters, Specifications for D/A Converters, A/D Converters – Simultaneous A/D converter, Counter type A/D converter, Successive approximation type A/D converter, Dual slope converter, Comparison of converter types.

Text Book:

1. "Digital Integrated Electronics". Taub & Schilling, TMH.
2. "Pulse Digital and Switching Waveforms", Millman & Taub, TMH.
3. "Integrated Electronics", Millman & Halkias, McGraw Hill.

Reference Books:

1. "Electronics Circuits: Discrete and Integrated", D. Schilling and C. Belove, McGraw ill.
2. "Modern Digital Electroncis", R. P. Jain, TMH
3. "Digital Principles & Application", Malvino & Leach, TMH.

FIFTH SEMESTER

IT 5101	INTRODUCTION TO ANALOG COMMUNICATION THEORY	1.0

MODULE - I

Signal Analysis: Introduction of Signal, Representation of Signals in the Frequency and Time Domain, Fourier Transform and its Application to signal Analysis. The Discrete Spectrum, The Continuous Spectrum, Dirac Delta Functions, Energy Density Spectra.

Text Books:

1. Communication Systems by S. Haykin; 2nd Edition
2. Communication Systems, B.P Lathi, 1968

MODULE - II

Amplitude Modulation System: Basics Communication system, Modulation, Need of Modulation, Introduction of Amplitude Modulation, Frequency spectrum of Amplitude Modulation, Modulator: Square law Modulator, Switching Modulator, Demodulator: Envelop Detector, Square law detector, AM-DSB-SC, Balanced Modulator and Ring Modulator, AM-SSB-SC, Generation of SSB-SC signal and demodulation of SSB-SC and DSB-SC signal. Comparisons of Various AM systems

Text Books:

1. Communication Systems by S. Haykin; 2nd Edition
2. D. Roddy & J. Coolen: Electronics Communication 4th Edition, PHI

MODULE - III

Angle Modulation System: Introduction, Concept of Angle Modulation, Frequency and phase Modulations, Types of Frequency Modulation, Generation of FM wave: Direct and Indirect Method Detection of FM wave using slope detector, Balanced Slope Detector and Phase Discriminator, Comparison of Frequency Modulation and Amplitude Modulation.

Text Books:

1. Communication Systems by S. Haykin; 2nd Edition
2. M.S.Roden: Analog & Digital Communication Systems: Shroff. Pub. New Delhi; 2003.

MODULE - IV

Multiplexing: Introduction and its classification, Frequency division Multiplexing

Text Books:

1. Communication Systems by S. Haykin; 2nd Edition
2. M. S. Roden: Analog & Digital Communication Systems: Shroff. Pub. New Delhi; 2003.

MODULE - V

AM and FM receivers: Introduction, Classification of Radio receiver, Superheterodyne receiver, Sensitivity, Selectivity, Fidelity and Image rejection ratio.

Text Books:

1. Communication Systems by S. Haykin; 2nd Edition
2. D. Roddy & J. Coolen: Electronics Communication 4th Edition, PHI

MODULE - VI

Random Signal Theory: Random Variables, Continuous and Statistically Independent random variables, Examples of probability Density functions of Uniform, Gaussian, Rayleigh functions. Stationary & Ergodic Processes, Auto Correlation Functions, Energy Spectral Density.

Text Books:

1. Communication Systems by S. Haykin; 2nd Edition
2. H. Taub and D.L. Schilling: Principles of Communication Systems, TMH, New Delhi.

MODULE - VII

Noise: White Noise, Atmospheric Noise, Thermal Noise, Equivalent Noise Band width Shot noise, Partition Noise, Flicker Noise, Noise Figure, Signal to Noise Ratio.,Noise Factor, Noise Temperature. Equivalent Noise figure of Amplifiers.

Text Books:

1. Communication Systems by S. Haykin; 2nd Edition
2. D. Roddy & J. Coolen: Electronics Communication 4th Edition, PHI

IT 5103	THEORY OF COMPUTATIONS	1.0

MODULE- I & II

Sets, Relations, and Languages: Sets, Relations and functions, Special types of binary relations, Finite and infinite sets, Three fundamental proof techniques, Closures and algorithms, Alphabets and languages, Finite representations of languages.

Finite Automata: Deterministic finite automata, Nondeterministic finite automata, Finite automata and regular expressions, Languages that are and are not regular, State minimization, Algorithmic aspects of finite automata.

MODULE- III & IV

Context-free Languages: Context-free grammars, Parse trees, Pushdown automata, Pushdown automata and context-free grammars, Languages that are and are not context-free, Algorithms for context-free grammars, Determinism and parsing.

MODULE- V & VI

Turing Machine: Definition and Computing with Turning machines, Extensions of Turning machines, Random access Turing machines, Nondeterministic Turing machines, Grammars, Numerical functions.

MODULE- VII

Undecidability: The Church-Tuning thesis, Universal Turing machines, The halting problem, Unsolvable problems about Turing machines, Unsolvable problems about grammars, Properties of recursive languages.

Text Book:

1. H.R. Lewis & C.H. Papadimitriou, Elements of the theory of computation – 2nd Edn. Pearson Education.

Reference Books:

1. Fundamentals of the Theory of Computation: Principles and Practices: Horcourt India Pvt Ltd. 2000 Morgan Kaufmann Publishers.
2. J.C. Martin– Introduction to Languages and the theory of computation, 2nd Edn., TMH, New Delhi 2000
3. K.L.P. Misra – et.al., “Theory of Computer Science”, 2nd Edn. PHI, New Delhi, 2000

CP 5103 FUNDAMENTALS OF DATA COMMUNICATIONS 1.0

MODULE- I

Data Communications and Networking Overview: A Communications Model, Data Communications, Data Communication Networking.

Protocol Architecture: The Need for a Protocol Architecture, A Simple Protocol Architecture, OSI, The TCP/IP Protocol Architecture

MODULE- II

Data Transmission: Concepts and Terminology, Analog and Digital Data Transmission, Transmission Impairments, Channel Capacity.

Guided and Wireless Transmission: Guided Transmission Media, Wireless Transmission, Wireless Propagation, Line-of-Sight Transmission.

MODULE- III

Signal Encoding Techniques: Digital Data Digital Signals, Digital Data Analog Signals, Analog Data Digital Signals, Analog Data Analog Signals.

MODULE- IV

Digital Data Communication Techniques: Asynchronous and Synchronous Transmission, Types of Errors, Error Detection, Error Correction, Line Configurations, Interfacing.

MODULE- V

Data Link Control: Flow Control, Error Control, High-Level Data Link Control (HDLC).

Multiplexing: Frequency Division Multiplexing, Synchronous Time Division Multiplexing, Statistical Time Division Multiplexing.

MODULE- VI

Circuit Switching and Packet Switching: Switching Networks, Circuit-Switching Networks, Circuit-Switching Concepts, Control Signaling, Softswitch Architecture, Packet-Switching Principles, X.25, Frame Relay.

MODULE- VII

Asynchronous Transfer Model: Protocol Architecture, ATM Logical Connections, ATM Cells, Transmission of ATM Cells, ATM Service Categories, ATM Adaptation Layer.

Routing in Switched Networks: Routing in Circuit-Switching Networks, Routing in Packet-Switching Networks, Least-Cost Algorithms

Text Book:

1. W. Stallings- Data and Computer Communications, 7th Edn., Pearson Edn./ PHI, New Delhi, 2006

Reference Books:

1. B. A. Forouzan - Data Communications and Networking, 4th Edn. TMH, New Delhi 2006
2. P.C. Gupta – Data Communications and Computer Networks, PHI, New Delhi 2006

I FUZZY LOGIC

MODULE- I

Fuzzy Set Theory: Basic Definition and Terminology, Set Theoretic Operations, MF Formulation and Parameterization, MF of two dimension, Fuzzy Union, Intersection and Complement.

MODULE- II

Fuzzy Rules and Fuzzy Reasoning: Extension Principles and Fuzzy Relations, Fuzzy IF THEN Rules, Fuzzy Reasoning.

MODULE- III

Fuzzy Inference System: Introduction, Mamdani Fuzzy Models, Other Variants, Sugeno Fuzzy Models, Tekamoto Fuzzy Models.

II GENETIC ALGORITHMS

MODULE- IV

Fundamentals of Genetic Algorithms: Basic Concepts Creation, Offsprings Encoding, Fitness functions, Reproduction, Genetic Modelling: Inheritance Operators, Cross over, Inversion and detection, Mutation operator, Bitwise operators.

III ARTIFICIAL NEURAL NETWORKS

MODULE- V

Introduction, Architecture, Back Propagation and feed Forward Networks, Offline Learning, Online Learning.

MODULE- VI

Supervised Learning of Neural Networks: Introduction, Perceptrons, Adaline, Back Propagation Multilayer Perceptrons, Back Propagation Learning Rules, Methods of Speeding. Radical Basis Function Networks, Functional Expansion Networks.

MODULE- VII

Unsupervised Learning: Competitive Learning Networks, Kohonen self-organising networks, Hebbian Learning, The Hopfield Network

Text Book:

1. J.S.R. Jang, C.T.Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing” PHI/Pearson Education, New Delhi 2004.
2. S. Rajasekaran & G.A. Vijayalakshmi Pai, PHI, New Delhi 2003

Reference Books:

1. T. J. Ross, “Fuzzy Logic with Engineering Applications.” TMH, New York, 1997.

EC5101 MICROPROCESSOR AND INTERFACING 1.0

MODULE- I

Revision of logic circuits with emphasis on control lines, SAP concepts with stress on timing diagrams, Microinstructions, Microprogramming, Variable machine cycle, Architecture of 8085 Processor , Functions of all signals, Bus concepts, Multiplexed and De-multiplexed Bus, Minimum system.

Text Books:

1. "Digital Computer Electronics", 2/e. by A. P. Malvino.
2. "Microprocessor Architecture, Programming and Applications with 8085" by R. S. Gaonkar.

MODULE- II

Instruction set, Addressing modes, Stack operation, Timing diagrams, Programming examples like Time delay, Looping, Sorting, Code conversions like BCD to Binary, Binary to BCD, HEX to ASCII, ASCII to HEX, BCD Arithmetic etc.

Text Books:

1. "Digital Computer Electronics", 2/e. by A. P. Malvino.
2. "Microprocessor Architecture, Programming and Applications with 8085" by R. S. Gaonkar.

MODULE- III

8085 based Microcomputer system, Memory Organization, Memory Interfacing, Memory Mapped I/O, I/O Mapped I/O, Interrupts, Hardware and Software Interrupts, Interrupt instructions, Programmed I/O, Interrupt driven I/O, DMA.

Text Books:

1. "Digital Computer Electronics", 2/e. by A. P. Malvino.
2. "Microprocessor Architecture, Programming and Applications with 8085" by R. S. Gaonkar.

MODULE- IV

Architecture of 8255 I/O peripheral chip, Modes of operation, Hand shake mode operation, BSR mode, ADC 0801 and ADC 0808 Interfacing with microprocessor, Analogue multiplexed ADC, DAC 0808 specifications, DAC Interfacing, Programming examples for Generation of square wave, positive and negatives ramps, triangular and sine waves, Sample and Hold circuit, LF 398 and its applications in Data Acquisition.

Text Books:

1. "Digital Computer Electronics", 2/e. by A. P. Malvino.
2. "Microprocessor Architecture, Programming and Applications with 8085". by R. S. Gaonkar.
3. "Microprocessor and Interfacing, Programming of Hardware" by Douglas Hall.
4. "Microprocessor and Peripherals" by S. P. Chowdhury and Sunetra Chowdhury.

MODULE- V

8253 timer, Modes of operation, Applications, 8279 Keyboard/Display Interface, Different modes of operation, Interfacing, Programming examples, 8237 DMA Controller.

Text Books:

1. "Microprocessor and Interfacing, Programming of Hardware" by Douglas Hall.
2. "Microprocessor and Peripherals" by S. P. Chowdhury and Sunetra Chowdhury.
3. "The INTEL 8086/8088 Msicroprocessor, Architecture, Programming, Design and Interfacing", 3/e. by Bhupendra Singh Chhabra.

MODULE- VI

Evolution of Microprocessors, Introduction (Architecture and Instruction set only) of 8086 and 8088, Evolutionary steps and Additional features of 80186, 80286, 80386, 80486 and Pentium Processors, Concept of CISC and RISC processors

Text Books:

1. "Microprocessor, Microcomputer and their Applications", 2/e. by A,K. Mukhopadhyay.
2. "Advanced Microprocessor" by Y. Rajasree.
3. "The INTEL 8086/8088 Microprocessor, Architecture, Programming, Design and Interfacing", 3/e. by Bhupendra Singh Chhabra.

MODULE- VII

Introduction to Microcontrollers, 8051 Microcontroller, Memory Organization, Programming techniques, Addressing modes, Instruction set, Interrupt structure, Port structure, Different modes of operation, Programming examples.

Text Books:

1. "Advanced Microprocessors and Microcontrollers" by S. K. Venkata Ram.
2. "Microprocessor, Microcomputer and their Applications", 2/e.by A, K. Mukhopadhyay.
3. "Advanced Microprocessors" by Y. Rajasree.
4. "Microprocessor and Peripherals" by S. P. Chowdhury and Sunetra Chowdhury.

EE 5107	DIGITAL SIGNAL PROCESSING	1.0

MODULE- I

Introduction: Discrete-Time Signals, Shanon's sampling theorem, Difference equation description, characteristics of digital filters and time domain analysis, properties of discrete time system (linearity, time-variance, convolution), BIBO stability, Z-transformation and their application in solving difference equations, Relationship between Laplace and Z-transforms.

(7)

Text Books:

1. "Digital Signal Processing, Principles, Algorithms and Applications" ,John G. Proakis, Dimitris G. Mamalakis,
2. "Digital Signal Processing", Alan V. Oppenheim Ronald W. Schafer, PHI, India.

MODULE- II

Frequency domain analysis: Discrete Time Fourier Transform (DTFT) and Discrete Fourier Transform (DFT), Periodic convolution, Direct evaluation of DFT, FFT algorithms-decimation in time and frequency, Relationship between Fourier and Z-transforms

(8)

Text Books:

1. "Digital Signal Processing, Principles, Algorithms and Applications" ,John G. Proakis, Dimitris G. Mamalakis,
2. "Digital Signal Processing", Alan V. Oppenheim Ronald W. Schafer, PHI, India.

MODULE- III

Digital Filter Structures: Direct form I&II, cascade, parallel and ladder realizations.

(5)

Text Books:

1. "Digital Signal Processing, Principles, Algorithms and Applications" ,John G. Proakis, Dimitris G. Mamalakis,
2. "Digital Signal Processing", Alan V. Oppenheim Ronald W. Schafer, PHI, India.

MODULE- IV

Filter Function Approximations and Transformations: Review of approximations of ideal analog filter response, Butterworth filter, Chebyshev Type I & II.

(6)

Text Books:

1. "Digital Signal Processing, Principles, Algorithms and Applications" ,John G. Proakis, Dimitris G. Mamalakis,
2. "Digital Signal Processing", Alan V. Oppenheim Ronald W. Schafer, PHI, India.

MODULE- V

Frequency Transformations: Frequency transformation in analog domain, frequency transformation in digital domain.

(4)

Text Books:

1. "Digital Signal Processing, Principles, Algorithms and Applications" ,John G. Proakis, Dimitris G. Mamalakis,
2. "Digital Signal Processing", Alan V. Oppenheim Ronald W. Schafer, PHI, India.

MODULE- VI

Design of IIR Filter: Design based on analog filter approximations, Impulse invariance method, Matched Z-transformation, Bilinear transformation.

(7)

Text Books:

1. "Digital Signal Processing, Principles, Algorithms and Applications" ,John G. Proakis, Dimitris G. Mamalakis,
2. "Digital Signal Processing", Alan V. Oppenheim Ronald W. Schafer, PHI, India.

MODULE- VII

Design of FIR filters: Symmetric and antisymmetric FIR filters, design of linear phase FIR filters using windows and frequency – sampling methods, design of optimum equiripple linear phase FIR filters, comparison of FIR and IIR filters.

(8)

Text Books:

1. "Digital Signal Processing, Principles, Algorithms and Applications" ,John G. Proakis, Dimitris G. Mamalakis,
2. "Digital Signal Processing", Alan V. Oppenheim Ronald W. Schafer, PHI, India.

Reference Book:

1. "Digital Filter Design", Antonious, Mc-Graw-Hill International Editions.

SIXTH SEMESTER

IT6101	INTRODUCTION TO DIGITAL COMMUNICATION THEORY	1.0

MODULE– I

Basics of Communication System: Introduction, Types of Communication System, Advantages and disadvantages of Analog and Digital Communication, Base band and Band pass transmission.

Text Books:

1. Electronic Communication Systems.4th Ed, Wayne Tomasi, Pearson Asia Education
2. Principles of Communication Systems", 2/e, by H. Taub and DL Schilling, Tata McGraw Hills, ND.

MODULE- II

Random Signal, **Sampling Theory and signal reconstruction:** Probability, Mutually Exclusive events, Joint Probability, Statistical independence, Random variables, Cumulative Distribution function, Probability Density function, Mean and variance of random variables, Error function, Rayleigh Probability Density, Gaussian Probability Density. Sampling Theorem and Signal reconstruction

Text Books:

1. Electronic Communication Systems.4th Ed, Wayne Tomasi, Pearson Asia Education
2. Principles of Communication Systems", 2/e, by H. Taub and DL Schilling, Tata McGraw Hills, ND.

MODULE- III

Pulse Analog Modulation System: Analog Pulse modulation System, Demodulation of PAM Signal, Transmission of PAM signal, Transmission Bandwidth, Pulse time Modulation, Generation and demodulation of PWM and PPM signal

Text Books:

1. Electronic Communication Systems.4th Ed, Wayne Tomasi, Pearson Asia Education
2. Principles of Communication Systems", 2/e, by H. Taub and DL Schilling, Tata McGraw Hills, ND.

MODULE- IV

Pulse code Modulation System: Quantization of Signals, Quantizer, Quantization Error, Companding, PCM, PCM system, DPCM, DM, ADM, TDM, T1 digital system.

Text Books:

1. Electronic Communication Systems.4th Ed, Wayne Tomasi, Pearson Asia Education
2. Principles of Communication Systems, 2/e, by H. Taub and DL Schilling, Tata McGraw Hills, ND.

MODULE- V

Digital Modulation Techniques: Introduction, Amplitude shift Keying(ASK),Phase shift Keying(PSK), Differential phase shift keying(DPSK), Frequency Phase shift keying(FSK), Quadrature Phase shift keying(QPSK), Comparison of different digital modulation systems.

Text Books:

1. Electronic Communication Systems.4th Ed, Wayne Tomasi, Pearson Asia Education
2. Principles of Communication Systems", 2/e, by H. Taub and DL Schilling, Tata McGraw Hills, ND.

MODULE- VI

Information Theory

Information Measure, Average information, Entropy, content and information Rate, Discrete Channel capacity, Shannon's Theroems and channel capacity, capacity of Gaussian channel, Bandwidth-S/N Trade off.

Text Books:

1. Electronic Communication Systems.4th Ed, Wayne Tomasi, Pearson Asia Education
2. Principles of Communication Systems", 2/e, by H. Taub and DL Schilling, Tata McGraw Hills, ND.

MODULE- VII

Coding: Introduction, Source coding, Shannon-Fano coding, Huffman's code, Introduction to channel coding.

Text Books:

1. Electronic Communication Systems.4th Ed, Wayne Tomasi, Pearson Asia Education
2. Principles of Communication Systems", 2/e, by H. Taub and DL Schilling, Tata McGraw Hills, ND.

MODULE- I

Computer Networks and the Internet: What is the Internet?, The Network Edge, The Network Core, Network Access and Physical Media, ISPs and Internet Backbones, Delay and Loss in Packet-Switched Networks, Protocol Layers and their Service Models.

MODULE- II

Application Layer: Principles of Application Layer Protocols, The Web and HTTP, File Transfer: FTP, DNS- The Internet's Directory Service, Socket Programming with TCP, Socket Programming with UDP.

MODULE- III

Transport Layer: Introduction and Transport –Layer Services, Multiplexing and Transport: UDP, Connectionless Transport: UDP, Principles of Reliable Data Transfer, Connection-Oriented Transport: TCP, Principles of Congestion Control.

MODULE- IV & V

Network Layer and Routing: Introduction and Network Service Models, Routing Principles, Hierarchical Routing, The Internet Protocol (IP), Routing in the Internet, What's inside a Router? IPv6, Multicast Routing.

MODULE- VI

Link Layer and Local Area Networks: Data Link Layer: Introduction and Services, Error-Detection and –Correction Techniques, Multiple Access Protocols, LAN Addresses and ARP, Ethernet, Hubs, Bridges, and Switches, Wireless Links, PPP: The Point-to-Point Protocol, Asynchronous Transfer Mode (ATM).

MODULE- VII

Security in Computer Networks: What is Network Security?, Principles of Cryptography, Authentication, Integrity.

Text Book:

1. J. F. Kurose & K. W. Ross- Computer Networking: A Top- Down Approach, 2nd Edition, Pearson Education, New Delhi, 2006

Reference Books:

1. A. Forouzan- Data communications and Networking, 4th Edn., TMH, New Delhi, 2006
2. P.C. Gupta- Data Communications and Computer Networks, PHI, New Delhi, 2006.

MODULE- I

Multimedia-An Overview: Introduction, Multimedia presentation and production, Characteristics of a multimedia presentation, Multiple media, Utilities of multisensory perception, Hardware and Software requirements, Uses of multimedia, Promotion of multimedia based content, Steps for creating a multimedia presentation.

Digital Representation: Introduction, Analog representation, Waves, Digital representation, Need for digital representation, Analog to Digital conversion, Digital to Analog conversion, Relation between sampling rate and Bit Depth, Quantization error, Fourier representation, Pulse modulation, Importance and drawbacks of digital representation.

MODULE- II

Text: Introduction, Types of text, Unicode standard, Font, Insertion of text, Text compression, File formats.

Images: Introduction, Image types, Seeing color, Color models, Basic steps for image processing, Scanner, Digital camera, Interface standards, Specifications of digital images, Color management system(CMS), Device independent color models, Gamma and Gamma correction, Image processing software, File formats, Image output on monitor, Image output on printer.

MODULE- III & IV

Audio: Introduction, Acoustics, Nature of sound waves, Fundamental characteristics of sound, Musical note and pitch, Psycho-Acoustics, Elements of audio systems, Microphone, Amplifier, Loudspeaker, Audio Mixer, Digital Audio, Synthesizers, Musical instrument digital interface (MIDI), MIDI messages, MIDI connections, General MIDI (GM) specifications, Basics of staff notation, Sound Card, Audio transmission, Audio recording devices, Audio file formats and CODECs, Software audio players, Audio recording systems, Digital audio broadcasting, Audio and Multimedia.

MODULE- V

Video: Introduction, Analog Video camera, Transmission of video signals, Video signal formats, Television broadcasting standards, Digital Video, Digital Video standards, PC Video, Video recording formats and systems, Video file formats and CODECs, Video editing.

Animation: Introduction, Historical background, Uses of Animation, Keyframes and Tweening, Types of Animation, Computer assisted animation, Creating movement, Principles of animation, Some techniques of animation, Animation on the web, 3D animation, Camera, Special effects, Creating animation, Rendering algorithms.

MODULE- VI

Compression: Introduction, CODEC, Types of compression, Types of redundancies, Lossless/Statistical compression techniques, GIF image coding standard, Lossy/Perceptual compression techniques, JPEG image coding standard, MPEG standards overview, MPEG-1 Audio, MPEG-1 Video, MPEG-2 Audio, MPEG-2 Video, MPEG-4, MPEG-7, Fractals.

MODULE- VII

Multimedia Architecture: Introduction, User interfaces, Windows multimedia support, Hardware support, Distributed multimedia applications, Real-time protocols, Playback Architectures, Streaming technologies, Temporal relationships, Synchronization, Multimedia

database systems(MMDBS), Feature extraction of image, Feature extraction of audio, Feature of extraction of video, Benchmarking of MMDBS.

Text Book:

1. R. Parekh – Principles of Multimedia, 2nd Edition, TMH, New Delhi, 2006

Reference Books:

1. R.Steinmetz & K. Nahrstedt- Multimedia: Computing, Communications and Applications, Pearson Edn., New Delhi, 2006.
2. P.K.Audleigh & K.Thakrar- Multimedia Systems Design, PHI, New Delhi, 2005.

MODULE- I

Source Coding: Definitions and Examples, Uniquely Decodable Codes, Instantaneous Codes, Costructing Instantaneous Codes, Kraft's Inequality, McMillan's Inequality, Comments on Kraft's and McMillan's Inequalities.

MODULE- II

Optimal Codes: Optimality, Binary Huffman Codes, Average Word-length of Huffman Codes, Optimality of Binary Huffman Codes, r-ary Huffman Codes, Extensions of Sources.

MODULE- III

Entropy: Information and Entropy, Properties of the Entropy Function, Entropy and Average Word-length, Shannon-Fano Coding, Entropy of Extensions and Products, Shannon's First Theorem, An Examples of Shannnon's First Theorem.

MODULE- IV

Information Channels: Notation and Definitions, The Binary Symmetric Channel, System Entropies, System Entropies for the Binary Symmetric Channel, Extension of Shannon's first Theorem to Information Channels, Mutual Information, Mutual Information for the Symmetric Channel, Channel Capacity.

MODULE- V

Using an Unreliable Channel: Decision Rules, An Examples of Improved Reliability, Hamming Distance, Statement and Outline Proof of Shannon's Theorem, The Converse of Shannon's Theorem, Comments on Shannon's Theorem

MODULE- VI

Error- correcting Codes: Introductory Concepts, Examples of Codes, Minimum Distance, Hamming's Sphere-packing Bound, The Gilbert – Varshamov Bound, Hadamard Matrices and Codes.

MODULE- VII

Linear Codes: Matrix Description of Linear Codes, Equivalence of Linear Codes, Minimum Distance of Linear Codes, The Hamming Codes, The Golay Codes, The Standard Array, Syndrome Decoding.

Text Book:

1. G.A.Jones & J.M.Jones-Information and Coding Theory, 3rd Edition, Springer Publication, New Delhi, 2000.

Reference Books:

1. R.Bose- Information Theory, Coding and Cryptography, TMH, New Delhi, 2002.
2. R.W. Hamming- Coding and Information Theory, Prentice-Hall, New Jersy, 1980.

MODULE- I

Basic Tools on Designing Algorithms: What is an algorithm? Algorithm specification and performance analysis, randomized algorithms.

MODULE- II

Divide-and-Conquer: The general method, application to binary search, finding the maximum and minimum, merge sort, quick sort, the problem of selection and Strassen's matrix multiplication.

MODULE -III

The Greedy Method: The general method, application to optimal storage on tapes, job sequencing with deadlines, optimal merge patterns and minimum weight spanning trees.

MODULE –IV & V

Dynamic Programming: The general method, application to multistage graphs, all pairs shortest paths, optimal binary search trees, 0/1- Knapsack and traveling salesman problem, Flow shop scheduling

Backtracking: The general method, application to 8- puzzle problem, 8- queen problem and sum of subsets

MODULE- VI

Branch and Bound: The method, application to 0/1 Knapsack traveling salesman problems, and efficiency considerations.

MODULE -VII

NP-Hard and NP-Complete Problems: Introduction and basic concepts, non-deterministic turing machine, the classes of P and NP, NP-hard graph problems, NP-completeness of the satisfiability problem, and polynomial- space-bounded problem.

Text Book:

1. E. Horowitz. et.al., Fundamentals of computer Algorithms, Galgotia Publication Pvt. Ltd., New Delhi, 2004

Reference Books:

1. J.Kleinberg & E. Tardos – Algorithm Design, Pearson Education, New Delhi, 2006
2. G.Brassard & P. Bratley – Fundamentals of Algorithms, PHI, New Delhi, 2005
3. T.H. Cormen et.al. – Introduction to Algorithms – PHI, New Delhi, 2005
4. S.Dasgupta et.al. – Algorithms, TMH, New Delhi - 2007

CP 6109	SOFTWARE ENGINEERING	1.0

MODULE – I

Introduction: Some Definitions, FAQs about software engineering, The evolving role of software, Software characteristics, SW applications

Software Processes: Software process models, Walifull model, the prototyping model, spiral model, RAD and Incremental model.

MODULE – II

Project Management: Management activities, Project planning, Project scheduling, Risk Management.

MODULE – III

Software Requirements: Functional and non functional requirements, User requirements, System requirements, The software requirements document. IEEE standard of SRS, Quality of good SRS

Requirement Engineering Process: Feasibility study, Requirements elicitation and analysis, Requirements validation, Requirement management.

MODULE – IV

Software Design: Design Concepts and Principles, Architectural Design, Object oriented Design, User interface design

UML: Class diagram, Sequence diagram, Collaboration diagram

MODULE – V

Verification and Validation: Verification and Validation Planning, S/W inspection, static analysis.

Software Testing: Testing functions, Test care design, White Box testing, Black box testing, Unit testing, Integration Testing, System testing, Reliability.

MODULE – VI

Management: SW cost estimation: Estimation techniques, Algorithmic cost modelling, Project duration and staffing.

Quality Management: Quality assurance and standards, Quality planning, Quality control.

MODULE – VII

Software Change: Program Evolution Dynamic, S/W Maintance in detail.

Text Book:

1. I. Sommerville: Software Engineering, Pearson Education Publication, 7th ed.

Reference Book:

1. R. S. Pressman: Software Engineering: A Practiioners Approach, 5th Edn., TMA, New Delhi.
2. J. F. Peters & W. Pedrycz– Software Engineering, John Wiley & Sons,Inc. 2000
3. A.Behforooz & F.J. Hudson – Software Engineering Fundamentals, Oxford Univ. Press, New York, 2000.

SEVENTH SEMESTER

IT 7101	Modern Telecommunication Systems	1.0

MODULE – I + II

Introduction to Switching System: General principles of switching, signaling and control, stored program control concepts, Space Division and Time Division switching, 2 -, 3-, and n – stage networks, Blocking and Non – Blocking switching, Digital Exchange (basic concept only).

MODULE – III

ISDN & ATM : ISDN user interface, architecture and user access, ISDN channels. B – ISDN, concepts of ATM and user – network Interface. Brief descriptions and functions of different layers of ATM protocol.

MODULE – IV + V

Mobile Cellular telecommunications: Basic Cellular systems, components and operation of Cellular systems, mobile propagation and fading, co-channel and adjacent channel interferences, frequency reuse channels, near - end - interferences, Handoff. Channel assignment and frequency assignment. Spread Spectrum technique, Multiple Access Techniques: Introduction to FDMA, TDMA & CDMA

MODULE – VI + VII

Mobile Antennas: Antenna parameters (Gain, Directivity, Efficiency, Effective Aperture etc.) and radiation characteristics. Qualitative description of Dipole antenna, LP antenna, Discone antenna, Helical antenna, Horn antenna, Patch and slot antenna. PIFA. Characteristics of cell site and mobile antennas.

Text Books :

1. T. Vishwanathan - Telecommunication Switching Systems and Networks - PHI, 2/e, New Delhi, 2002
2. Roy Blake - Wireless Communication Technology ,Thomson Asia Pvt. Ltd, Singapore 2002.
3. W.C.Y. Lee - Mobile Cellular telecommunications - Mc Graw – Hill Int. Edition, Singapore, 1995.

MODULE-I

Characterization of the Wireless Channel: Multipath Propagation Environment, Linear Time-Variant Channel Model, Channel Correlation Functions, Large-Scale Path Loss and Shadowing, Small-Scale Multipath Fading.

MODULE-II

Bandpass Transmission Techniques for Mobile Radio: Introduction, Signal Space and Decision regions, Digital Modulation, Power Spectral Density, Probability of Transmission Error.

MODULE-III

Receiver Techniques for Fading Dispersive Channels: Overview of Channel Impairment Mitigation Techniques, Diversity, Channel Equalization.

MODULE-IV

Fundamentals of Cellular Communications: Frequency Reuse and Mobility Management, Cell Cluster Concept, Cochannel and Adjacent Channel Interference, Call Blocking and Delay at the Cell-Site.

MODULE-V

Multiple Access Techniques: Multiple Access in a Radio Cell, Random Access, Conflict-Free Multiple Access Technologies, Spectral Efficiency.

MODULE-VI

Mobility Management in Wireless Networks: Introduction, Call Admission Control (CAC), Handoff Management, Location Management for Cellular Networks, Location Management for PCS Networks, Traffic Calculation.

MODULE-VII

Wireless/Wireline Interworking: Mobile IP, Internet Protocol (IP), Transmission Control Protocol (TCP), Network Performance, Wireless Application Protocol (WAP), Mobile AD HOC Networks.

Text Book:

1. J.W. Mark & W.Zhuang – Wireless Communications and Networking, Pearson Education, New Delhi – 2007.

Reference Books:

1. W.Stallings – Wireless communications & Networks, 2/e, Pearson Education, New Delhi- 2007.

MODULE-I

Introduction: A brief history, Computer organization for parallel and distributed computing, Communications and computer networks, Operating systems for distributed and parallel computing, The client-server model, Distributed database systems, Parallel programming languages and algorithms.

Computer organization for parallel and distributed computing: Pipeline and vector processors, Multicomputers and computer networks, Multiprocessors, Massively parallel architecture, Non-von Neumann-type computers, Cache architectures in multiprocessors.

MODULE-II

Communications and computer networks: Communications, Computer network architecture Network topology, Network interconnection, Integrated Services Digital Network (ISDN), Asynchronous Transfer Mode, Wireless computing.

MODULE-III

Operating systems for distributed and parallel computing: Network operating systems, Distributed operating systems, Operating systems for parallel computing, Distributed and Parallel system modeling, Example systems.

MODULE – IV

Distributed Computing: Introduction – Distributed Systems, Theory of Distributed Computing, Formal models for Message – passing systems, Broadcast and Converge Cast on a Spanning Tree, Flooring and Building a Spanning Tree, Constructing DFS Spanning Tree for a Specified Root and without a Specified Root, The Leader Election Problems, Anonymous Rings, Asynchronous and Synchronous Rings.

MODULE V

Mutual Exclusion in Shared Memory: Formal model for shared memory systems, The Mutual Exlusion Problem, Mutual Exclusion Problem, Mutual Exclusion using powerful Primitives and R/W registers.

MODULE – VI

Fault to Lerant Concensus: Synchronous systems with Crash and Byzantine Failures, Impossibility in a synchronous systems.

MODULE – VII

Causality and Time: Capturing Causality, Examples of using causality, Clock synchronization.

Text Books:

1. J.M. Crichlow – An Introduction to Distributed and parallel computing, 2/e PHI, New Delhi – 2002.

2. H.Attiya & J. Welch – Distributed Computing, 2/e John Wiley, India Edition, 2006.

CP 7103	Computer Graphics	1.0

MODULE-I

Introduction and Overview of Graphics Systems: Use of Computer graphics, Video Display Devices, Refresh Cathode-Ray Tubes, Raster and Random Scan Displays, Color CRT Monitors, Direct View Storage Tubes, Flat Panel Displays, Three-Dimensional Viewing Devices, Stereoscopic & Virtual Reality Systems, Raster and Random Scan Systems, Different Input and Hard Copy Devices, Graphics Softwares.

MODULE-II

Output Primitives: Points and Lines, Line Drawing Algorithms (DDA & Bresenham's), Circle and Ellipse Generating Algorithms, Conic Sections.

MODULE-III

Two-Dimensional Geometric Transformations: Different types of transformations and their matrix representations, Homogeneous Coordinates, Composite Transformations, transformations between Coordinate Systems, Affine transformations, Window-to-Viewport Coordinate transformation, Clipping-Point, Line, Polygon, Curve and Text Clipping.

MODULE-IV

Three-Dimensional Concepts and Object Representation:- Three Dimensional Display Methods, Polygon Surfaces, Curved Lines & Surfaces, Qudric Surfaces, Spline Representations, Cubic Spline interpolation methods, Bezier Curves and Surfaces.

MODULE-V

Three Dimensional Transformations and Viewing: Translation, Rotation, Scaling, Reflection, Shears, Composite Transformations, Projections- Parallel and Perspective, Projection Transformations, Clipping.

MODULE-VI

Visible Surface Detection Methods: Classification of Visible Surface Detection Algorithms, Back Face Detection, Depth Buffer Method, A-Buffer Method, Scan-Line Method, Depth Sorting Method, BSP-Tree Method & Area Subdivision Method.

MODULE-VII

Illumination Models and Surface Rendering: Light Sources, Basic Illumination Models, Polygon- Rendering Methods.

Text Book:

1. D. Hearn & M.P. Baker - Computer Graphics, 2/e , Pearson Education, New Delhi, 2005

Reference Books:

1. W.M. Newman. et. al.- Principle of Interactive Computer Graphics, Mc Graw Hill Publication, New Delhi, 1995.
2. S. Harrington -Computer Graphics- A Programming Approach ,Mc Graw Hill Publication, New Delhi, 1994.
3. J.D. Foley et. al- A Fundamental of Computer Graphics Addition Wesley, London, 1993.

ELECTIVE

IT 7111	Software Reliability & Testing

MODULE – I
Introduction: Software Reliability & Hardware Reliability, Basic Concepts, Availability, Modeling.

MODULE – II
Selected Models: Execution Time Component, Calendar Time Component, Model Choice.

MODULE - III
Applications: System Engineering, Project Management, Management of Operational Phase, Evaluation of S/W Engg. Technologies.

MODULE – IV
System Definition: Failure definition, System Configuration, Text Run Selection.

MODULE – V
Parameter Determination: Execution Time Component, Calendar Time Component.

MODULE – VI+VII
Project Specific Techniques: Unobserved Failures, Failure Time Measurement, Evolving Programs, Changes in Environment, Other Consideration.

Text Book:

1. J. D. Musa, et.al - Software Reliability: Measurement, Prediction & Application, Mc-Graw Hill, New York.

ELECTIVE

IT 7113	Distributed Database Systems

MODULE - I
Introduction: Distributed Data Processing, Promises of DDBSs, Complicating Factors, Problem Areas.

MODULE - II
Distributed DBMS Architecture: DBMS standardization, Architectural Models for Distributed DBMSs, Distributed DBMS Architecture, Global Directory Issues.

MODULE - III
Distributed Database Design: Alternative Design Strategies, Distributed Design Issjues, Fragmentation, Allocation.
Semantic data Control: View Management, Data Security, Semantic Integrity Control.

MODULE - IV
Optimization of Distributed Queries: Query Optimization, Centralized Query Optimization, Join Ordering in Fragment Queries, Distributed Query Optimization Algorithms.

MODULE - V
Introduction to Transaction Management: Definition of a Transaction, Properties of Transactions, Types of Transactions.

MODULE - VI
Distributed Concurrency Control: Serializability Theory, Taxonomy of Concurrency Control Mechanisms, Locking – based Concurrency Control Algorithms, Timestamp-based Concurrency Control algorithms, Optimistic Concurrency Control Algorithms, Deadlock Management, Relaxed concurrency control.

MODULE - VII
Distributed DBMS Reliability: Reliability Concepts and Measures, Failures and Fault Tolerance in distributed Systems, Failures in Distributed DBMS, Local Reliability Protocols, Distributed Reliability Protocols, Dealing with Site Failuros, Network Partitioning, Architectural Considerations.

Text Book:

1. M.Tamer Ozsu & Patrick Valduries : Distributed Database Systems, 2/e, Pearson Education, 2001.

ELECTIVE

IT 7115	Business Data Communications

MODULE-I

Introduction: Information and Communication, The Manager's Dilemma, The Nature of Business Information Requirements, Distributed Data Processing, The Transmission of Information, Networks, Communications, Software, Management Issues, Stadards, Internet Resources, Useful Publications.

MODULE-II

Distributed Data Processing: Centralized Versus Distributed Processing, Forms of Distributed Data Processing, Distributed Data, Networking Implications of DDP.

The Internet Addressing and Services: The Internet, Internet Addressing, Quality of Service, Integrated Services, Differentiated Services**.**

MODULE-III

Data Transmission: Signals for Conveying Information, Transmission Impairments and Channel Capacity.

Transmission Media: Guided Transmission Media, Wireless Transmission.

MODULE-IV

Data Communication Fundamentals: Analog and Digital Data Communication, Data Encoding Techniques, Asynchronous and Synchronous Transmission, Interfacing.

MODULE-V + VI

Data Link Control: Flow Control, Error Detection, Error correction, Data Link Control Protocols.

Transmission Efficiency: The Need for Transmission Efficiency, Frequency-Division Multiplexing, Synchronous Time-Division Multiplexing, Statistical Time-Division Multiplexing, Data Compression**.**

Distributed Applications: Electronic Mail, Electronic Data Interchange, Enterprise Application Integration.

MODULE-VII

Client/Server and Intranet Computing: The Growth of Client/Server Computing, Client/Server Applications, Middleware, Intranets, Extranets, Case Studies.

Text Book:

1. Willian Stallings – Business Data Communications 4/e, Pearson Education, New Delhi,-2007.

Reference Book:

1. D.A.Stamper and T.L.Case –Business Data Communications, 6/e, Pearson Education, New Delhi- 2004.

ELECTIVE

IT 7117	E-Commerce

MODULE - I

Introduction to Electronic Commerce: Electronic Commerce, Scope of Electronic Commerce, Definition of Electronic commerce, Electronic Commerce and Tmade cycle, Electronic Market, Electronic Data Interchange, Internet Commerce.

MODULE - II

Business Strategy in an Electronic Age: Value Chain, Supply Chains, Porter's Value Chain Model Inter organizational Value chains Competitive advantage, Competitive strategy, Porter's Model, First Mover advantage, Competitive advantage using e-commerce.

MODULE - III

Business strategy: Introduction to Business Strategy, Strategic implications of IT, Technology, Business Environment, Business Capability, Existing Business strategy, Strategy Formulation and Complementation Planning, e-commerce implementation, e-commerce & evaluation.

MODULE - IV

Case Study: Case Study, e-commerce in passenger Air Transport.
Business to Business Electronic Commerce: Inter-orgranisational Transactions.

MODULE - V

Electronic Market: Markets, Electronic Markets, Usage of electronic markets, Advantages and Disadvantages of electronic market.

MODULE - VI

Future of electronic markets: Electronic Data Interchange (EDI), Introduction, Definition, Benefits, Examples, EDI Technology, EDI Communications, EDI implementation, EDI Security, EDI Business.
Inter Organizational: e- commerce, Transaction, Purchasing on line.
Business to Consumer Electronic Commerce: Consumer Trade Organizations, Internet e-commerce, e-shop, e-commerce Technology, Advantages & Disadvantages.
Electronic Data Interchange (EDI) : Introduction, Definition, Benefits, Examples, EDI Technology, EDI Communications, EDI implementations, EDI Security, EDI and Business.

MODULE - VII

Inter Organizational e-commerce: Transactions, Purchasing on line.
Internet: Internet, TCP/IP, Internet Components.
Page on the Web : TAIL Basic, introduction.
Elements of E-Commerce: Elements, e-shop, Online Payments, Internet e-commerce security.
E-Business: Introduction, Grocery Supplies, Internet Banking, Online share sealing, Gambling on the Net, e-diversity.

Text Book:

1. David Whiteley - E-COMMERCE: Strategy, Technologies and Applications, TMH, New Delhi, 2000.

Reference Book:

1. Ravi Kalakota & Andre B. Whinston - Electronic Commerce A Manager's Guide Pearson Education, 2005.

ELECTIVE

CP 7107	Digital Image Processing

MODULE - I

Introduction: Background, Digital Image Representation, Fundamental Steps in Image Processing, Elements of a Digital Image Processing System.

Digital Image Fundamentals: Elements of Visual Perception, A Simple Image Model, Sampling and Quantization, Some Basic Relationships between Pixels, Imagining Geometry.

MODULE - II

Image Transforms: Introduction to the Fourier Transform, The Discrete Fourier Transform, Some Properties of the Two-Dimensional Fourier Transform, Other Separable Image Transforms.

MODULE - III

Image Enhancement : Spatial Domain Methods, Frequency Domain Methods, Some Simple Intensity Transformations, Histogram Processing, Image Subtraction, Image Averaging, Background, Smoothing Filters, Sharpening Filters, Lowpass Filtering, Highpass Filtering, Generation of Spatial Masks from Frequency Domain Specifications.

MODULE – IV + V

Image Restoring : Degradations Model - Definitions, Degradation Model for Continuous Functions, Diagonalization of Circulant and Block-Circulant Matrices, Circulant Matrices, Block Circulant Matrices, Effects of Diagonalization on the Degradation Model, Algebraic Approach to Restoration, Unconstrained Restoration, Constrained Restoration, Inverse Filtering – Formulation, Removal of Blur Caused by Uniform Linear Motion, Restoration in the Spatial Domain, Geometric Transformation.

MODULE – VI + VII

Image Compression: Fundamentals – Coding Redundancy, Interpixel Redundancy, Psychovisual Redundancy, Fidelity Criteria. Image Compression Models – The Source Encoder and Decoder, The Channel Encoder and Decoder. Elements of Information Theory – Measuring Information, The Information Channel, Fundamental Coding Theorems, Using Information Theory. Error-Free Compression–Variable-Length Coding, Bit-Plane Coding, Lossless Predictive Coding. Lossy Compression – Lossy Predictive Coding, Transform Coding.

Text Book :

1. Rafael. C. Gonzalez & Richard E.Woods.- Digital Image Processing, 2/e Pearson Education, New Delhi - 2006

Reference Books :

1. W.K.Pratt.-Digital Image Processing, 3/e Edn., John Wiley & sons, Inc. 2006
2. A.K.Jain.- Fundamentals of Digital Image Processing, PHI, New Delhi, 2006
3. M. Sonka et.al Image Processing, Analysis and Machine Vision, 2/e, Thomson, Learning, India Edition, 2007.

ELECTIVE

CP 7115	Neural Networks & Applications

MODULE - I

Recurrent Networks And Temporal Feedforward Networks: Introduction , Overview of Recurrent Neural Networks, Hopfield Associative Memory , Simulated Annealing, Boltzmann Machine , Overview of Temporal Feedforward Networks, Simple Recurrent Network, Time-Delay Neural Networks, Distributed Time-Lagged Feedforward Neural

MODULE - II

Neural Networks For Optimization Problems: Introduction, Neural Networks for Linear Programming Problems, Neural Networks for Quadratic Programming Problems, Neural Networks for Nonlinear Continuous Constrained Optimization Problems.

MODULE - III

Solving Matrix Algebra Problems With Neural Networks: Introduction, Inverse and Pseudoinverse of a Matrix, LU Decomposition, QR Factorization, Schur Decomposition, Spectral Factorization- Eigenvalue Decomposition (EVD) (Symmetric Eigenvalue Problem), Neural Network Approach for the Symmetric Eigenvalue Problem.

MODULE – IV+V

Solution Of Linear Algebraic Equations Using Neural Networks: Introduction, Systems of Simultaneous Linear Algebraic Equations, Least-Squares Neurocomputing Approach for Solving Systems of Linear Equations, Conjugate Gradient Learning Rule for Solving Systems of Linear Equations, A Generalized Robust Approach for Solving Systems of Linear Equations Corrupted with Noise, Regularization Methods for Ill-Posed Problems with Ill-Determined Numerical Rank, Matrix Splittings for Iterative Discrete-Time Methods for Solving Linear Equations.

MODULE - VI

Statistical Methods Using Neural Networks: Introduction, Principal-Component Analysis, Learning Algorithms for Neural Network Adaptive Estimation of Principal Components, Principal- Component Regression, Partial Least-Squares Regression, A Neural Network Approach for Partial Least-Squares Regression.

MODULE - VII

Identification, Control, And Estimation Using Neural Networks: Introduction, Linear System Representation, Autoregressive Moving Average Models , Identification of Linear Systems with ARMA Models, Parametric System Identification of Linear Systems Using PLSNET, Nonlinear System Representation, Identification and Control of Nonlinear Dynamical.

Text Book:

1. M. Ham & I. Kostanic – Principles of Neurocomputing for Science & Engineering, TMH, New Delhi, 2002.

ELECTIVE

CP 7117	Optimization Techniques

MODULE -I

Introduction to Linear Programming: Prototype Example, The Linear Programming Model, Assumptions of Linear Programming, Additional Examples, Some Classic Case Studies.

Solving Linear Programming Problems- The Simplex Method: The Essence of the Simplex Method, Setting Up the Simplex Method, The Algebra of the Simplex Method, The Simplex Method in Tabular Form, Tie Breaking in the Simplex Method, Adapting to Other Model Forms, Postoptimality Analysis.

MODULE -II

The Theory Of The Simplex Method: Foundations of the Simplex Method, The revised Simplex Method, A Fundamental Insight.

Duality Theory And Sensitivity Analysis: The Essence of Duality Theory, Economic Interpretation of Duality, Primal-Dual relationships, Adapting to Other Primal Forms, The Role of Duality Theory in Sensitivity Analysis.

MODULE -III

Other Algorithms for Linear Programming: The Dual Simplex Method, Parametric Linear Programming, The Upper Bound Techniques, An Interior-Point Algorithm.

Network Optimization Models: Prototype Example, The Terminology of Networks, The Shortest-Path Problem, The Minimum Spanning Tree Problem, The Maximum Flow Problem, The Minimum Cost flow Problem, The Network Simplex Method.

MODULE -IV

Dynamic Programming: A Prototype Example for Dynamic Programming, Characteristics of Dynamic Programming Problems, Deterministic Dynamic Programming, Probabilistic Dynamic Programming.

MODULE -V

Integer Programming : Prototype Example, Some BIP Applications, Innovative Uses of Binary Variables in Model Formulation, Some Formulation examples, Some Perspectives on Solving Integer Programming Problems, The Branch-and-Bound Technique and Its Application to Binary Integer Programming, A Branch-and-Bound Algorithm for Mixed Integer.

MODULE -VI

Nonlinear Programming : Sample Applications, Graphical Illustration of Nonlinear Programming Problems, Types of Nonlinear Programming Problems, One-Variable Unconstrained Optimization, Multivariable Unconstrained Optimization, The Karush-Kuhn-Tucker (KKT) Conditions for Constrained Optimization, Quadratic Programming, Separable Programming , Convex Programming.

MODULE -VII

Queueing Theory : Prototype Example, Basic Structure of queueing Models, Examples of Real Queueing Systems, The role of the Exponential Distribution, The Birth-and-Death Process, Queueing Models Based on the Birth-and Death Process ,Queueing Models Involving Nonexponential Distributions.

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Text Book:

1. S. Hiller & G.J. Lieberman – Operations Research, 8th Edn, TMH, New Delhi – 2006.

Reference Books:

1. H.A.Taha – Operations Research, 8/e, Pearson Education, New Delhi-2007.
2. J.K. Sharma – Operations Research, 3/e, McMillan, India Ltd, 2007.

ELECTIVE

CP 7123 Bio-informatics

MODULE – I

Molecular Biology and Biological Chemistry: The Generic Material: Nucleotides, Orientation, Base Pairing, The Central Dogma of Molecular Biology, Gene Structure and Information Content: Promoter Sequences, The Genetic Code, Open Reading Frames, Introns and Exons, Protein Structure and Function: Primary Structure, Secondary, Tertiary, and Quaternary Structure, The Nature of Chemical Bonds: Anatomy of an Atom, Valence, Electronegativity, Hydrophilicity and Hydrophobicity, Molecular Biology Tools: Restriction Enzyme Digests, Gel Electrophoresis, Blotting and Hybridization, Cloning, Polymerase Chain Reaction, DNA Sequencing, Genomic Information Content: C-Value Paradox, Reassociation Kinetics.

MODULE – II

Data Searches and Pairwise Alignments : Dot Plots, Simple Alignments, Gaps: Simple Gap Penalties, Origination and Length Penalties, Scoring Matrices, Dynamic Programming: The Needleman and Wunsch Algorithm, Global and Local Alignments: Semiglobal Alignments, The Smith-Waterman algorithm, Database Searches: BLAST and Its Relatives, FASTA and Related Algorithms, Alignment Scores and Statistical Significance of Database Searches, Multiple Sequence Alignments.

MODULE – III

Substitution Patterns: Estimating Substitution Numbers: Jukes-Cantor Model, Transitions and Transversions, Kimura's Two-Parameter Model, Models With Even More Parameters, Substitutions Between Protein Sequences, Variations in Evolutionary Rates Between Genes.

MODULE –IV

History of Molecular Phylogenetics: Advantages to Molecular Phylogenies, Phylogenetic Trees: Terminology of Tree Reconstruction, Rooted and Unrooted Trees, Gene vs. Species Trees, Character and Distance Data, Distance Matrix Methods: UPGMA, Estimation of Branch Lengths, Transformed Distance Method, Neighbor's Relation Method, Neighbor-Joining Methods, Maximum Likelihood Approaches, Multiple Sequence Alignments.

MODULE –V

Character–Based Methods of Phylogenetics: Parsimony: Informative and Uninformative Sites, Unweighted Parsimony, Weighted Parsimony, Inferred Ancestral Sequences, Strategies for Faster Searches: Branch and Bound, Heuristic Searches, Consensus Trees, Tree Confidence: Bootstrapping, Parametric Tests, Comparison of Phylogenetic Methods, Molecular Phylogenies: The Tree of life, Human Origins.

MODULE –VI

Genomics and Gene Recognition : Prokaryotic Genomes, Prokaryotic Gene Structure: Promoter Elements, Open Reading Frames, Conceptual Translation, Termination Sequences, GC Content in Prokaryotic Genomes, Prokaryotic Gene Density, Eukaryotic Genomes, Eukaryotic Gene Structure: Promoter Elements, Regulatory Protein Binding Sites, Open Reading Frames: Introns and Exons, Alternative Spicing, GC Content in Eukaryotic Genomes: CpG Islands, Isochores, Codon Usage Bias, Gene Expression: cDNAs and ESTs, Serial Analysis of Gene Expression, Microarrays.

MODULE -VII

Protein and RNA Structure Prediction : Amino Acids, Polypeptide Composition, Secondary Structure: Backbone Flexibility, Accuracy of Predictions, The Chou-Fasman and GOR Methods, Tertiary and Quaternary Structure: Hydrophobicity, Disulfide Bonds, Active Structures vs. Most Stable Structures, Algorithms for Modeling Protein Folding: Lattice Models, Off-Lattice Models, Energy Functions and Optimization, Structure Prediction: Comparative Modeling, Threading : Reverse Protein Folding, Predicting RNA Secondary Structures.

Text Book:

1. D.E. Krane & M.L. Raymer - Fundamental Concepts of Bioinformatics, Pearson Education, New Delhi-2003.

Reference Books:

1. S.C. Rastogi et.al.- Bioinformatics: Methods and Applications, PHI, New Delhi-2005.
2. V.R. Srinivas - Bioinformatics: A Modern Approach, PHI, New Delhi-2005.
3. A.M. Lesk – Introduction to Bioinformatics, Oxford (Indian Edn), New Delhi-2004.

ELECTIVE

CP 7125	Object Oriented Analysis and Design

MODULE-I

What Is Object-Orientation: Introduction, Basic Concepts, The Origins of Object-Orientation, Object-Oriented languages Today.

Modelling Concepts: Introduction, Models and diagrams, Drawing Activity Diagrams.

MODULE-II + III

Requirements Capture: Introduction, User Requirements, Fact Finding Techniques, User Involvement, Documenting Requirements, Use Cases, Requirements Capture and Modelling.

Requirements Analysis: Introduction, What Must a Requirements Model Do, Use Case Realization, The Class Diagram, Drawing a Class Diagram, CRC (Class Responsibility Collaboration) Cards, Assembling the Analysis Class Diagram.
Refining The Requirements Model: Introduction, Component-based Development, Adding Further Structure, Software Development Patterns.

MODULE-IV

Object Interaction: Introduction, Object Interaction and Collaboration, Interaction Sequence Diagrams, Collaboration Diagrams, Model Consistency.
Specifying Operations: Introduction, The Role of Operation Specifications, Contracts, Describing Operation Logic, Object Constraint Language, Creating an Operation Specification.

MODULE-V

Specifying Control: Introduction, States and Events, Basic Notation, Further Notation, Preparing a Statechart, Consistency Checking, Quality Guidelines, Summary.

Moving Into Design: Introduction, How is Design Different from Analysis, Logical and Physical Design, System Design and Detailed Design, Qualities and Objectives of Analysis and Design, Measurable Objectives of Analysis and Design, Measurable Objectives in Design, Planning for Design.

MODULE-VI

System Design: Introduction, The Major Elements of System Design, Software Architecture Concurrency, Processor Allocation, Data Management Issues, Development Standards, Prioritizing Design Trade-offs, Design for Implementation.
OBJECT DESIGN: Introduction, Class Specification, Interfaces, Criteria for Good Design, Designing Associations, Integrity Constraints, Designing Operations, Normalization.

MODULE-VII

Design Patterns: Introduction, Software Development Patterns, Documenting Patterns-Pattern Templates, Design Patterns, How to Use Design Patterns, Benefits and Dangers of Using Patterns.
Designing Boundary Classes: Introduction, The Architecture of the Presentation Layer, Prototyping the User Interface, Designing Classes, Designing Interaction with Sequence Diagrams, The Class Diagram Revisited, User Interface Design Patterns, Modelling the Interface Using Statecharts.

Text Books:

1. S.Bennett, S.Mc Robb and R.Farmer – Object- Oriented Systems Andlysis and Design Using UML 2nd edn, TMH, New Delhi – 2007.

Reference Book:

1. M.Blaha and J.Runbangh – Object- Oriented Modeling and Design with UML 2./e, Pearson Education, New Delhi,2007.
2. J.W. Satzinger, B.R. Jackson and S.D. Burd – Object –Oriented Analysis and Design, Thomson Learning, India Edition, 2007.
3. G. Booch – Object Oriented Analysis and Design with Applications,2/e, CA;Benjamin/Cumming,1994.

ELECTIVE

CP 6103	System Programming

MODULE – I

Background: Introduction, System Software and Machine Architecture, The Simplified Instructional Computer (SIC), Traditional (CISC) machines, RISC Machines.

MODULE – II & III

Assemblers: Basic Assembler Functions, Machine – Dependent Assembler Features, Machine – Independent Assembler Features, Assembler Design Options, Implementation Examples.

MODULE – IV & V

Loaders and Linkers: Basic Loader Functions, Machine - Dependent Loader Features, Machine – Independent Loader Features, Loader Design Options, Implementation Examples.

MODULE – VI

Macro Processors: Basic Macro Processor Functions, Machine – Independent Macro Processor Features, Macro Processor Design Options, Implementation Examples.

MODULE – VII

Software Engineering Issues: Introduction to Software Engineering Concepts, System Specifications, Procedural System Design, Object – Oriented Design, System Testing Strategies.

Text Book:

1. L. L. Beck – System Software – An Introduction to Systems Programming, 3/e, Pearson Education, New Delhi, 2004

Reference Book:

1. J.J. Donovan – System Programming, McGraw Hill , New Delhi, 1993.
2. D.M. Dhamdhere – System Programming and Operating Systems, 2/e., Tata McGraw Hill , New Delhi, 2000

ELECTIVE

CP 6105	Compiler Design

MODULE -I

Introduction to Compiling: Compilers, Analysis of the source program, The phase of a compiler, Cousins of the compiler, The grouping of phases, Compiler-constructions tools.

MODULE -II

A Simple One-Pass Compiler: Syntax definition, Syntax-directed translation, Parsing, A translator for simple expressions, Lexical analysis, Incorporating a symbol table, Abstract stack machines.

Lexical Analysis: The role of the lexical analyzer, Input buffering, Specification of tokens, Recognition of tokens, A language of specifying lexical analyzers, Design of a lexical analyzer generator.

MODULE –III & IV

Syntax Analysis : The role of the parser, Writing a grammar, Top-down parsing, Bottom-up parsing, Operator-precedence parsing, LR parsars, Using ambiguous grammars, Parsar generators.

MODULE V & VI

Syntax-Directed Translation: Syntax-direct definitions, Constraction of syntax trees, Bottom-up evaluation of S-**,** attributed definitions, L-attributed definitions, Top-down translation.

Type Checking: Type systems, Specification of a simple type checker.

Run-Time Environments: Source language issues, Storage organization, Storage-allocation strategies, Access to nonlocal names, Parameter passing, Symbol tables, Language facilities for dynamic storage allocation, Dynamic storage allocation techniques.

MODULE VII

Intermediate Code Generation: Intermediate languages, Declarations, Assignment statements, Boolean expressions.

Code Generation: Issues in the design of a code generator, Target machine, Run-time storage management, Basic blocks and flow graphs.

Code Optimization: Introduction, The Principle sources of optimization.

Text Book:

1. A.V.Aho, R. Sethi et.al.- Compilers Principles, Techniques, and Tools, 2nd Edition, Pearson Education, New Delhi, 2006

Reference Books:

1. A.I.Holub -Compiler Design in C, Prentice Hall of India, New Delhi, 1995
2. J.P. Tremblay - The Theory and Practical of Compiler Writing, McGraw Hill, Singapore, 1993.
3. K.C. Louden- Compiler Construction: Principles and Practice, Thomson, Learning, New Delhi, 2005.

EIGHTH SEMESTER

IT 8101	Data Mining & Warehousing	1.0

MODULE - I
Data Mining : Introduction, Relational Databases, Data Warehouses, Transactional databases, Advanced database Systems and Application, Data Mining Functionalities, Classification of Data Mining Systems, Major Issues in Data Mining.

MODULE - II
Data Warehouse : Introduction, A Multidimensional data Model, Data Warehouse Architecture, Data Warehouse Implementation, Data Cube Technology, From Data warehousing to Data Mining.

MODULE - III
Data Processing: Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and concept Hierarchy Generation.
Data Mining Primitives, Languages and System Architecture: Data Mining Primities, DMQL, Architectures of Data Mining Systems.

MODULE – IV
Concept Description: Data Generalization & Summarization – Based Characterization, Analytical Characterization, Mining class Comparisons, Mining Descriptive Statistical Measures in Large Databases.

MODULE - V
Mining Association Rules in Large Databases : Association Rule Mining, Single – Dimensional Booloan Association Rules, Multilevel Association Rules from Transaction Databases, Multi Dimensional Association Rules from Relational Databases, From Association Mining to Correlation Analysis, Constraint – Based Association Mining.

MODULE - VI
Classification and Prediction : Classification & Prediction, Issues Regarding Classification & Prediction, Classification by decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification based on concepts & Association Rule, Other Classification, Prediction, Classification Accuracy.

MODULE - VII
Cluster Analysis: Types of Data in Cluster Analysis, Partitioning methods, Hierarchical methods, Density – Based Methods, Grid – Based Methods, Model – Based Clustering Methods, Outlier Analysis.
Mining Complex Types of Data.

Text Books:

1. Jiawei Han & Micheline Kamber - Data Mining Concepts & Techniques Publisher Harcout India. Private Linited.

Reference Books:

1. G.K. Gupta – Introduction to Data Mining with case Studies, PHI, New Delhi – 2006.
2. A. Berson & S.J. Smith – Data Warehousing Data Mining, COLAP, TMH, New Delhi – 2004
3. H.M. Dunham & S. Sridhar – Data Mining, Pearson Education, New Delhi, 2006.

MODULE – I

Overview of Artificial Intelligence: Definition & Importance of AI.

Knowledge: General Concepts: Introduction, Definition and Importance of Knowledge, Knowledge-Based Systems, Representation of Knowledge, Knowledge Organization, Knowledge Manipulation, Acquisition of Knowledge.

MODULE – II

LISP and Other AI Programming Languages: Introduction to LISP : Syntax and Numeric Function, Basic List Manipulation Functions in LISP, Functions, Predicates and Conditionals, Input, Output and Local Variables, Iteration and Recursion, Property Lists and Arrays, Miscellaneous Topics, PROLOG and Other AI Programming Languages.

MODULE – III

Knowledge Representation : Introduction, Syntax and Semantics for Propositional logic, Syntax and Semantics for FOPL, Properties of Wffs, Conversion to Clausal Form, Inference Rules, The Resolution Principle, No deductive Inference Methods, Representations Using Rules.

MODULE – IV

Dealing With Inconsistencies and Uncertainties: Introduction, Truth Maintenance Systems, Default Reasoning and the Closed World Assumption, Predicate Completion and Circumscription, Modal and Temporal Logics.

Probabilistic Reasoning: Introduction, Bayesian Probabilistic Inference, Possible World Representations, Dumpster-Shafer Theory, Ad-Hoc Methods.

MODULE – V

Structured Knowledge: Graphs, Frames and Related Structures: Introduction, Associative Networks, Frame Structures, Conceptual Dependencies and Scripts.

Object-Oriented Representations: Introduction, Overview of Objects, Classes, Messages and Methods, Simulation Example using an OOS Program.

MODULE – VI

Search and Control Strategies: Introduction, Preliminary Concepts, Examples of Search Problems, Uninformed or Blind Search, Informed Search, Searching And-Or Graphs.

Matching Techniques: Introduction, Structures Used in Matching, Measures for Matching, Matching Like Patterns, Partial Matching.

MODULE – VII

Knowledge Organization and Management: Introduction, Indexing and Retrieval Techniques, Integrating Knowledge in Memory, Memory Organization Systems.

Expert Systems Architectures: Introduction, Rule Based System Architecture, Non-Production System Architecture, Dealing with uncertainty, Knowledge Acquisition and Validation, Knowledge System Building Tools.

Text Book:

1. Dan W. Patterson - Introduction to Artificial Intelligence and Expert Systems, PHI, New Delhi, 2006.

Reference Books:

1. E. Rich & K. Knight - Artificial Intelligence, 2/e, TMH, New Delhi, 2005.
2. P.H. Winston - Artificial Intelligence, 3/e, Pearson Edition, New Delhi, 2006.
3. D.W. Rolston,- Principles of AI & Expert System Development, TMH, New Delhi.

CP 8103	Simulation & Modeling	1.0

MODULE-I

Basic Simulation Modeling:- The nature of Simulation, Systems, Models, and Simulation, Discrete- Event Simulation, Simulation of a Single-Server Queueing System, Simulation of an Inventory System, Alternative Approaches to Modeling and Coding Simulations, Steps in a Sound Simulation Study, Other Types of Simulation, Advantages, Disadvantages, and Pitfalls of Simulation.

MODULE -II

Modeling Complex Systems:- List Processing in Simulation, Single-Server Queueing Simulation with Simlib, Time-Shared Computer Model, Multiteller Bank with Jockeying, Job-Shop Model, Efficient Event-List Manipulation.

MODULE -III

Simulation Software:- Introduction, Comparison of Simulation Packages with Programming Languages,Classfication of Simulation Software, Desirable Software Features, General-Purpose Simulation Packages, Object-Oriented Simulation.

MODULE -IV

Building Valid, Credible, and Appropriately Detailed Simulation Models:- Introduction and Definitions, Guidelines for Determining the Level of Model Detail, Verification of Simulation Computer Programs, Techniques for Increasing Model Validity and Credibility.

MODULE -V

Selecting Input Probability Distribution:- Introduction, Useful Probability Distributions, Techniques for Accessing Sample Independence, Activity I: Hypothesizing Families of Distributions, Activity II: Estimation of Parameters, Activity III: Determining How Representative the Fitted Distributions Are.

MODULE -VI

Random- Number Generators:- Linear Congruential Generators, Other Kinds of Generators, Testing Random-Number Generators.

MODULE -VII

Generating Random Variates:- Introduction, General Approaches to Generating Random Variates, Generating Continuous Random Variates, Generating Discrete Random Variates.

Text Book:

1. A.M.Law & W.D. Kelton- Simulation Modeling and Analysis, 4/e, Tata McGraw Hill, New Delhi, 2006.

Reference Books:

1. J. Banks et.al. Discrete – Event System Simulation, 4/e, Pearson Education, New Delhi, 2007.
2. A.F. Seila et.al. Applied Simulation Modeling, Thomson Learning, India Edition, 2004.
3. G. Gordon – System Simulation, PHI, New Delhi, 2006.

MODULE - I
Concepts of Managements: Definition, nature and scopes, overall view of Management, Relation with other social sciences and industry.

MODULE – II + III
Evolution Of Management Thought: Classical theory of management, Bureaucracy - Introduced by Max Weber, Scientific Management-F.W. Taylor and his followers, Process Management-Introduced B.H. Fayol and others, NCO-classical theory of management, aluman Relations-B.E. May and Roethlisberger, Behavioral Science approach-By Mc Gregor Maslow and others, Modern Management theories peter Drucker.

Management Functions: Planning, Organisation, staffing, Directing and controlling.

MODULE - IV
Executive Functions: Production, Marketing, Finance, Personnel.

Planning: Concept, Nature, Importance, Objectives, Policies, Procedure, strategies, and Method of Decision-Making.

MODULE - V
Organisations: Definition, Theories of Organisation, Forms of Organisation, Formal and Informal Organisation, Type of formal organisations, Departmentation, Line and Staff Relationship, Span of Decentralisation, Committees.

MODULE – VI + VII
Staffing: Selection, Recruitment, raining, Development and Welfare.

Directing: Leadership and Supervision, Motivation and communication.

Controlling: The elements, process and style of Control, techniques of control.

Social Responsibility of Business:

Reference Books:

1. Koontz et.al - Principle of Management Essentials of management.
2. Theo Haiman - Management theory and Practice.
3. Drucker P.F - Management-Task and Responsibility.
4. Drucker P.F- The Practice of Management.
5. Newman et.al - Process of Managements.
6. Beach E.F.L. - The Principle and Practical Management Chapter 1.
7. Merril H.F - Classics in Management Preface.

ELECTIVE

IT 8111	Enterprise Resource Planning

MODULE - I
Introduction to ERP: Evolution of ERP, What is ERP, Reasons for the growth of the ERP market, Advantages of ERP, Reasons of Failure.

MODULE - II
Enterprise- An overview: Integrated Management information, Business Modeling, Integrated Data Model.

MODULE - III
ERP and Related Technologies: BRP (Business Process Reengineering), MIS (Management Information System), DSS (Decision Support System), EIS (Executive Information system), OLAP, Supply Chain Management.

MODULE - IV
A Manufacturing Perspective: ERP, CAD/CAM, MRP (Material Requirement Planning), Bill of Material, Closed loop MRP, MRP-II, DRP (Distributed Requirement Planning), Product Data Management, Data Management,

MODULE -V
Benefits of PDM: ERP Modules, Finance, Plant Maintenance, Quality Management, Material Management.

MODULE - VI
Benefits of ERP:
ERP Market: SAP, BAAN, Oracle Corporation, People Soft.
ERP Implementation Life Cycle:

MODULE - VII
Vendors, Consultants & User's: In – house Implementation – pros & cons, Vendors, Consultants, End-users.
Future Directions in ERP.
ERP Case Studies.

Text Book :

1. Alexis Leon - Enterprise Resource Planning, TMH, New Delhi 2001.

Reference Books:

1. E. Monk & B. Wagner – Concepts in Enterprise source planning, 2/e, Thomson Learning, India Edition 2007.

ELECTIVE

IT 8113	Information System Project Management

MODULE-I + II

Information Systems: Concepts and Management: Information Systems: Concepts and Definitions, Types of Information Systems, Examples of Information Systems, Managing Information Resources.

The Modern Organization in the Digital Economy: Doing Business in the Digital Economy, Business Pressures, Organizational Responses, and IT Support, Competitive Advantage and Strategic Information Systems, Why Should You Learn About Information Technology.

MODULE -III+ IV

Ethics, Privacy, and Informationsecurity: Ethical Issues, Threats to Information Security, Protecting Information Resources.

Data and Knowledge Management: Managing Data, The Database Approach, Database Management Systems, Data Warehousing, Data Visualization Technologies, Knowledge Management.

Wireless, Mobile Computing, and Mobile Commerce: Wireless Technologies, Wireless Computer Networks and Internet Access, Mobile Computing and Mobile Commerce, Pervasive Computing, Wireless Security.

MODULE -V

Organizational Information Systems: Transaction Processing Systems, Functional Information Systems, Enterprise Resource Planning Systems, Customer Relationship Management, Supply Chain Management Systems, Electronic Data Interchange and Extranets.

MODULE -VI + VII

Managerial Support Systems: Managers and Decision Making, Decision Support Systems, Enterprise and Executive Decision Support Systems, Intelligent Systems.

Acquiring IT Application: Planning for and Justifying IT Applications, Strategies for Acquiring IT Applications, The Traditional Systems Development Life Cycle, Alternative Methods and Tools for Systems Development, Outsourcing and Application Service Providers.

Text Book:

1. R.K. Rainer Jr, E Turban & R.E.Potter- Introduction to Information Systems, John Wiley, India Edition, 2006.

Reference:

1. L.Jessup – Information Systems Today, 2/e, Pearson Education, New Delhi-2006.

ELECTIVE

IT 8115	Decision Support Systems & Intelligent Systems

MODULE-I

Decision Support Systems: An Overview: Opening Vignette: Southwest Airlines Flies in the Face of Competition through DSS, DSS Configurations, What Is a DSS, Characteristics and Capabilities of DSS, Components of DSS, The Data Management Subsystem, The User Interface (Dialog) Subsystem, The Knowledge-Based Management Subsystem, The User, DSS Hardware, DSS Classifications.

MODULE -II

Modeling and Analysis: Opening Vignette: DuPont Simulates Rail Transportation System and Avoids Costly Capital Expense, MSS Modeling, Static and Dynamic Models, Certainty, Uncertainty, and Risk, Influence Diagrams, MSS Modeling with Spreadsheets, Decision Analysis of a Few Alternatives (Decision Tables and Decision Trees), The Structure of MSS Mathematical Models, Mathematical Programming Optimization, Multiple Goals, Sensitivity Analysis, What-If, and Goal Seeking, Problem-Solving Search Methods, Heuristic Programming, Simulation, Visual Interactive Modeling and Visual Interactive Simulation, Quantitative Sofware Packages, Model Base Management.

MODULE -III

Business Intelligence: Data Warehousing, Data Acquisition, Data Mining, Business Analytics, and Visualization: Opening Vignette: Information Sharing a Principal Component of the National Strategy for Homeland Security, The Nature and Sources of Data, Data Collection, Problems, and Quality, The Web/Internet and Commercial Database Services, Database Management Systems in Decision Support Systems/Business Intelligence, Database Organization and Structures, Data Warehousing, Data Marts, Business Intelligence/Business Analytics, Online Analytical Processing (OLAP), Data Mining, Data Visualization, Multidimensionality, and Real-Time Analytics.

MODULE -IV

Decision Support System Development: Opening Vignette: Osram Sylvania Thinks Small, Strategizes Big-Develops the InfoNet HR Portal System, Introduction to DSS Development, The Traditional System Development Life Cycle, Alternative Development Methodologies, Prototyping: The DSS Development Methodology, Change Management, DSS Technology Levels and Tools, DSS Development Platforms, DSS Development Tool Selection, Team-Developed DSS, End User Developed DSS, Putting The DSS Together.

MODULE -V

Artificial Intelligence and Expert Systems: Knowledge-Based Systems: Opening Vignette: Intelligent Systems in KPN Telecom and Logitech, Concepts and Definitions of Artificial Intelligence, Evolution of Artificial Intelligence, The Artificial Intelligence Field, Basic Concepts of Expert Systems, Applications of Expert Systems, Structure of Expert Systems, How Expert Systems Work, Problem Areas Suitable for Expert Systems, Benefits and Capabilities of Expert Systems, Problems and Limitations of Expert Systems, Expert System Success Factors, Types of Expert Systems, Expert Systems on the Web.

MODULE -VI

Knowledge Acquisition, Representation, and Reasoning: Opening Vignette: Development of a Real-Time Knowledge-Based System at Eli Lilly, Concepts of Knowledge Engineering, Scope and Types of Knowledge, Methods of Knowledge Acquisition from Experts, Knowledge Acquisition from Multiple Experts, Automated Knowledge Acquisition from Data and Documents, Knowledge Verification and Validation, Representation of Knowledge, Reasoning in Rule-Based Systems, Explanation and Metaknowledge, Inferencing with Uncertainty, Expert Systems Development, Knowledge Acquisition and the Internet.

MODULE -VII

Intelligent Systems over the Internet: Opening Vignette: Spartan Uses Intelligent Systems to Find the Right Person and Reduce Turnover, Web-Based Intelligent Systems, Intelligent Agents: An Overview, Characteristics of Agents, Why Intelligent Agents, Classification and Types of Agents, Internet-Based Software Agents, DSS Agents and Multi-Agents.

Text Book:

1. E. Turban, J.E. Aronson & T.P.Liang- Decision Support Systems and Intelligent Systems, 7/e, Pearson Education, New Delhi- 2006.

ELECTIVE

CP 8105	Distributed Systems

MODULE-I

Characterization of Distributed Systems: Introduction, Examples of distributed systems, Resource sharing and the Web, Challenges.

System Models: Introduction, Architectural models, Fundamental models, Summary.

MODULE -II

Networking and Internetworking: Introduction, Types of network, Network Principles, Internet protocols, Case studies: Ethernet, WiFi, Bluetooth and ATM.

Module-III

Interprocess Communication: Introduction, The API for the Internet protocols, External data representation and marshalling, Client-server communication, Group communication, Case study: interprocess communication in UNIX.

MODULE -IV

Time and Global States: Introduction, Clocks, events and process states, Synchronizing physical clocks, Logical time and logical clocks, Global states, Distributed debugging.

Coordination and Agreement: Introduction, Distributed mutual exclusion, Elections, Multicast communication.

MODULE -V

Transactions and Concurrency Control: Introduction, Transactions, Nested transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

MODULE -VI

Distributed Transactions: Introduction, Flat and nested distributed transactions, Atomic commit protocols, Concurrency control in distributed transactiuons. Distributed deadlocks, Transactions recovery.

MODULE -VII

Replication: Introduction, System model and group communication, Fault-tolerant services, Case studies of highly available services: the gossip architecture, Bayou and Coda, Transaction with replicated data.

Text Book:

1. G. Coulouris et. al. - Distributed Systems: concepts and Design, 4/e, Pearson Education, New Delhi.

ELECTIVE

CP 8115	Embedded System Design

MODULE-I

Embedded Computing: Introduction, Complex systems and Microprocessors, The embedded system design process, Formalization for system design.

MODULE -II+III

Instruction Sets CPUs: Instruction and preliminaries ARM and SHARC Processors, Programming I/O CPU performance and Power consumption.

MODULE -IV + V

The embedded Computing Platform and program design: Introduction, the CPU bus, Component interfacing, designing with microprocessors, development and debugging.

MODULE -VI+ VII

Program Design and Analysis: Introduction program design, Assembly, Linking, Basic compilation techniques, Analysis optimisation of executive time.

Text Book:

1. Wayner Wolf., "Computers as components – Principle of Embedded Computing
2. System Design", Morgan Kaufmann/ Hercourt India Pvt. Ltd.

Reference Books :

1. Raj Kamal - Embedded Systems, TMH, New Delhi 2004.
2. F. Vahid & T. givargis- Embedded system Design, John wiley, India Edition, 2005.

ELECTIVE

CP 8119 Advance Computer Graphics

MODULE-I

Representing Curves and Surfaces: Polygon Meshes, Parametric Cubic Curves, Parametric Bicubic Surfaces, Quadratic Surfaces.

MODULE -II

Achromatic and Colored Light Achromatic Light, Chromatic Color, Color Models for Raster Graphics, Reproducing color, Using Color in Computer Graphics.

MODULE -III

The Quest for Visual Realism Why Realism, Fundamental Difficulties, Rendering Techniques for Line Drawings, Rendering Techniques for Shaded Images, Improved Object Model, Dynamics, Stereopsis, Improved Displays, Interacting with Our Other Senses, Aliasing and Antialiasing.

MODULE -VI

Visible-Surface Determination : Functions of Two Variables, Techniques for Efficient Visible-Surface Algorithms, Algorithms for Visible-Line Determination, The z-Buffer Algorithm, List Priority Algorithms, Scan-Line Algorithms, Area-Subdivision Algorithms, Algorithms for Octrees, Algorithms for Curved Surfaces, Visible-Surface Ray Tracing.

MODULE -V

Illumination and Shading : Illumination Models, Shading Models for Polygons, Surface Detail, Shadows, Transparency, Interobject Reflections, Physically Based Illumination Models, Extended Light Sources, Spectral Sampling.

MODULE -VI

Advanced Raster Graphics Architecture: Simply Raster-Display System, Display-Processor Systems, Standard Graphics Pipeline, Introduction to Multiprocessing, Pipeline Front-End Architectures, Parallel Front-End Architectures, Multiprocessor Rasterization Architectures.

MODULE -VII

Advanced Geometric and Raster Algorithms: Clipping, Scan-Converting Primitives, Antialiasing, The Special Problems of Text, Filling Algorithms, Making copyPixel Fast, The Shape Data Structure and Shape Algebra.

Text Book:

1. J.D. Foley et. al. – Computer Graphics Principles & Practical 2/e , Pearson Education, New Delhi, 2004.

ELECTIVE

CP 8121	Pattern Recognition

MODULE – I

Pattern Recognition Overview: Overview, Pattern Recognition, Classification and Description, Patterns and Feature Extraction, Training and Learning in PR Systems, Pattern Recognition Approaches.

MODULE – II

Statistical Pattern Recognition: Introduction, The Gaussian case and Class Dependence Discriminate Functions, Extensions, Classifier Performance, RISK and Errors.

MODULE – III

Supervised Learning: Parametric Estimation and Supervised Learning, Maximum Likelihood Estimation Approach, Bayesian Parameter Estimation Approach, Non – Parametric Approaches, Parzen Windows, K-nn Non-Parametric Estimation. Nearest Neighbour Rule.

MODULE – IV

Linear Discriminate Functions and the Discrete and Binary Feature Cases: Introduction, Discrete and Binary Classification Problems, Techniques to Directly Obtain Linear Classifiers.

MODULE – V + VI

Syntactic Pattern Recognition: Overview Quantifying Structure in Pattern Description and Recognitions, Grammar Based Approach and Application, String Generation as Pattern Description.

Recognition by String Matching and Parsing. The Cocke-Younger Kasami ((ck) parsing algorithm.

MODULE – VII

Neural Pattern Recognition: Introduction to Neural Networks, Neural Network Structure from Pattern Recognition Applications. Physical Neural Network. The Artificial Neural Network Model, Neural Network Based Pattern Associators.

Text Book :

1. Robort Schalkoff - Pattern Recognition, Statistical, Structural and Neural Approach, John Wiley, Indian Edition, 200.

Reference Books :

1. R. U. Duda – Pattern Classification, John Wiley, Indian Edition, 2006.

ELECTIVE

CP 8123	Real Time Systems

MODULE-I

Basic Real-Time Concepts: Terminology, Real-Time System Design Issues, Example Real-Time Systems, Common Misconceptions, Brief History.

MODULE -II

Hardware Considerations: Basic Architecture, Hardware Interfacing, Central Processing Unit, Memory, Input/Output, Enhancing Performance, Other Special Devices, Non-von-Neumann Architectures.

MODULE -III

Real-Time Operating Systems: Real-Time Kernels, Theoretical Foundations of Real-Time Operating Systems, Intertask Communication and Synchronization, Memory Management, Case Study: POSIX.

MODULE -IV

Software Requirements Engineering: Requirements-Engineering Process, Types of Requirements, Requirements Specification for Real-Time Systems, Formal Methods in Software Specification, Structured Analysis and Design, Object-Oriented Analysis and the Unified Modeling Language, Organizing the Requirements Document, Organizing and Writing Requirements, Requirements Validation and Review.

MODULE -V

Software System Design: Properties of Software, Basic Software Engineering Principles, The Design Activity, Procedural-Oriented Design, Object-Oriented Design, Appendix: Case Study in Software Requirements Specification for Four-Way Traffic Intersection Traffic Light Controller System.

MODULE -VI

Programming Languages and the Software Production Process: Introduction, Assembly Language, Procedural Languages, Object-Oriented Languages.

MODULE -VII

Performance Analysis and Optimization: Theoretical Preliminaries, Performance Analysis, Application of Queuing Theory, I/O Performance, Performance Optimization.

Text Book:

1. Phillip A. Laplante- Real-Time Systems: Design and Analysis, John Wiley- India Edition, 2006.

Reference Books:

1. Rajib Mall- Real Time Systems; Theory and Practice, Pearson Edition, New
2. Delhi- 2007.
3. J.W.S.Liu – Real Time Systems, Pearson Education, New Delhi – 2004.
4. C.M.Krishna & K.G. Shiv – Real Time Systems, Mc Graw Hill – 1997.

ELECTIVE

CP 8127	Computing & Complexity Theory

MODULE - I

The Church- Turing Thesis: Turing Machines- Formal definition of a Turing machine, Examples of Turing machines; Variants of Turing Machines- Multitape Turing machines, Nondeterministic Turing machines, Enumerators, Equivalence with other models; The Definition of Algorithm- Hilbert's problems, Terminology for describing Turing machines.

MODULE - II

Decidability: Decidable Languages- Decidable problems concerning regular languages, Decidable problems concerning context-free languages; The Halting Problem- The diagonalization method, The halting problem is undecidable.

MODULE - III

Reducibility: Undecidable Problems from Language Theory- Reductions via computation histories; A Simple Undecidable Problem; Mapping Reducibility-Computable functions, formal definition of mapping reducibility.

MODULE - IV

Advanced Topics In Computability Theory:- The Recursion Theorem, Self-reference, Terminology for the recursion theorem, applications; Decidability of logical theories- A decidable theory, An undecidable theory; Turing Reducibility; A Definition of Information- Minimal length descriptions, Incompressible strings and randomness.

MODULE – V+VI

Time Complexity: Measuring Complexity- Big-O and small-o notation, Analyzing algorithms, Complexity relationships among models; The Class P- Polynomial time, Examples of problems in P; The Class NP- Examples of problems in NP, The P versus NP question; NP-completeness- Polynomial time reducibility, Definition of NP-completeness, The Cook-Levin Theorem; Additional NP-complete Problems- The vertex cover problem, The Hamiltonian path problem, The subset sum problem.

MODULE - VII

Space Complexity: Savitch's Theorem, The Class PSPACE, PSPACH-completeness – The TQBF problem, Winning strategies for games, Generalized geography; The Classes L and NL, NL-completeness- Searching in graphs; NL equals coNL.

Intractability: Hierarchy Theorems- Exponential space completeness; Relativization- Limits of the diagonalization method; Circuit Complexity.

Text Book:

1. Michael Sipser – Introduction to the Theory of Computation, 2/e, Thomson Learning – India Edition 2006.

Reference Books:

1. R.G.Taylor – Models of Computation and Formal Languages, Oxford University New York, 1998.
2. 2. B.M. Moret – The Theory of Computation, Pearson Education, New Delhi – 2002.