Proposed Syllabus

For

B.Tech Program

in

Information Technology

By

C.S.J.M.University,Kanpur

Department of Information Technology

B.Tech program curriculum

Semester-wise breakup of courses

Semester: 1st

		L	T	P	Cr
MTH-S101	Mathematics – 1	3	2	0	4
PHY-S101T	Physics –I	3	2	0	3
PHY-S101P	Physics –I Lab	0	0	3	2
ISC-S101T	Programming and Computing (C & Unix)	3	0	3	3
ISC-S101P	Programming and Computing (C & Unix) Lab	0	0	3	2
TCA-S102T	Workshop Concepts	1	1	0	2
TCA-S102P	Workshop Practice	0	0	3	3
HSS-S101	Communicative English	3	1	0	4

Semester: 2nd

MTH-S102	Mathematics II	3	2	0	4
PHY-S102T	Physics II	3	2	0	3
PHY-S102P	Physics II Lab	0	0	3	2
CHM-S101T	Chemistry I	3	2	0	3
CHM-S101P	Chemistry I Lab	0	0	3	2
TCA-S101	Engg. Drawing	0	2	4	5
ESC-S101T	Basic Electrical & Electronics Engineering	3	1	0	3
ESC-S101P	Basic Electrical & Electronics Engineering Lab	0	0	3	2

Semester: 3rd

DIT –S201T	Object Oriented Systems Theory	3	1	0	3
DIT –S201P	Object Oriented Sys Lab	0	0	3X2	2
DIT –S203T	Digital Electronics	3	0	0	4
DIT –S203P	Digital Electronics Lab	0	0	2	1
MTH-S201	Mathematics III	3	2	0	4
ESC-S201	Engg. Mechanics	3	1	0	4
DIT-S205T	Data Structures	3	1	0	3
DIT-S205P	Data Structures Lab	0	0	3X2	2
GP-101	General Proficiency				1

Semester: 4th

DIT-S202	Computer Organisation	3	1	0	4
DIT –S204	PPL	3	0	0	4
DIT-S206T	Software Engineering	3	0	0	3
DIT-S206P	Software Engineering Lab	0	0	3	1
HSS-S401	INDUSTRIAL ECONOMICS	3	0	0	4
MTH-S301	DISCRETE MATHEMATICS	3	1	0	4
GP-102	General Proficiency				1

Semester: 5th		**L**	**T**	**P**	**Cr**
DIT –S301T	Microprocessors	3	0	0	3
DIT-S301P	Microprocessors Lab	0	0	3	1
DIT-S303	Theory of computation	3	0	0	4
DIT-S305	Design & Analysis of Algorithm	3	0	0	4
DIT-S307T	DBMS	3	1	0	3
DIT-S307P	DBMS Lab	0	0	3X2	2
DIT-S309T	Operating System	3	0	0	3
DIT-S309P	Operating System Lab	0	0	3	1
GP-103	General Proficiency				1
Semester: 6th					
DIT-S302T	Computer Networks	3	0	0	3
DIT-S302P	Computer Networks Lab	0	0	3	1
DIT-S308T	Internet Technology	3	0	0	3
DIT-S308P	Internet Technology Lab	0	0	3X2	2
---	Departmental Elective			-	
---	Departmental Elective			-	
---	Mathematics Elective			-	
SST-S301	Summer Training	0	0	1	2
HSS-S301	Professional Communication	1	1	1	2
GP-104	General Proficiency				1
Semester: 7th					
DIT-S401T	Digital Image Processing	3	0	0	4
DIT-S401P	Digital Image Processing Lab	0	0	3	1
----	Departmental Elective				
---	Departmental Elective				
HSS-S201	Industrial Management	3	0	0	4
PRT-S401	B Tech Project I	0	0	6	4
SSM-S401	Student Seminar	0	0	2	2
GP-105	General Proficiency				1
Semester: 8th					
DIT-S402	Information Systems	3	1	0	4
---	Departmental Elective				
---	Departmental Elective				
---	Departmental Elective				
PRT-S402	B Tech Project II	0	0	6	4
GP-106	General Proficiency				1

Note: Total No. of Lectures in each course should in the range of 40 to 45 per semester if per week three lectures are allotted.

List of Electives

		L	T	P	Cr
DIT –S501	Software project management	3	0	0	4
DIT –S502	Mobile/Wireless Computing	3	0	0	4
DIT –S503	Information coding & techniques	3	0	0	4
DIT– S504	Advance Computer Architecture	3	0	0	4
DIT –S505	Computer Graphics	3	1	2	5
DIT –S506	Artificial Intelligence	3	0	0	4
DIT –S507	Advance JAVA	3	1	2	5
DIT –S508	Data Mining	3	0	0	4
DIT –S509	Dot NET	3	1	2	5
DIT –S510	VLSI	3	0	0	4
DIT –S511	Distributed Systems	3	0	0	4
DIT –S512	Network Security	3	0	0	4
DIT –S513	Multimedia Systems	3	0	0	4
DIT –S514	System Analysis And Design	3	0	0	4
DIT –S515	Embedded Systems	3	0	0	4
DIT –S516	Real Time Systems	3	0	0	4
DIT–S517	Geographic Information systems	3	0	0	4
DIT–S518	e–Commerece	3	0	0	4
DIT–S519	Data Communication	3	0	0	4
DIT–S520	Analog Electronics Circuit	3	0	1	4
DIT–S521	Signal & Systems	3	0	0	4
DIT–S522	Modeling & Simulation	3	0	0	4
DIT–S523	Artificial Neural Networks	3	0	0	4
DIT–S524	Stochastic Models for Computer Applications	3	0	0	4
DIT–S525	Telecommunication & Switching	3	0	0	4
DIT–S526	Information Security and Cyber Laws	3	0	0	4
DIT –S527	Digital Signal Processing	3	0	0	4
MTH–S501	Operations Research	1	0	4	3
MTH –S502	Graph Theory	3	2	0	4
MTH–S503	Probability and Statistics	3	0	0	4

Detailed Syllabus of B.Tech program courses

Course Code: MTH-S101 **Breakup: 3 – 1 – 0 – 4**

Course Name: Mathematics-I

Course Details:

Unit I

Applications of Integrals : Areas between curves, Methods of finding volume : Slicing, Solids of revolution, Cylindrical shell, Lengths of plane curves, Areas of surface of revolution, Moments and Center of mass, Improper integrals .

Unit II

Sequences: Definition, Monotonic sequences, Bounded sequences, Convergent and Divergent Sequences**.**

Series: Infinite series, Oscillating and Geometric series, their Convergence, Divergence. Tests of Convergence: n^{th} Term test of divergence, Integral test, Comparison Test, Limit Comparison test, Ratio test, n^{th} root test (Cauchy root test), Alternating series, Absolute and Conditional convergence.

Power Series: Power series and its convergence, Radius and interval of convergence, Term by term differentiation, Term by term integration, Product of power series, Taylor and Maclaurin series, Convergence of Taylor series, Error estimates, Taylor's Theorem with remainder .

Unit III

Vector Calculus: Vector valued functions, Arc length and Unit Tangent vector, Curvature, Torsion and TNB frame **.**

Partial Derivatives: Function of two or more variables (Limit, Continuity, Differentiability , Taylors Theorem) , Partial derivatives, Chain Rule, Partial Derivatives of higher orders, , Maxima and Minima and Saddle Point, Lagrange Multipliers, Exact differential, Leibniz Theorem.

Directional derivatives, Gradient Vectors, Divergence and Curl, Tangent planes .

Unit III

Multiple Integrals: Double and triple integral, Change of order, Jacobian, Change of variables, Application to area and volume, Dirichlet integral and Applications.

Line, surface integrals , Path independence, Statement and problems of Green's, Stoke's and Gauss divergence theorems (without proof).

Text Books and Reference :

1. G.B.Thomas and R.L.Finney : Calculus and Analytical Geometry, 9^{th} edition, Pearson Educaion
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 2005.

Course Code: PHY-S101T **Breakup: 3 – 1 – 0 – 3**

Course Name: Physics-I

Course Details:

Unit-I: Newton's laws and their applications, Friction, conservative forces and potentials, Work energy theorem, conservation of energy and linear momentum, variable mass system (rocket), impulse, system of particles and collision, Elementary rigid body kinematics, rotation motion, moment of inertia, and Gyroscopic motion.

Unit-II: Rigid body motion, angular momentum, fundamental of classical mechanics, Lagrangian and Hamiltonian formulation.

Unit-III: Motion in non-inertial frames, fractious forces, special theory of relativity, central forces, Gravitation motion under central forces and Kepler's Laws.

Unit-IV: Simple harmonic motion (SHM), small oscillations and resonance; Wave particle duality, de-Broglie matter's waves, Phase and group velocities, Davisson-Germer experiment, Heisenberg uncertainty principle and its applications.

Unit-V: Wave function and its significance, Schrödinger equations (time dependent and independent), Schrödinger's wave equation for particle in one dimensional box, diffraction of X-rays by crystal planes, Bragg's spectrometer, Compton's effect.

Text Books and References:

1. Mechanics: D. S. Mathur
2. A textbook of Mechanics: J. C. Upadhyay
3. Concept of physics (I & II): H. C. Verma
4. Introduction to Mechanics: R. D. Kleppner and J. Kolenkow
5. Physics: Resnick, Halliday and Krane
6. Vector analysis: M. R. Spiegel
7. Classical Mechanics: Goldstien
8. Modern Physics: Author Beiser

Course Code: PHY-S101P **Breakup: 0 – 0 – 3 – 2**

Course Name: Physics Lab-I

Course Details:

1. Graphical Analysis (Ref. UIET Laboratory Manual)
2. Trajectory of projectile (Ref. UIET Laboratory Manual)

Apparatus Used (Trajectory Apparatus, Metal Balls, Channels, Vernier Callipers, Carbon & Graph Paper)

3. Moment of Inertia of Bicycle wheel (Ref. Book by K. K. Dey, B. N. Dutta)

Apparatus Used (Bicycle Wheel, Masses, Thread, Stopwatch, Meter Scale, Vernier Callipers)

4. Spring Oscillations (Ref. UIET Laboratory Manual)

Apparatus Used (Spring Oscillation Apparatus, Stop Watch, Masses)

5. Coupled Pendulum (Ref. UIET Laboratory Manual)

Apparatus Used (Coupled Pendulum Setup, Stop Watch, Scale)

6. Bifilar Suspension System (Ref. UIET Laboratory Manual)

Apparatus Used (Bifilar Suspension System Setup, Stop Watch, Masses)

7. Frequency of AC Mains by Melde's Method (Ref. Book by K. K. Dey, B. N. Dutta)

Apparatus Used (Electrical Vibrator, String, Pulley, Small Pan, Weight Box & Physical Balance)

8. Kater's(Reversible) Pendulum (Ref. Book by K. K. Dey, B. N. Dutta)

Apparatus Used (Kater's Pendulum, Stop Watch)

9. Inertia Table (Ref. Book by K. K. Dey, B. N. Dutta)

Apparatus Used (Inertia Table, Stop Watch, Vernier Callipers, Split Disc, Balancing Weights, and Given Body(Disc))

Course Code: **ISC – S101T** **Breakup:** **3 – 0 – 0 – 3**

Course Name: **Programming & Computing(C & UNIX)**

Course Details:

Basic concepts of Computers, Basic UNIX Concepts and Vi - Editor

Introduction to C: Basic Programming concepts, Program structure in C, Variables and Constants, Data types, Conditional statements, control statements, Functions, Arrays, Structures, Introduction to pointers, Introduction to File Systems.

Text Books and References:

1. Programming in C, Schaum Series
2. The 'C' Programming, Denis Ritchi (PHI)
3. Programming in C, Venugopal (TMH)
4. Let us C, Yashant Kanetkar (BPB)
5. Programming in C, Balaguruswami (TMH)

Course Code: **ISC – S101P** **Breakup:** **0 – 0 – 3 – 2**

Course Name: **Computer Programming Lab:**

Course Details:

Learning OS Commands

Practice of all Internal and External DOS Commands, Writing simple batch programs, Exposure to Windows environment, Practice of UNIX commands and Vi editor, Writing simple shell script

C Programming:

Practicing programs to get exposure to basic data types, algebraic expressions, Conditional statements, Input Output Formatting, Control structures, arrays, functions, structures, pointers and basic file handling.

Course Code: **TCA – S102T** **Breakup:** **1 – 1 – 0 – 2**

Course Name: **Workshop Concepts**

Course Details:

Historical perspectives; Classification of Manufacturing process.

Machining: Basic principles of lathe machine & operations performed on it. Basic description of machines & operations of shaper-planer, drilling, milling, grinding.Unconventional machining processes , Machine tools.

Casting processes:pattern & allowances. Moulding sands & its desirable properties. Mould making with the use of a core. Gating system. Casting defects & remedies. Cupola furnace. Die-casting & its uses.

Metal forming: Basic metal forming operations & uses of such as-forging, rolling, wire& tube drawing/making & extrusion, & its products/applications, press work & die & punch assembly, cutting & forming, its application. Hot working vs Cold working. Powder metallurgy: powder metallurgy process & its applications, plastic-products manufacturing, galvanizing & electroplating.

Welding: Importance & basics concepts of welding, classification of welding processes. Gas welding, types of flames, Electric arc welding. Resistance welding. Soldering & brazing and its uses. Modern trends in manufacturing, Automation. Introduction to NC/CNC/DNC,FMS,CAD/CAM,CIM and factory of future.

Text Books and References:

1. Chapman,W A J & Arnold ,E "Workshop Technology ; vol. I,II&III" Viva Low Priced Student Edition.
2. Raghuwanshi,B S "Workshop Technology ; vol. I&II" Dhanpat Rai & Sons
3. Chaudhary, Hajra "Elements of Workshop Technology ; vol. I&II" Media Promoters & Publishers.

Course code: **TCA – S102P** **Breakup:** **0 – 0 – 3 – 3**

Course Name: **Workshop Practice**

Course Details:

1. Foundry (1 turn)
2. Welding (3 turns)
   a. Gas Welding (1 turn)
   b. Arc Welding (2 turns)
      (i). Lap Joint (1 turn)

      (ii) Butt Joint (1 turn)
3. M/C Shop (4 Turns)
4. Fitting & Sheet Metal Work (1 turn+1 turn)
5. Carpentry Shop(1 turn)
6. Black-smithy shop(1 turn)

Text Books and References:

1. Chapman,W A J & Arnold ,E "Workshop Technology ; vol. I,II&III" Viva Low Priced Student Edition.
2. Raghuwanshi,B S "Workshop Technology ; vol. I&II" Dhanpat Rai & Sons .
3. Chaudhary, Hajra "Elements of Workshop Technology ; vol. I&II" Media Promoters & Publishers.

Course Code: HSS-S101 **Breakup: 3 –1 – 0 – 4**

Course Name: Communicative English

Course Details:

Unit 1: Basics of Technical Communication: Technical Communication: features; Distinction between General and Technical communication; Language as a tool of communication; Levels of communication: Interpersonal, Organizational, Mass communication; The flow of Communication: Downward, Upward, Lateral or Horizontal (Peer group); Barriers to Communication.

Unit 2: Constituents of Technical Written Communication: Word formation, Prefix and Suffix; Synonyms and Antonyms; Homophones; One Word Substitution; Technical Terms; Paragraph Development: Techniques and Methods -Inductive, Deductive, Spatial, Linear, Chronological etc; The Art of Condensation- various steps.

Unit 3: Forms of Technical Communication: Business Letters: Sales and Credit letters; Letter of Enquiry; Letter of Quotation, Order, Claim and Adjustment Letters; Memos, Notices, Circulars; Job application and Resumes. Reports: Types; Significance; Structure, Style & Writing of Reports. Technical Proposal; Parts; Types; Writing of Proposal; Significance.

Unit 4: Presentation Strategies: Defining Purpose; Audience & Locale; Organizing Contents; Preparing Outline; Audio-visual Aids; Nuances of Delivery; Body Language; Space; Setting Nuances of Voice Dynamics; Time- Dimension.

Unit 5: Value- Based Text Readings: Following essays form the suggested text book with emphasis on Mechanics of writing,

(i) The Language of Literature and Science by A.Huxley
(ii) Man and Nature by J.Bronowski
(iii) The Mother of the Sciences by A.J.Bahm
(iv) Humanistic and Scientific Approaches to Human Activity by Moody E. Prior
(v) The Effect of Scientific Temper on Man by Bertrand Russell.

Text Books and References:

1. Improve Your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, New Delhi.
2. Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press 2007, New Delhi.
3. Effective Technical Communication by Barun K. Mitra, Oxford Univ. Press, 2006, New Delhi
4. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., New Delhi.
5. How to Build Better Vocabulary by M.Rosen Blum, Bloomsbury Pub. London.
6. Word Power Made Easy by Norman Lewis, W.R.Goyal Pub. & Distributors; Delhi.
7. Developing Communication Skills by Krishna Mohan, Meera Banerji- Macmillan India Ltd. Delhi.
8. Manual of Practical Communication by L.U.B. Pandey & R.P. Singh; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, Delhi.

Course Code: MTH-S102 **Breakup: 3 – 1 – 0 – 4**

Course Name: Mathematics-II

Course Details:

Unit-I

Linear Algebra
Matrices, Elementary row and Column operations, Echelon form, Determinants, Rank of matrix, Vector spaces, Linear dependence and Independence, Linear transforms and matrices, Consistency of linear system of equations and their solution, Special Matrices : Symmetric, Hermition etc, Characteristic equation, Cayley-Hamilton theorem(statement only), Eigen values and Eigen vectors, Diagonalization .

Unit-II

Differential Equations : Separable, Exact Differential Equation , Integrating Factors, Linear differential equations with constant coefficients, Homogeneous Linear differential equations, Bernoulli Equation, Simultaneous linear differential equations, Clairaut's equation, Homogeneous linear differential equations of second order with constant coefficients, Complex root case, Differential operators, Euler-Cauchy equation , Wronskian, Nonhomogeneous equations,
Solution by undetermined coefficients, solution by variation of parameters.
Series solution: Ordinary differential equations of 2^{nd} order with variable coefficients (Frobenius Method).

Unit-III: Laplace Transform

Laplace transform, Existence Theorem, Laplace transform of derivatives and integrals, Inverse Laplace transform, Unit step function, Dirac Delta function, Laplace transform of periodic functions, Convolution Theorem, Applications to solve simple linear and simultaneous differential equations.

Text Books and Reference :

1. E. Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 2005.
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 2005.
3. C. Ray Wylie & Louis C. Barrett, Advanced Engineering Mathematics, Tata McGraw-Hill Publishing Company Ltd. 2003.
4. G.F. Simmons, Differential Equations, Tata McGraw-Hill Publishing Company Ltd. 1981.

Course Code: PHY-S102T **Breakup: 3 – 1 – 0 – 3**

Course Name: Physics-II

Course Details:

Unit-I: Vector analysis: scalars, vectors, vector differentiation, gradient, divergence and curl, vector, integration, Gauss divergence and Stoke's theorem, co-ordinate systems (spherical polar & cylindrical), Electrostatics: electric fields, potentials, Gauss's law, electric dipoles and multipoles, polarization, bound charges, linear dielectrics and force on dielectrics, electric displacement, boundary condition of E and D, work and energy of electrostatics, Laplace's equation and uniqueness theorem, image theory.

Unit-II: Motion of charge in electric and magnetic field, Magnetostatics: current density, magnetic fields, Ampére's law, Faraday's law, magnetic potential, magnetic polarization, bound current, magnetic properties of materials (para, dia and ferro), boundary condition of B and H, basic idea of superconductor.

Unit-III: Displacement current, Maxwell's equations for free space and matter (dielectric and conductor), Electromagnetic waves, Poynting vector.

Unit-IV: Origin the refractive index, Interference: division of wave-front and division of amplitude; diffraction: Fraunhoffer, Grating, Resolving power (grating, prism, telescope and microscope); polarization: Phenomena of double refraction, Nicol prism, optical activity Production and analysis of plane, circular and elliptical polarized light, Frenels theory of optical activities and Polarimeters.

Unit-V: Fiber optics and photonics: Fundamental ideas about optical fiber, types of fibers, Total Internal Reflection (TIR), critical angle, acceptance angle and application, basic principal of Laser and Holography and fundamental ideas about photonics.

Text Books and References

1. Optics: Ajoy Ghatak
2. A textbook of OPTICS: Subrahmanyam, Brijlal and Avadhanulu
3. Electrodynamics: David J. Griffith
4. Classical electrodynamics: J. D. Jackson
5. Modern Physics: Author Beiser
6. Photonic Crystals: J. D. Joannopoulos, R. D. Meade, and R. D. Winn

Course Code: PHY-S102P **Breakup: 0 – 0 – 3 – 2**

Course Name: Physics Lab-II

Course Details:

1. Newton's Ring (Ref. Book by K. K. Dey, B. N. Dutta)
Apparatus Used (Traveling Microscope, Support for Glass Plate inclined at 45^0 to the Vertical, Short Focus Convex Lens, Sodium Lamp, Plano Convex Lens, An Optically Plane Glass Plate)
2. Prism Spectrometer (Ref. Book by K. K. Dey, B. N. Dutta)
Apparatus Used (Spectrometer, Glass Prism, Reading Lens, Mercury Lamp)
3. Plane Transmission Grating (Ref. Book by K. K. Dey, B. N. Dutta)
Apparatus Used (Spectrometer, Diffraction Grating, Mercury Lamp)
4. Ballistic Galvanometer (Ref. Book by K. K. Dey, B. N. Dutta)
Apparatus Used (Ballistic Galvanometer, Morse key, Damping key, Condenser, Rheostat, Volt Meter, Storage Battery, Connection Wires)
5. Carey Foster's Bridge (Ref. Book by K. K. Dey, B. N. Dutta)
Apparatus Used (Carey Foster's Bridge, Laclanche cell, Resistance Box, Galvanometer, Plug Key, Copper Strip)
6. Fresnel's Biprism (Ref. Book by K. K. Dey, B. N. Dutta)
Apparatus Used (Sodium Lamp, Biprism, Convex Lens, Optical Bench with Four Uprights)
7. Variation of Magnetic Field (Ref. Book by K. K. Dey, B. N. Dutta)
Apparatus Used (Stewart and Gee type Tangent Galvanometer, Storage Battery, Commutator, Ammeter, Rheostat, One way Plug Key, Connection Wires)
8. Polarimeter (Ref. Book by K. K. Dey, B. N. Dutta)
Apparatus Used (Sodium Lamp, Polarimeter, Physical Balance)

Course Code: **CHM – S101T** **Breakup:** **3 – 0 – 0 – 3**

Course Name: **Chemistry - I**

Course Details:

UNIT-I - Atoms and Molecules:

1. Need for wave mechanical picture of atomic structure [Photoelectric effect, de Broglie concept of matter waves], Derivation of schrodinger wave equation [as an example particle moving in unidimensional potential well]
2. Chemical Bonding- Orbital concepts in bonding, V.B. and M.O. theory, M.O. diagrams, Intermolecular interactions.

UNIT-II - Reaction Dynamics:

Order, Molecularity, Rate law, Integrated rate equations, Methods of determining of order of reaction, Complex reaction kinetics- chain reactions and reversible reactions in detail, Catalysis and enzyme catalysis

UNIT-III - Electrochemistry:

Arrhenius theory of electrolytic dissociation, Transport number, Kohlrausch's law, Solubility product, Redox reaction, Electrochemical and concentration cells.

UNIT-IV- Stereochemistry:

Introduction, Chirality, Enantiomers, Diastereomers, Projection formula of a tetrahedral carbon, Geometrical isomerism, Conformers

UNIT- V- Spectroscopic Techniques:

General introduction to IR, NMR and Mass spectroscopy

UNIT-VI - Organic Reactions:

Introduction, Electron displacement effects, Organic intermediates, Types of reactions [addition, elimination and substitution reactions]

UNIT-VII - Photochemistry:

Photoexcitation of organic molecules, Jablonski diagram, Laws of photochemistry and quantum yield, Some examples of photochemical reactions, Chemistry of vision and other applications of photochemistry.

UNIT-VIII - Transition Metal Chemistry:

Stucture of coordination compounds corresponding to coordination number up to 6, Tpes of ligands, Isomerism [geometrical, optical, ionization, linkage and coordination], Theories of bonding in coordination compounds- crystal field theory, Valence bond theory, Chelation.

UNIT-IX - Laboratory Practical Classes:

Text Books and References:

Physical Chemistry- 1. P.W. Atkins
2. Puri & Sharma

Organic Chemistry- 1. Morisson & Boyd
2. Bahl and Bahl

Inorganic Chemistry- 1. J.D. Lee
2. R.P. Rastogi

Engineering Chemistry- Shashi Chawla

Course Code: **CHM – S101P** **Breakup:** **0 – 0 – 3 – 2**

Course Name: **Chemistry Lab- I**

Course Details:

Exp. 01. To estimate the strength of the given unknown solution of Mohr's salt (Ferrous ammonium sulphate ($FeSO_4(NH_4)_2SO_4.6H_2O$) using $KMnO_4$ solution as an intermediate.

Exp. 02. To prepare a sample of p-nitroacetanilide.

Exp. 03. To prepare a sample of Aspirin.

Exp. 04. Preparation of Tris (Thiourea) Copper (I) sulphate.

Exp. 05. Preparation of Hexamine Nickel (II) chloride $[Ni(NH_3)_6]Cl_2$.

Exp. 06. Estimation of commercial caustic soda: Determination of the amounts of sodium carbonate and sodium hydroxide present together in the given commercial caustic soda.

Exp. 07. Estimation of calcium ions present in tap water.

Exp. 08. To determine the partition coefficient of acetic acid between n-butanol and water.

Exp. 09. To study the photochemical reduction of a ferric salt (Blue printing).

Exp. 10. To determine the viscosity of a given liquid (30% sugar solution) at room temperature using Ostwald's viscometer.

Exp. 11. To separate Ag(I), Hg (I) and Pb (II) ions by paper chromatography and calculate their RF values.

Exp. 12. Understanding reaction kinetics and calculating the rate and order of a reaction.

Exp.13. To study the kinetics of methyl acetate hydrolysis catalyzed by 0.5N HCl solution.

Course Code: TCA-S101 **Breakup: 0 –2 – 4 – 5**

Course Name: Engineering Drawing

Course Details:

Introduction- Drawing instruments and their uses, BIS conventions, lettering dimensioning and free hand practicing.

Orthographic projections: Lines, planes and surfaces of objects, Sectional views, Auxiliary views, Space geometry: lines and planes, True lengths and shapes, Properties of parallelism, Perpendicularity and intersections of lines and planes, Simple intersections of solids and development of lateral simple solids**.**

Isometric Projections: Introduction , isometric scale, isometric projection of simple plane figures, isometric projection of tetrahedron, hexahedron (cube), right regular prisms , pyramids, cylinders, cones, spheres, cut spheres and combinations of solids.

Introduction to computer graphics: Some problems on above topics on computer graphics.

Text Books and References:

1. Narayana,K.L. & Kannaiah,P. "Engg.Graphics". Tata McGraw Hill, New Delhi.
2. Bhatt,N.D. "Elementary Engg. Drawing" Charotar Book stall. Anand.
3. Lakshminarayanan ,V and Vaish Wannar , R. S. "Engg.Graphics".Jain Brothers , New Delhi.
4. Chandra, A.M. & Chandra Satish, "Engg.Graphics".Narosa.
5. French & Vireck, "The Fundamental Of Engg. Drawing & Graphic Tech.". McGraw Hill.
6. Gill, P.S. "A Text Book Of Machine Drawing" Katson Publishing House , Ludhiana.

Course Code: ESC-S101T **Breakup: 3 –1 – 0 – 3**

Course Name: Basic Electrical & Electronics Engineering

Course Details:

Unit – I

Sinusoidal steady state circuit analysis, voltage, current, sinusoidal & phaser presentation single phase AC circuit – behavior of resistance, inductance & capacitance & their combination, impedance concept of power, power factor. Series & parallel resonance – band width & quality factor. Three phase circuits – phase voltage & current, line & phase quantities, phasor diagram, balanced & unbalanced loads, Measurement of R, L, and C.

Unit –II

Network Theory: Network theorems – Thevenin's, Norton, maximum power transfer theorem, star delta transformation, circuit theory concept – mesh & nodal analysis.

Unit – III

Magnetic circuit concepts: self inductance , magnetic coupling analysis of single tuned & double tuned circuit involving mutual inductance , introduction to transformer.

Unit – IV

Basic Instruments, electrical measurement – measurement of voltage , current , power & energy, voltmeters & ammeter , wattmeter , energy meter , three phase power measurement , electronics instrument – multimeter, CRO(analog & digital),An overview of voltage regulator.

Unit – V

Introduction to basic electronics devices – junction diode, BJT, amplifier, op-amps & instrumentation amplifier with mathematical operation.

Number System: Introduction to binary, octal, decimal & hexadecimal systems, representation of negative numbers, 1's, 2's, 9's, 10's complement and their arithmetic.

Text Books and References:

1. W.H.Hayt & J.E. Kemmerly : Engg. Circuit Analysis , Mc Graw Hill.
2. N.N. Bhargava : 'Basic Electronics',Tata McGraw Hill.
3. Malvino, A.P. / "Electronics Principles" / Tata McGraw-Hill / 6th Ed.
4. Morris Mano, "Digital Computer Design" PHI
5 Del Toro : Principles of Electrical Engg. – PHI
6 Boylstad & Neshishkey, "Electronic devices & circuits" , PHI
7. Malvino & Leech "Digital Principle and application", TMH

Course Code: ESC-S101P **Breakup: 0 –0 – 3 – 2**

Course Name: Basic Electrical & Electronics Engineering Lab

Course Details:

1. Familiarization with the Electronic Instruments.
2. Familiarization with electronic components and Bread board.
3. To verify the Thevenin theorem.
4. To verify the Superposition theorem.
5. Measurement of voltage and frequency with CRO.
6. To study half wave rectifier.
7. To study full wave bridge rectifier.
8. To study full wave bridge rectifier with filter.
9. To study and verify the truth table of different logic gates using digital IC.
10. To study different type of transformer and there operation.
11. To study basic wiring and design a switchboard/extension board.
12. To study the polarity test of a single phase transformer.
13. To study the open & short circuit test of a transformer and calibration losses.
14. To study the load test and efficiency of a single phase transformer.

Course Code: DIT-S201T **Breakup: 3 - 1 - 0 - 3**

Course Name: Object Oriented Systems Theory

Course Details:

OOP Concepts and Characteristics, Overview (Transition from C) Data types, Variables & Constants, Expression operators & statements. Control structures, Functions, Arrays, Pointers & Strings, Structures & Unions, Classes & Data Abstraction, Objects, Operation Overloading, Inheritance, Virtual Functions & Polymorphism, I/O Streams, Templates, Exception Handling, File Processing, Data Structures, Standard C++ and C Language additions, Pre Processors

Course Code: DIT-S201P **Breakup: 0 - 0 - 3 - 2**

Course Name: Object Oriented Systems Lab

Course Details:

PROGRAMMING IN C^{++} or JAVA -LAB
List of Sample Problems/Experiments (same can be in JAVA)

1. Write a C++ program to find the sum of individual digits of a positive integer.
2. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.Write a C++ program to generate the first n terms of the sequence.
3. Write a C++ program to generate all the prime numbers between 1 and n , where n is a value supplied by the user.
4. Write C++ programs that use both recursive and non-recursive functions
5. To find the factorial of a given integer. b. To find the GCD of two given integers.
6. To find the nth Fibonacci number.
7. Write a C++ program that uses a recursive function for solving Towers of Hanoi problem.
8. Write a C++ program that uses functions
9. To swap two integers. b. To swap two characters.
10. To swap two reals. Note: Use overloaded functions.
11. Write a C++ program to find both the largest and smallest number in a list of integers.
12. Write a C++ program to sort a list of numbers in ascending order.
13. Write a C++ program that uses function templates to solve problems-7&8.
14. Write a C++ program to sort a list of names in ascending order.
15. Write a C++ program to implement the matrix ADT using a class. The operations supported
16. by this ADT are: a) Reading a matrix. b)Printing a matrix.
c) Addition of matrices. d) Subtraction of matrices. e)Multiplication of matrices.
17. Implement the matrix ADT presented in the problem-11 using overloaded operators
18. (<<, >>, +, -, *) and templates.
19. Implement the complex number ADT in C++ using a class. The complex ADT is used to represent complex numbers of the form c=a+ib, where a and b are real numbers. The operations supported by this ADT are:
20. Reading a complex number. d) Subtraction of complex numbers.
21. Writing a complex number. e) Multiplication of complex numbers.
22. Addition of Complex numbers. f) Division of complex numbers.
23. Write a C++ program that overloads the + operator and relational operators (suitable) to perform the following operations:
24. Concatenation of two strings.
25. Comparison of two strings.

26. Implement the complex number ADT in C++ using a class. The complex ADT is used to represent complex numbers of the form c=a+ib, where a and b are real numbers. The operations supported by this ADT are:
27. Reading a complex number. Subtraction of complex numbers.
28. Writing a complex number. Multiplication of complex numbers.
29. Addition of Complex numbers. f) Division of complex numbers.
30. Note: 1. overload <<>> operators in part a and part b.
31. 2. overload +, - , * , / operators in parts c, d, e and f.
32. Write a template based C++ program that determines if a particular value occurs in an array of values.
33. Write a C++ program that uses functions to perform the following operations:
34. Insert a sub-string into the given main string from a given position.
35. Delete n characters from a given position in a given string.
36. Write a C++ program that uses a function to reverse the given character string in place, without any duplication of characters.
37. Write a C++ program to make the frequency count of letters in a given text.
38. Write a C++ program to count the lines, words and characters in a given text.
39. Write a C++ program to determine if the given string is a palindrome or not.
40. Write a C++ program to make frequency count of words in a given text.
41. Write a C++ program that displays the position or index in the string S where the string t begins, or –1 if S doesn't contain t.
42. 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C++ program to find the 2's complement of a binary number.
43. Write a C++ program that counts the number of 1 bit in a given integer.
44. Write a C++ program to generate Pascal's triangle.
45. Write a C++ program to construct of pyramid of numbers.
46. Write a C++ program to compute the Sine series.
47. Write a C++ program that converts Roman numeral into an Arabic integer.
48. Write a C++ program which converts a positive Arabic integer into its
49. corresponding Roman Numeral.
50. Write a C++ program to display the contents of a text file.
51. Write a C++ program which copies one file to another.
52. Write a C++ program that counts the characters, lines and words in the text file.
53. Write a C++ program to change a specific character in a file.
54. Note: Filename , number of the byte in the file to be changed and the new character are specified on the command line.
55. Write a C++ program to reverse the first n characters in a file.
56. Write a C++ program that uses a function to delete all duplicate characters in the given string.
57. Write a C++ program that uses a function to convert a number to a character string.
58. Write a C++ program that uses a recursive function to find the binary equivalent of a given non-negative integer n.
59. Write a C++ program to generate prime numbers up to n using Sieve of Eratosthenes method.
60. Write a C++ program
61. <!--[if !supportLists]-->a) <!--[endif]-->To write an object to a file.
62. <!--[if !supportLists]-->b) <!--[endif]-->To read an object from the file.
63. Write C++ programs that illustrate how the following forms of inheritance are supported:
64. Single inheritance and Multiple inheritance
65. Multi level inheritance and Hierarchical inheritance
66. Write a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.
67. Write a C++ program that illustrates how run time polymorphism is achieved using virtual functions.
68. Write a C++ program that illustrates the role of virtual base class in building class hierarchy.
69. Write a C++ program that illustrates the role of abstract class in building class hierarchy

Course Code: DIT-S203T **Breakup: 3 - 0 - 0 - 3**

Course Name: Digital Electronics

Course Details:

Basic Concepts and Boolean Algebra, Logic Gates and Gate Networks, Combinational Logic Circuits, Sequential Logic Circuits, Synchronous and Asynchronous State Machines.

Books and References: -

1. Charles H. Roth Junior, **Fundamentals of Logic Design**, Jaico Publishing House, Mumbai, IV Edition, 1992
2. Morris Mano, **Digital Logic and Computer Design**, Prentice Hall of India, 1979
3. William I. Fletcher, **An Engineering Approach to Digital Design**, Prentice Hall of India
4. Alan B. Marcovitz, **Introduction to Logic Design**, McGraw-Hill 2001
5. Ronald J. Tocci, **Digital Systems Principles and Applications**, PHI, 1995
6. Kenneth J. Ayala, The 8051 Microcontroller, Architecture, Programming and Applications, Penram International Publishing, India, 1996

Course Code: DIT-S203P **Breakup: 0 - 0 - 1 - 1**

Course Name: Digital Electronics

Course Details:

Digital Electronics Lab

1 Design and implementation of Adders and Subtractors using logic gates.
2 Design and implementation of code converters using logic gates
(i) BCD to excess-3 code and voice versa
(ii) Binary to gray and vice-versa
3 Design and implementation of 4 bit binary Adder/ subtractor and BCD adder using IC 7483
4 Design and implementation of 2Bit Magnitude Comparator using logic gates 8 Bit Magnitude Comparator using IC 7485
5 .Design and implementation of 16 bit odd/even parity checker /generator using IC74180.
6 Design and implementation of Multiplexer and De-multiplexer using logic gates and study of IC74150 and IC 74154
7 Design and implementation of encoder and decoder using logic gates and study of IC7445 and IC74147
8 Construction and verification of 4 bit ripple counter and Mod-10 / Mod-12 Ripple counters
9 Design and implementation of 3-bit synchronous up/down counter
10 Implementation of SISO, SIPO, PISO and PIPO shift registers using Flip- flops.

Course Code: DIT-S205T **Breakup: 3 - 0 - 0 - 4**

Course Name: DATA STRUCTURES

Course Details:

Unit - I

Introduction: Basic Terminology, Elementary Data Organization, Structure operations, Algorithm Complexity and Time-Space trade-off Arrays: Array efinition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters, Ordered List, Sparse Matrices and Vectors. Stacks: Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Array Representation of Stack, Linked Representation of Stack, Operations Associated with Stacks, Application of stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack. Recursion: Recursive definition and processes, recursion in C, example of recursion, Tower of Hanoi Problem, simulating recursion, Backtracking, recursive algorithms, principles of recursion, tail recursion, removal of recursion.

UNIT - II

Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, D-queues and Priority Queues. Linked list: Representation and Implementation of Singly Linked Lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List in Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

UNIT – III

Trees: Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree, Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees, Traversing Threaded Binary trees, Huffman algorithm. Searching and Hashing: Sequential search, binary search, comparison and analysis, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.

UNIT – IV

Sorting: Insertion Sort, Bubble Sorting, Quick Sort, Two Way Merge Sort, Heap Sort, Sorting on Different Keys, Practical consideration for Internal Sorting. Binary Search Trees: Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, Path Length, AVL Trees, B-trees.

UNIT - V

Graphs: Terminology & Representations, Graphs & Multi-graphs, Directed Graphs, Sequential Representations of Graphs, Adjacency Matrices, Traversal, Connected Component and Spanning Trees, Minimum Cost Spanning Trees. File Structures: Physical Storage Media File rganization, Organization of records into Blocks, Sequential Files, Indexing and Hashing, Primary indices, Secondary indices, B+ Tree index Files, B Tree index Files, Indexing and Hashing Comparisons.

Reference text books:

1. Horowitz and Sahani, “Fundamentals of data Structures”, Galgotia Publication Pvt. Ltd., New Delhi.
2. R. Kruse etal, “Data Structures and Program Design in C”, Pearson Education Asia, Delhi-2002
3. A. M. Tenenbaum, “Data Structures using C & C++”, Prentice-Hall of India Pvt. Ltd., New Delhi.

Supplementary reference books:

1. K Loudon, “Mastering Algorithms With C”, Shroff Publisher & Distributors Pvt. Ltd. 2. Bruno R Preiss, “Data Structures and Algorithms with Object Oriented Design Pattern in C++”, Jhon Wiley & Sons, Inc.
3. Adam Drozdek, “Data Structures and Algorithms in C++”, Thomson Asia Pvt. Ltd.(Singapore)

Course Code: DIT-S205P **Breakup: 0 - 0 - 3X2 - 2**

Course Name: DATA STRUCTURES LAB

Course Details:

Problems in " C / C++" using Data Structures involving arrays, stacks, queues, strings, linked lists, trees, graphs.

1 Using STACK to check matching left and right characters such as parantheses, curly braces and square brackets in a given string.
2 Single server queuing system and gathering statistics.
3 Operations on Stacks.
4 Sparse Matrices
5 Linear linked list implementation
6 Operations on Doubly Linked List and Circular List with a test application
7 Operations on Ordered Binary Trees.
8 Graph Traversal Techniques
9 Implementation of Quicksort, Mergesort and Heapsort
10 Operations on Binary Trees
11 Shortest Path Problem

Course Code: MTH-S201 **Breakup: 3 – 1 – 0 – 4**

Course Name: Mathematics - III

Course Details:

Unit – I : Function of a Complex variable
Complex numbers- power and roots, limits, continuity and derivative of functions of complex variable, Analytic functions, Cauchy-Reimann equations, Harmonic function, Harmonic conjugate of analytic function and methods of finding it, Complex Exponential, Trigonometric, Hyperbolic and Logarithm function.

Unit – II : Complex Integration
Line integral in complex plane(definite and indefinite), Cauchy's Integral theorem, Cauchy's Integral formula, Derivatives of analytic functions, Cauchy's Inequality, Liouville's theorem, Morera's theorem, Power series representation of analytic function and radius of convergence,Taylor's and Laurent's series, singularities, Residue theorem, Evaluation of real integrals, Improper Integrals of rational functions, Fourier integrals.

Unit – III : Fourier Series
Periodic functions, Trignometric series, Fourier series of period 2π , Eulers formulae, Functions having arbitrary period, Change of interval, Even and odd functions, Half range sine and cosine series, Complex fourier series.

Unit – IV : Partial Differential Equations
Linear partial differential equations with constant coefficients of second order and their classifications - parabolic, elliptic and hyperbolic with illustrative examples. Methods of finding solutions using separation of variables method. Wave and Heat equations up to two dimension (finite length)

Unit – V : Probability and Statistics
Basics of probability, Bayes theorem, Random variables, Probability and density fuctions, Binomial, Poisson and Normal distributions.

Text Books and Reference :
1. E. Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 2005.
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 2005.

Course Code: ESC-S201 **Breakup: 3 – 1 – 0 – 4**

Course Name: Engineering Mechanics

Course Details:

General Coplanar force systems : Basis concepts, Law of motions, principle of transmissibility of forces, Transfer of a force to parallel position, Resultant of a force system, simplest resultant of two dimensional concurrent & non concurrent force systems, free body diagrams, equilibrium & its equations, applications.

Trusses & Cables : Introductions, simple truss & solutions of simple truss, method of joints & method of sections.

Friction : Introductin , Laws of coulomb friction, equilibrium of bodies involving dry friction, belt friction, applications.

Centre of gravity , centroid, Moment of Inertia : Centroid of plane, curve, area ,volume & composite bodies, moment of inertia of plane area, parallel axis theorem, perpendicular axis theorem, principal moment inertia, mass moment of inertia of circular ring, disc, cylinder, sphere and cone about their axis of symmetry.

Beams: Introductions, shear force and bending moment , differential equations for equilibrium, shear force & bending moments diagrams for statically determinate beams.
Kinematics of rigid body: Introduction, plane motion of rigid bodies, velocity & acceleration under translation & rotational motion, Relative velocity, projectile motion.

Kinetics of rigid bodies: Introduction, force, mass & acceleration, work & energy, impulse & momentum, D'Alembert principles & dynamic equilibrium. Virtual work.

Text Books and Reference :

1. Beer F.P. & Johnston ,F.R. " Mechanics For Engineers", McGraw Hill.
2. Shames, I.H. " Engg. Mechanics" , P H I.
3. Meriam , J. L. " Statics" , J. Wiley.
4. Meriam , J. L. " Dynamics" , J. Wiley.

Course Code: DIT-S202 **Breakup:** **3 - 1 - 0 - 4**

Course Name: COMPUTER ORGANIZATION

Course Details:

Unit-I Introduction:
Number representation; fixed and floating point number representation, IEEE standard for floating point representation. Error detection and correction codes: Hamming code. Digital computer generation, computer types and classifications, functional units and their interconnections, buses, bus architecture, types of buses and bus arbitration. Register, bus and memory transfer.

Unit-II Central Processing Unit:
Addition and subtraction of signed numbers, look ahead carry adders. Multiplication: Signed operand multiplication, Booths algorithm and array multiplier. Division and logic operations. Floating point arithmetic operation Processor organization, general register organization, stack organization and addressing modes.

Unit-III Control Unit:
Instruction types, formats, instruction cycles and subcycles (fetch and execute etc) , micro-operations, execution of a complete instruction. Hardwire and microprogrammed control: microprogramme sequencing, wide branch addressing, microinstruction with next address field, pre-fetching microinstructions, concept of horizontal and vertical microprogramming.

Unit-IV Memory:
Basic concept and hierarchy, semiconductor RAM memories, 2D & 2 1/2D memory organization. ROM memories. Cache memories: concept and design issues 9 performance, address mapping and replacement) Auxiliary memories: magnetic disk, magnetic tape and optical disks Virtual memory: concept implementation.

Unit-V Input / Output:
Peripheral devices, I/O interface, I/O ports, Interrupts: interrupt hardware, types of interrupts and exceptions. Modes of Data Transfer: Programmed I/O, interrupt initiated I/O and Direct Memory Access., I/O channels and processors. Serial Communication: Synchronous & asynchronous communication, standard communication interfaces.

Books

1. Patterson, Computer Organisation and Design, Elsevier Pub. 2009
2. William Stalling, " Computer Organization", PHI
3. Vravice,Hamacher & Zaky, "Computer Organization", TMH
4. Mano," Computer System Architecture", PHI
5. John P Hays, " Computer Organization", McGraw Hill
6. Tannenbaum," Structured Computer Organization', PHI
7. P Pal chaudhry, ' Computer Organization & Design', PHI
8. Computer Organisation and Design, Rashi Agarwal, Acme Publication

Course Code: DIT-S204 **Breakup: 3 - 0 - 0 - 4**

Course Name: Principal of Programming Language

Course Details:

Unit -I

Introduction: Characteristics of programming Languages, Factors influencing the evolution of programming language, developments in programming methodologies, desirable features and design issues. Programming language processors: Structure and operations of translators, software simulated computer, syntax, semantics, structure, virtual computers, binding and binding time.

Unit -II

Elementary and Structured Data Types: Data object variables, constants, data types, elementary data types, declaration, assignment and initialization, numeration, characters, strings. Structured data type and objects: Specification of data structured types, vectors and arrays, records, variable size data structure, pointers and programmer constructed data structure, Sets files. Sub Program and programmer defined data types: Evolution of data types, abstractions, ncapsulations, information hiding, sub programmes, abstract data types.

Unit -III

Sequence Control; Implicit and Explicit sequence control, sequence control with within expression and statements, recursive sub programmes, exception handling, co routines, Scheduled sub programmes, concurrent execution. Data control referencing environments, static and dynamic scope, local data local data referencing environment, shared data: Explicit common environment dynamic scope parameter passing mechanism.

Unit -IV

Storage Management: Major run time requirements, storage management phases, static storage management, stack based, heap based storage management. Syntax and translation: General syntactic criteria, syntactic element of a language, stages in translation, formal syntax and semantics.

Unit -V

Operating and Programming Environment: Batch Processing Environments, Embedded system requirements, Theoretical models, Introduction to Functional Programming, Lambda calculus, Data flow language and Object Oriented language, Comparison in various general and special purpose programming languages e.g. Fortran, C, Pascal, Lisp, etc.

References:

1. Terrance W Pratt, "Programming Languages: Design and Implementation" PHI
2. Sebesta, "Concept of Programming Language", Addison Wesley
3. E Horowitz, "Programming Languages", 2nd Edition, Addison Wesley
4. "Fundamentals of Programming Languages", Galgotia.

Course Code: DIT-S206T **Breakup: 3 - 0 - 0 - 4**

Course Name: SOFTWARE ENGINEERING

Course Details:

Unit-I: Introduction
Introduction to Software Engineering, Software Components, Software Characteristics, Software Crisis, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Quality Attributes. Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models.

Unit-II: Software Requirement Specifications (SRS)
Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS. Software Quality Assurance (SQA): Verification and Validation, SQA Plans, Software Quality Frameworks, ISO 9000 Models, SEI-CMM Model.

Unit-III: Software Design
Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. Software Measurement and Metrics: Various Size Oriented Measures: Halestead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs.

Unit-IV: Software Testing
Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance, Top-Down and Bottom- Up Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suit Preparation, Alpha and Beta Testing of Products. Static Testing Strategies: Formal Technical Reviews (Peer Reviews), Walk Through, Code Inspection, Compliance with Design and Coding Standards.

Unit-V: Software Maintenance and Software Project Management
Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re- Engineering, Reverse Engineering. Software Configuration Management Activities, Change Control Process, Software Version Control, An Overview of CASE Tools. Estimation of Various Parameters such as Cost, Efforts, Schedule/Duration, Constructive Cost Models (COCOMO), Resource Allocation Models, Software Risk Analysis and Management.

Reference Books:
1. R. S. Pressman, Software Engineering: A Practitioners Approach, McGraw Hill.
2. Rajib Mall, Fundamentals of Software Engineering, PHI Publication.
3. K. K. Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers.
4. Carlo Ghezzi, M. Jarayeri, D. Manodrioli, Fundamentals of Software Engineering, PHI Publication.
5. Ian Sommerville, Software Engineering, Addison Wesley.
6. Pankaj Jalote, Software Engineering, Narosa Publication
7. Pfleeger, Software Engineering, Macmillan Publication.
8. A. Leon and M. Leon, Fundamentals of Software Engineering, Vikas Publication.

Course Code: DIT-S206P **Breakup: 0 - 0 - 3 - 1**

Course Name: SOFTWARE ENGINEERING

Course Details:

1. Program for configuration Management.
2. Perform SA/SD for the following software.
    - Hotel Automation System
    - Book Shop Automation Software
    - Word processing Software
    - Software Component Cataloguing Software.
3. Design and development of test cases for testing.
4. Writing program in Java for Computing Cyclomatic Complexity.
5. Development of Software tool for Halstead Analysis.
6. Perform Cost/Benefit analysis.
7. Illustration of various activities of Software development using MS Project 2000.
8. Lab exercise involving development of various practical applications using software like VJ++VB, SYBASE, JDK. [Students are to be given a major assignment to be completed using one or more of these tools, Student's exposure to any CASE tool is desirable]

9. Case Studies : Payroll System, Banking System, Purchase Order System, Library Management System, Railway Reservation System, Bill Tracking System, College Admission System, State Management System.

Course Code: MTH-S301 **Breakup: 3 – 1 – 0 – 4**

Course Name: Discrete Mathematics

Course Details:

Unit-I
Logic: Introduction to formal logic, Formulae of prepositional logic, Truth tables, Tautology, Satisfiability, Contradiction, Normal and principle normal forms, Completeness. Theory of inference. Predicate calculus: Quantifiers, Inference Theory of predicate logic, Validity, Consistency and Completeness.

Unit-II
Sets, Operations on sets, Ordered pairs, Recursive definitions, Relations and Functions, Equivalence relations, Composition of relations, Closures, Partially ordered sets, Hasse Diagram's,
Lattices (Definition and some properties).

Unit-III
Algebraic Structures : Definition, Semi groups, Groups, Subgroups, Abelian groups, Cyclic groups.

Unit-IV
Graph Theory: Incidence, Degrees, Walks, Paths, Circuits, Charactarization theorems, Connectedness, Euler graphs, Hamiltonian graphs, Travelling salesman problem, Shortest distance algorithm (Djkstra's), Trees, Binary trees, Spanning trees, Spanning tree algorithms Kruksal's and Prim's.

Unit-V
Introduction to Combinatorics: Counting techniques, pigeon–hole principle, Mathematical induction, Strong induction , Permutations and Combination.

Unit-VI
Generating functions, Recurrence relations and their solutions.

Text Books and Reference :

1. C.L.Liu : Discrete Mathematics
2. B.Kolman, R.C.Busby, and S.C.Ross, Discrete mathematical structures, 5/e, Prentice Hall, 2004
3. J.L.Mott, A.Kandel and T.P.Baker : Discrete mathematical structures For computer scientists & Mathematicians , Prentice–Hall India

   J.P.Trembley, R. Manohar, Discrete mathematical structures with applications to computer science, McGraw –Hill, Inc. New York, NY,1975

Course Code: DIT-S301T **Breakup: 3 - 0 - 0 - 3**

Course Name: MICROPROCESSORS

Course Details:

8-Bit Microprocessor, 8085 processor, 80 X 86 Processors, Peripherals and Interfacing, Microprocessor Based Systems Design and Digital

Interfacing.

Books and References: -

1. K. Ray and K M Bhurchandi, **Advanced Microprocessors and Peripherals**, I Edition, Tata McGraw-Hill, 2000.
2. 2Goankar, **Microprocessor Architecture Programming and Applications with 8085**, Wiley Eastern, 1998
3. 3Myke Predko, **Programming and Customizing the 8051 Microcontroller**, Tata McGraw-Hill, 1999
4. Mohd. Ali Mazidi and Janice Gillispie, **The 8051 Microcontroller and Embedded Systems**, Prentice Hall of India Pvt. Ltd., 2000
5. Douglas V. Hall, **Microprocessors and Interfacing Programming and Hardware**, Tata McGraw-Hill, 1999
6. Kenneth J. Ayala, **The 8051 Microcontroller, Architecture, Programming and Applications,** Penram International Publishing, India, 1996
7. Kenneth J. Ayala, **The 8086 Microprocessor, Programming and Interfacing The PC**, Penram International Publishing, India, 1995
8. Barry B. Brey, **The Intel Microprocessor 8086 / 8088, 80180, 80286, 80386 and 80846 Architecture, Programming and Interfacing**, Prentice Hall of India Pvt. Ltd. 1995
9. Ajale, **An Introduction to The Intel Family of Microprocessors**, Pearson Education, Asia, 2001
10. **The 8088 & 8086 Microprocessing**, William A. Tviebel Avtavsigh, III Edition, 2000

Course Code: DIT-S301P **Breakup: 0 - 0 - 1 - 1**

Course Name: MICROPROCESSORS

Course Details:

Microprocessors Lab

1.Programming with 8085 – 8-bit / 16-bit multiplication/division using repeated addition/subtraction
2. Programming with 8085-code conversion, decimal arithmetic, bit manipulations.
3. Programming with 8085-matrix multiplication, floating point operations
4. Programming with 8086 – String manipulation, search, find and replace, copy operations, sorting. (PC Required)
5. Using BIOS/DOS calls: Keyboard control, display, file manipulation. (PC Required)
6. Using BIOS/DOS calls: Disk operations. (PC Required)
7. Interfacing with 8085/8086 – 8255, 8253
8. Interfacing with 8085/8086 – 8279,8251

Course Code: DIT-S303 **Breakup: 0 - 0 - 1 - 1**

Course Name: Theory of computation

Course Details:

Basics of Prepositional and First Order Logic, Completeness and Compactness Results, Some Applications to Computer Science (E.g. Theorem Proving, Logic Programming). Theory of Computation: - Church's Thesis, Undecidability. Computational Complexity: - Time & Tape Bounds, Time & Tape Bounded Simulations, Notion of Complexity Classes, Classes P & NP, NP-Completeness, Some Natural NP-Complete Problems.

Books and References: -

1. Raynold M. Smullyan, **First-Order Logic**, Springer-Verlag, 1968.
2. J. E. Hoperoft and J. Ullman, **Introduction to Automata Theory, Languages of Computations**, Addison Wesley, 1979 (Indian Edition available from Narosa).
3. J. L. Balcazar, J. Diaz and J. Gabarro, **Structural Complexity I**, Springer-Verlag, 1998.
4. M. R. Garey and D. S. Johanson, **Computers & Intractability**, W. H. Freeman & Co. San Francisco, 1979.

Course Code: DIT-S305 **Breakup: 3 - 0 - 0 - 4**

Course Name: DESIGN & ANALYSIS OF ALGORITHMS

Course Details:

Introduction: Algorithms, analysis of algorithms, Growth of Functions, Master's Theorem, Designing of Algorithms. Sorting and order Statistics: Heap sort, Quick sort, Sorting in Linear time, Medians and Order Statistics. Advanced Data Structure: Red-Black Trees, Augmenting Data Structure. B-Trees, Binomial Heaps, Fibonacci Heaps, Data Stricture for Disjoint Sets. Advanced Design and Analysis Techniques: Dynamic Programming, Greedy Algorithms, Amortized Analysis, Back Tracking. Graph Algorithms: Elementary Graphs Algorithms, Minimum Spanning Trees, Single-source Shortest Paths, All-Pairs Shortest Paths, Maximum Flow, Travelling Salesman Problem. Selected Topics: Randomized Algorithms, String Matching, NP Completeness, Approximation Algorithms.

References:

1. Coreman, Rivest, Lisserson, : “Algorithms", PHI.
2. Basse, "Computer Algorithms: Introduction to Design & Analysis", Addision Wesley.
3. Horowitz & Sahani, "Fundamental of Computer Algorithm", Galgotia.

Course Code: DIT-S307T **Breakup: 3 - 1 - 0 - 3**

Course Name: DATA BASE MANAGEMENT SYSTEMS

Course Details:

Unit- I

Introduction: An overview of database management system, database system Vs file system, Database system concepts and architecture, data models schema and instances, data independence and database language and interfaces, Data definitions language, DML, Overall Database Structure. **Data Modeling using the Entity Relationship Model:** ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.

Unit- II

Relational data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus, **Introduction to SQL:** Characteristics of SQL. Advantage of SQL. SQL data types and literals. Types of SQL commands. SQL operators and their procedure. Tables, views and indexes. Queries and sub queries. Aggregate functions. Insert, update and delete operations. Joins, Unions, Intersection, Minus, Cursors in SQL.

Unit- III

Data Base Design & Normalization: Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependences, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.

Unit- IV

Transaction Processing Concepts: Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery, checkpoints, deadlock handling.

Unit- V

Concurrency Control Techniques: Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi version schemes, Recovery with concurrent transaction.

Text Books

1. Date C J, “An Introduction To Database System”, Addision Wesley
2. Korth, Silbertz, Sudarshan, “Database Concepts”, McGraw Hill
3. Elmasri, Navathe, “Fundamentals Of Database Systems”, Addision Wesley
4. Leon & Leon, “Database Management System”, Vikas Publishing House.
5. Bipin C. Desai, “An introduction to Database Systems”, Galgotia Publication
6. Majumdar & Bhattacharya, “Database Management System”, TMH
7. Ramakrishnan, Gehrke, “Database Management System”, McGraw Hill
8. Kroenke, “Database Processing: Fundamentals, Design and Implementation”, Pearson Education.
9. Maheshwari Jain, “DBMS: Complete Practical Approach”, Firewall Media, New Delhi.

Course Code: DIT-S307P **Breakup: 0 - 0 - 3 - 2**

Course Name: DATA BASE MANAGEMENT SYSTEMS

Course Details:

DBMS Lab

1 Exercises to be based on Sybase/Oracle/Postgres/VB/Power Builder/D2K.
2 Applications involving vendor development systems, stores management system, finance management etc.
3 Creation and querying of database tables.
4 Design of tables by Normalization and Dependency analysis.
5 Writing application softwares with host language interface.

Course Code: DIT-S309T **Breakup: 3 - 0 - 0 - 3**

Course Name: OPERATING SYSTEMS

Course Details:

Unit -I

Introduction: Operating System and Function, Evolution of Operating System, Batch, Interactive, Time Sharing and Real Time System, System Protection. Operating System Structure: ' System Components, System Structure, Operating System Services.

Unit - II

Concurrent Processes: Process Concept, Principle of Concurrency, Producer / Consumer Problem, Critical Section, Problem, Semaphores, Classical Problems in Concurrency, Inter Processes Communication, Process Generation, Process Scheduling.

Unit - III

CPU Scheduling: [05] Scheduling Concept, Performance Criteria Scheduling Algorithm Evolution, Multiprocessor Scheduling. Deadlock: [05] System Model, Deadlock Characterization, Prevention, Avoidance and Detection, Recovery from Deadlock, Combined Approach.

Unit - IV

Memory Management: [06] Basic Machine, Resident Monitor, Multiprogramming with Fixed Partition, Multiprogramming With Variable Partition, Multiple Base Register, Paging, Segmentation, Paged Segmentation, Virtual Memory Concept, Demand Paging, Performance, Paged Replaced Algorithm, Allocation of Frames, Thrashing, Cache Memory Organization, Impact on Performance.

Unit - V

I/O Management & Disk Scheduling: [04] I/O Devices and The Organization of I/O Function, I/O Buffering, Disk I/O, Operating System Design Issues. File System: [04] File Concept, File Organization and Access Mechanism, File Directories, File Sharing, Implementation Issues.

Suggested Books And References:

1. Milenekovie, "Operating System Concept", McGraw Hill.
2. Petersons, "Operating Systems", Addision Wesley.
3. Dietal, "An Introduction to Operating System", Addision Wesley.
4. Tannenbaum, "Operating System Design and Implementation", PHI.
5. Gary Nutt, "Operating System, A Modern Perspective", Addision Wesley.
6. W. Stalling, "Operating System", Maxwell Macmillan
7. Silveschatza, Peterson J, "Operating System Concepts", Willey.
8. Crowley, "Operating System", TMH.

Course Code: DIT-S309P **Breakup: 0 - 0 - 1 - 1**

Course Name: OPERATING SYSTEMS

Course Details:

Operating System Lab

1 Exercises involving DOS interrupts, DOS function calls, video interrupts and TSR.
2 Performance measurements of various processor scheduling methods.
3 Process creation, process synchronization, and interprocess communication using Semaphores, pipes and messages in UNIX environment.

Course Code: DIT-S302T **Breakup: 3 - 0 - 0 - 3**

Course Name: COMPUTER NETWOKS

Course Details:

Unit -I

Introduction Concepts: Goals and Applications of Networks, Network structure and architecture, The OSI reference model, services, Network Topology Design - Delay Analysis, Back Bone Design, Local Access Network Design. Physical Layer Transmission Media, Switching methods, ISDN, Terminal Handling.

Unit-II

Medium Access sub layer: Medium Access sub layer - Channel Allocations, LAN protocols - ALOHA protocols - Overview of IEEE standards - FDDI. Data Link Layer - Elementary Data Link Protocols, Sliding Window protocols, Error Handling.

Unit - III

Network Layer: Network Layer - Point - to Pont Networks, routing, Congestion control Internetworking -TCP / IP - IP packet, IP address, IPv6. '

Unit - IV

Transport Layer: Transport Layer - Design issues, connection management, session Layer-Design issues, remote procedure call. Presentation Layer-Design issues, Data compression techniques, cryptography - TCP - Window Management.

Unit-V

Application Layer: Application Layer: File Transfer, Access and Management, Electronic mail, Virtual Terminals, Other application, Example Networks - Internet and Public Networks

Books and References: -

1. Behrouz A. Forouzan, **Data Communication and Networking**, II Edition Tata McGraw-Hill, 2000
2. Fred Halsall, **Data Communication, Computer Networks and Open Systems**, IV Edition, Addison Wesley, 1995.
3. Andrew S. Tanenbaum, **Computer Networks**, III Edition, PHI, 1996, Chapter 4.

Course Code: DIT-S302P **Breakup: 0 - 0 - 1 - 1**

Course Name: COMPUTER NETWOKS

Course Details:

1. PC to PC Communication
Parallel Communication using 8 bit parallel cable
Serial communication using RS 232C
2. Ethernet LAN protocol
To create scenario and study the performance of CSMA/CD protocol through simulation
3. Token bus and token ring protocols
To create scenario and study the performance of token bus and token ring protocols through simulation
4. Wireless LAN protocols To create scenario and study the performance of network with CSMA / CA protocol and compare with CSMA/CD protocols.
5. Implementation and study of stop and wait protocol
6. Implementation and study of Goback-N and selective repeat protocols
7. Implementation of distance vector routing algorithm
8. Implementation of Link state routing algorithm
9. Implementation of Data encryption and decryption
10. Transfer of files from PC to PC using Windows / Unix socket processing

Course Code: DIT-S308T Breakup: 3 - 0 - 0 - 3

Course Name: INTERNET TECHNOLOGY

Course Details:

UNIT I

Introduction and Web Development Strategies History of Web, Protocols governing Web, Creating Websites for individual and Corporate World, Cyber Laws Web Applications, Writing Web Projects, Identification of Objects, Target Users, Web Team, Planning and Process Development.

UNIT II

HTML, XML and Scripting List, Tables, Images, Forms, Frames, CSS Document type definition, XML schemes, Object Models, Presenting XML, Using XML Processors: DOM and SAX Introduction to Java Script, Object in Java Script, Dynamic HTML with Java Script.

UNIT III

Java Beans and Web Servers Introduction to Java Beans, Advantage, Properties, BDK, Introduction to EJB, Java Beans API Introduction to Servelets, Lifecycle, JSDK, Servlet API, Servlet Packages: HTTP package, Working with Http request and response, Security Issues.

UNIT IV

JSP Introduction to JSP, JSP processing, JSP Application Design, Tomcat Server, Implicit JSP objects, Conditional Processing, Declaring variables and methods, Error Handling and Debugging, Sharing data between JSP pages- Sharing Session and Application Data.

UNIT V

Database Connectivity Database Programming using JDBC, Studying Javax.sql. *package, accessing a database from a JSP page, Application-specific Database Action, Developing Java Beans in a JSP page, introduction to Struts framework.

REFERENCE:

1. Burdman, “Collaborative Web Development” Addison Wesley.
2. Chris Bates, “Web Programing Building Internet Applications”, 2nd Edition, WILEY Dreamtech
3. Joel Sklar , “Principal of web Design” Vikash and Thomas Learning
4. Horstmann, “CoreJava”, Addison Wesley.
5. Herbert Schieldt, “The Complete Reference:Java”, TMH.
6. Hans Bergsten, “Java Server Pages”, SPD O’Reilly

Course Code: DIT-S308P Breakup: 0 - 0 - 3 - 2

Course Name: INTERNET TECHNOLOGY

Course Details:

Internet Technology Lab

Each student should develop two projects out of this list using JSP,JDBC,J2EE

1. Design Airlines Ticket Reservation System
2. Design ONLINE Banking system.
3. Design Library Information system
4. Design Gram Panchayat Information system for House tax, water tax, wealth tax, Library tax collection, phone bill, Electricity bill collection.
5. Design student information system portal which maintain attendance, marks etc.
6. Design online examination system.

Course Code: DIT-S401T **Breakup: 3 - 0 - 0 - 4**

Course Name: DIGITAL IMAGE PROCESSING

Course Details:

Introduction and Fundamentals
Motivation and Perspective, Applications, Components of Image Processing System, Element of Visual Perception, A Simple Image Model, Sampling and Quantization.

Image Enhancement in Spatial Domain
Introduction ; Basic Gray Level Functions – Piecewise-Linear Transformation Functions : Contrast Stretching ; Histogram Specification ; Histogram Equalization ; Local Enhancement Enhancement using Arithmetic/Logic Operations – Image Subtraction, Image Averaging ; Basics of Spatial Filtering ; Smoothing - Mean filter, Ordered Statistic Filter ; Sharpening – The Laplacian.

Image Enhancement in Frequency Domain
Fourier Transform and the Frequency Domain, Basis of Filtering in Frequency Domain, Filters – Low-pass, High-pass; Correspondence Between Filtering in Spatial and Frequency Domain; Smoothing Frequency Domain Filters – Gaussian Lowpass Filters ; Sharpening Frequency Domain Filters – Gaussian Highpass Filters; Homomorphic Filtering.

Image Restoration
A Model of Restoration Process, Noise Models, Restoration in the presence of Noise only-Spatial Filtering – Mean Filters : Arithmetic Mean filter, Geometric Mean Filter, Order Statistic Filters – Median Filter, Max and Min filters ; Periodic Noise Reduction by Frequency Domain Filtering – Bandpass Filters ; Minimum Mean-square Error Restoration

Color Image Processing
Color Fundamentals, Color Models, Converting Colors to different models, Color Transformation, Smoothing and Sharpening, Color Segmentation.

Morphological Image Processing
Introduction, Logic Operations involving Binary Images, Dilation and Erosion, Opening and Closing, Morphological Algorithms – Boundary Extraction, Region Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening

Registration
Introduction, Geometric Transformation – Plane to Plane transformation, Mapping, Stereo Imaging – Algorithms to Establish Correspondence, Algorithms to Recover Depth

Segmentation
Introduction, Region Extraction, Pixel-Based Approach, Multi-level Thresholding, Local Thresholding, Region-based Approach Edge and Line Detection : Edge Detection, Edge Operators, Pattern Fitting Approach, Edge Linking and Edge Following, Edge Elements Extraction by Thresholding, Edge Detector Performance, Line Detection, Corner Detection.

Feature Extraction
Representation, Topological Attributes, Geometric Attributes

Description
Boundary-based Description, Region-based Description, Relationship.

Object Recognition
Deterministic Methods, Clustering, Statistical Classification, Syntactic Recognition, Tree Search, Graph Matching

Text Books
1. Digital Image Processing 2nd Edition, Rafael C. Gonzalvez and Richard E. Woods. Published by: Pearson Education
2. Digital Image Processing and Computer Vision, R.J. Schalkoff. Published by: John Wiley and Sons, NY.

Course Code: DIT-S401P **Breakup: 0 - 0 - 1 - 1**

Course Name: DIGITAL IMAGE PROCESSING

Course Details:

Digital Image Processing Lab
Research and development in the CVIP Lab using Matlab/ CVIP:

- CVIPtools development
- Color image segmentation algorithm development
- Wavelet/vector quantization compression
- Deformable templates applied to skin tumor border finding
- Helicopter image enhancement
- High-speed film image enhancement
- Computer vision for skin tumor image evaluation
- New Border Images

Course code: HSS – S301 **Breakup: 3 – 1 – 0 – 3**

Course Name: Professional Communication

Course Details:

Unit 1- Presentation Techniques

- Meaning and importance of presentation technique
- Use of presentation techniques in everyday life
- Presentation skills required for business organization
- Types of business presentations-meetings, seminars, Conferences

Unit 2-Oral presentations

- Effective oral presentation techniques
- Tips for good oral delivery; debates, elocution, impromptu speeches
- Levels and models of organizational Communication
- Interviews-types of interviews
- Group discussions

Unit 3- Written communication

- Style and tone of writing business messages and Documents.
- Writing for websites, internet e-mails and short messages
- Applications, letters, memos
- Proposals and report writing

Unit 4 - Nonverbal presentations

- Nonverbal communication techniques
- Business manners, ethics and personality development
- Audio/visual presentations, power point presentations
- Art of delivery

Unit 5- Literary concepts

- Stories, essays, comprehension
- Reading techniques-skimming and scanning methods
- Listening skills

Recommended Books:

1. "Business Communication Today", Bove'e, Thill and Schatzman: Pearson Education(Singapore),2003

2. "Business Communication-a framework of success", H.Dan O'Hair, James S.O'Rourke and Mary John O' Hair: South Western College Publishing 2001.

3. "Basic Business Communication", Raymond V.Lesikar, Marie E.Flatley: Tata McGraw Hill Publishing Company Ltd., 2002.

Course Code: HSS-S201 Breakup: 3 – 0 – 0 –4

Course Name: Industrial Management

Course Details:

Introduction to Industrial management, Brief history of industries in India, Brief definition of management, organization and administration. Characteristics of management, Principle of management, Function of management like, planning, organization, direction, co-ordination etc.

Level of management, skills of management, inter relation between skills and levels of management, scientific management, Introduction to Schools of Management thoughts, introduction to organization, study of basic type of organization for ex. Line and staff organization, project organization, metrics organization, Informal organization, Introduction to industrial Psychology, Motivation theory and study of Maxlow, Need, Hierarchy Theory, Planned Location, Planned Layout. Study of different forms of layout like line layout, process layout, product layout, combinational layout, sixth position layout etc.

Objective of planned layout, introduction to material management, scope of material management, study of inventory control method, introduction to different types of inventory control techniques, introduction to work study, motion study etc, introduction to conflict management.

Text Book and References:

1. Khanna O.P. : Industrial Engineering
2. T.R. Banga : Industrial Engineering and Management
3. Mahajan : Industrial and Process Management

Course Code: DIT-S402 **Breakup: 3 - 1 - 0 - 4**

Course Name: INFORMATION SYSTEMS

Course Details:

Introduction to Information system Understanding system from business view point Business processes Types & Levels of Information Systems
An overview of SCM, KM, CRM, ERP. Technology support for IS: Data warehousing concepts Data pre-processingConcept of data cube,
Comparison of OLAP with OLTP systems Overview data mining for knowledge discovery Mini project or by means of programming

Departmental Electives

Course Code: DIT-S501P **Breakup: 3 - 0 - 0 - 3**

Course Name: SOFTWARE PROJECT MANAGEMENT

Course Details:

UNIT-I: Introduction and Software Project Planning
Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope document, Project Management Cycle, SPM Objectives, Management Spectrum, SPM Framework, Software Project Planning, Planning Objectives, Project Plan, Types of project plan, Structure of a Software Project Management Plan, Software project estimation, Estimation methods, Estimation models, Decision process.

UNIT-II: Project Organization and Scheduling
Project Elements, Work Breakdown Structure (WBS), Types of WBS, Functions,Activities and Tasks, Project Life Cycle and Product Life Cycle, Ways to Organize Personnel, Project schedule, Scheduling Objectives, Building the project schedule,Scheduling terminology and techniques, Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts.

UNIT-III: Project Monitoring and Control
Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators: Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index (SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews, Types of Review: Inspections, Deskchecks, Walkthroughs, Code Reviews, Pair Programming.

UNIT-IV: Software Quality Assurance and Testing
Testing Objectives, Testing Principles, Test Plans, Test Cases, Types of Testing, Levels of Testing, Test Strategies, Program Correctness, Program Verification & validation, Testing Automation & Testing Tools, Concept of Software Quality, Software Quality Attributes, Software Quality Metrics and Indicators, The SEI Capability Maturity Model CMM), SQA Activities, Formal SQA Approaches: Proof of correctness, Statistical quality assurance, Cleanroom process.

UNIT-V: Project Management and Project Management Tools
Software Configuration Management: Software Configuration Items and tasks, Baselines, Plan for Change, Change Control, Change Requests Management, Version Control, Risk Management: Risks and

risk types, Risk Breakdown Structure (RBS), Risk Management Process: Risk identification, Risk analysis, Risk planning, Risk monitoring, Cost Benefit Analysis, Software Project Management Tools: CASE Tools, Planning and Scheduling Tools, MS-Project.

Books:
3. Software Project Management by M. Cotterell
4. Information Technology Project Management
5. Management Information and Control by
6. Software Project Managemnet by S. A. Kelkar

Course Code: DIT-S502 Breakup: 3 - 0 - 0 - 4

Course Name: MOBILE COMPUTING

Course Details:

Unit – I
Introduction, issues in mobile computing, overview of wireless telephony: cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.
Unit - II
Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment, applications.
Unit – III
Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.
Unit - IV
Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment.
Unit – V
Ad Hoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.

Books:
1. J. Schiller, Mobile Communications, Addison Wesley.
2. A. Mehrotra , GSM System Engineering.
3. M. V. D. Heijden, M. Taylor, Understanding WAP, Artech House.
4. Charles Perkins, Mobile IP, Addison Wesley.
5. Charles Perkins, Ad hoc Networks, Addison Wesley.

Course Code: DIT-S503 **Breakup: 3 - 0 - 0 - 4**

Course Name: INFORMATION CODING TECHNIQUES

Course Details:

Information Entropy Fundamentals, Data and Voice Coding, Error Control Coding, Comprehension Techniques, Audio and Video Coding.

Books and References: -

1. Simon Haykin, **Communications Systems**, IV Edition, John Wiley and Sons, 2001
2. Fred Halsall, **Multimedia Communications, Application Networks Protocols & Standards**, Pearson Education, Asia 2002, Chapters 3,4,5.
3. Proakis, **Digital Communication**, McGraw-Hill, 1982.
4. Mark Nelson, **Data Compression Book**, BPB Publication, 1992
5. Watkinson J., **Compression in Video & Audio**, Focal Press, London, 1995.

Course Code: DIT-S504 **Breakup: 3 - 0 - 0 - 4**

Course Name: ADVANCE COMPUTER ARCHITECTURE

Course Details:

Unit - I: Introduction
Parallel Computing, Parallel Computer Model, Program and Network Properties, Parallel Architectural Classification Schemes, Flynn's & Feng's Classification, Performance Metrics and Measures, Speedup Performance Laws: Multiprocessor System and Interconnection Networks; IEEE POSIX Threads: Creating and Exiting Threads, Simultaneous Execution of Threads, Thread Synchronization using Semaphore and Mutex, Canceling the Threads.

Unit – II: Pipelining and Memory Hierarchy
Basic and Intermediate Concepts, Instruction Set Principle; ILP: Basics, Exploiting ILP, Limits on ILP; Linear and Nonlinear Pipeline Processors; Super Scalar and Super Pipeline Design; Memory Hierarchy Design: Advanced Optimization of Cache Performance, Memory Technology and Optimization, Cache Coherence and Synchronization Mechanisms.

Unit – III: Thread and Process Level Parallel Architecture
Introduction to MIMD Architecture, Multithreaded Architectures, Distributed Memory MIMD Architectures, Shared Memory MIMD Architecture, Clustering, Instruction Level Data Parallel Architecture, SIMD Architecture, Fine Grained and Coarse Grained SIMD Architecture, Associative and Neural Architecture, Data Parallel Pipelined and Systolic Architectures, Vector Architectures.

Unit – IV: Parallel Algorithms
PRAM Algorithms: Parallel Reduction, Prefix Sums, Preorder Tree Traversal, Merging two Sorted lists; Matrix Multiplication: Row Column Oriented Algorithms, Block Oriented Algorithms; Parallel Quicksort, Hyper Quicksort; Solving Linear Systems: Gaussian Elimination, Jacobi Algorithm; Parallel Algorithm Design Strategies.

Unit –V: Developing Parallel Computing Applications
OpenMP Implementation in 'C': Execution Model, Memory Model; Directives: Conditional Compilation, Internal Control Variables, Parallel Construct, Work Sharing Constructs, Combined Parallel Work-Sharing Constructs, Master and Synchronization Constructs; Run-Time Library Routines: Execution Environment Routines, Lock Routines, Timing Routines; Simple Examples in 'C'. Basics of MPI.

Books:-
1. Kai Hwang," Advance Computer Architecture", TMH
2. Matthew, "Beginning Linux Programming", SPD/WROX
3. Hennessy and Patterson," Computer Architecture: A Quantitative Approach", Elsevier
4. Dezso and Sima, "Advanced Computer Architecture", Pearson
5. Quinn, "Parallel Computing: Theory & Practice", TMH
6. Quinn, "Parallel Programming in C with MPI and Open MP", TMH
Open MP Specification and Usage (www.openmp.org)

Course Code: DIT-S505T **Breakup: 3 - 1 - 0 - 3**

Course Name: COMPUTER GRAPHICS

Course Details:

Unit-I

Line generation: Points lines, Planes, Pixels and Frame buffers, vector and character generation. Graphics Primitives: Display devices, Primitive devices, Display File Structure, Display control text.

Unit-II

Polygon: Polygon Representation, Entering polygons, Filling polygons. Segments: Segments table, creating deleting and renaming segments, visibility, image transformations.

Unit-III

Transformations: Matrices transformation, transformation routines, displays procedure. Windowing and Clipping: Viewing transformation and clipping, generalize clipping, multiple windowing.

Unit-IV

Three Dimension: 3-D geometry primitives, transformations, projection clipping. Interaction: Hardware input devices handling algorithms, Event handling echoing, Interactive techniques.

Unit-V

Hidden Line and Surface: Back face removal algorithms, hidden line methods. Rendering and Illumination: Introduction to curve generation, Bezier, Hermite and B-spline algorithms and their comparisons.

References :

1. Rogers, "Procedural Elements of Computer Graphics", McGraw Hill

2. Asthana, Sinha, "Computer Graphics", Addison Wesley Newman and Sproul, "Principle of Interactive Computer Graphics", McGraw Hill

3. Steven Harrington, "Computer Graphics", A Programming Approach, 2nd Edition

4. Rogar and Adams, "Mathematical Elements of Computer Graphics", McGraw Hill.

Course Code: DIT-S505P **Breakup: 0 - 0 - 2 - 2**

Course Name: COMPUTER GRAPHICS

Course Details:

Study the built in functions available in Turbo- C Environment and then perform the following in:

1. WAP to display the name in graphics mode.
2. WAP to display the student information with changing background color.
3. WAP to switch to or from text to graphics mode and vice- versa.
4. WAP to draw ten circles inside one another and fill the circles with different colors.
5. WAP to draw a BUS.
6. WAP to draw a KITE.
7. WAP to draw a line with DDA algorithm.
8. WAP to draw a line with Bresenham's algorithm.
9. WAP to draw a circle using Bresenham's algorithm.
10. WAP to draw a circle using mid point algorithm.
11. WAP to draw ellipse using mid point algorithm.
12. WAP to fill a polygon by using scan line fill algorithm.
13. WAP to provide movement to BUS.
14. WAP to draw a fish and provide the moment.
15. WAP to apply all types of transformations on the KITE.
16. WAP to develop a clock
17. WAP to develop a digital clock
18. WAP to draw cubic Bezier curve.
19. WAP to clip the lines using Cohen Sutherland line clipping algorithm.
20. Minor Project Assigned by the faculty

Course Code: DIT-S506 **Breakup: 3 - 0 - 0 - 4**

Course Name: ARTIFICIAL INTELLIGENCE

Course Details:

UNIT -I

Introduction

Introduction to Artificial Intelligence, Simulation of sophisticated & Intelligent Behavior in different area problem 3OIving in games, natural language, automated reasoning, visual perception, heuristic algorithm versus solution guaranteed algorithms.

UNIT - II

Understanding Natural Languages. Parsing techniques, context free and transformational grammars, transition nets, augmented transition nets, Fillmore's grammars, Shanks Conceptual Dependency, grammar free analyzers, sentence generation, and translation.

UNIT III

Knowledge Representation First order predicate calculus, Horn Clauses, Introduction to PROLOG, Semantic Nets, Partitioned Nets, Minskey frames, Case Grammar Theory, Production Rules Knowledge Base, The Interface System, Forward & Backward Deduction.

UNIT - IV

Expert System Existing Systems (DENDRAL, MYCIN) domain exploration Meta Knowledge, Expertise Transfer, Self Explaining System

UNIT - V

Pattern Recognition Introduction to Pattern Recognition, Structured Description, Symbolic Description, Machine perception, Line Finding, Interception Semantic & Model, Object Identification, Speech Recognition. Programming LanguageIntroduction to programming Language, LISP, PROLOG.

Course Code: DIT-S507T **Breakup: 3 - 1 - 0 - 3**

Course Name: ADVANCE JAVA

Course Details:

Review of Java Fundamentals,

Multi-threaded programming

Java EE

Servlets

Java Server Pages

JDBC, SQL etc

Data and Transaction Management

Distributed Computing

Web-tier Security

Struts

Java Server Faces

Java Design Patterns

AJAX

Portlets

Hibernate

Java Archives and JNLP

Methods of Logging

Methods of Profiling

Course Code: DIT-S507P **Breakup: 0 - 0 - 2 - 2**

Course Name: ADVANCE JAVA

Course Details:

1. Develop Rational number class in Java. Use JavaDoc comments for documentation.Your implementation should use efficient representation for a rational number, i.e.(500 / 1000) should be represented as (½).
2. Develop Date class in Java similar to the one available in java.util package. Use JavaDoc comments.
3. Implement Lisp-like list in Java. Write basic operations such as 'car', 'cdr', and 'cons'. If L is a list [3, 0, 2, 5], L.car() returns 3, while L.cdr() returns [0,2,5].
4. Design a Java interface for ADT Stack. Develop two different classes that implement this interface, one using array and the other using linked-list. Provide necessary exception handling in both the implementations.
5. Design a Vehicle class hierarchy in Java. Write a test program to demonstrate polymorphism.
6. Design classes for Currency, Rupee, and Dollar. Write a program that randomly generates Rupee and Dollar objects and write them into a file using object serialization. Write another program to read that file, convert to Rupee if it reads a Dollar, while leave the value as it is if it reads a Rupee.
7. Design a scientific calculator using event-driven programming paradigm of Java.
8. Write a multi-threaded Java program to print all numbers below 100,000 that are both prime and fibonacci number (some examples are 2, 3, 5, 13, etc.). Design a thread that generates prime numbers below 100,000 and writes them into a pipe.
9. Design another thread that generates fibonacci numbers and writes them to another pipe. The main thread should read both the pipes to identify numbers common to both.
10. Develop a simple OPAC system for library using even-driven and concurrent programming paradigms of Java. Use JDBC to connect to a back-end database.
11. Develop multi-threaded echo server and a corresponding GUI client in Java.
12. [Mini-Project] Develop a programmer's editor in Java that supports syntax highlighting, compilation support, debugging support, etc.

Course Code: DIT-S508 **Breakup: 3 - 0 - 0 - 4**

Course Name: DATA MINING & DATA WAREHOUSING

Course Details:

Review of basic concepts of **data** warehousing and **data** mining, reasons for their use, benefits and problems arising. Data warehouse logical design: star schemas, fact tables, dimensions, other schemas, materialized, views, Data warehouse physical design: hardware and i/o considerations, parallelism, indexes. Data warehousing technologies and implementations: data extraction, transportation, transformation, loading and refreshing. Data warehouse support in SQL Server 2000 and Oracle 9i. From data warehousing to data mining: OLAP architectures, design and query processing. SQL, extensions for OLAP. Data mining approaches and methods: concept description, classification, association rules, clustering, Mining complex types of data, Research trends in data warehousing and data mining.

Books:

1. Data Mining - Concepts and Techniques by Jiawei Han and Micheline Kamber, Morgan Kaufmann 2006.
2. Data Mining: Practical Machine Learning Tools and Techniques with Java Implementations by Ian H. Witten and Eibe Frank, Morgan Kaufmann 2000.
3. Data Mining: Introductory and Advanced Topics by Margaret Dunham, Prentice Hall 2003.
4. **Data** Mining with Microsoft SQL Server 2000 Technical Reference Microsoft Press.

Course Code: DIT-S509T **Breakup: 3 - 1 - 0 - 3**

Course Name: DOT NET

Course Details:

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

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

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

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

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

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

Course Code: DIT-S509P **Breakup: 0 - 0 - 2 - 2**

Course Name: DOT NET Lab

Course Details:

List of Projects:
1. Shopping cart project using ADO.NET: This sample project has all basic features required for a shopping cart web site including Login, Registration, Add to Cart, Checkout etc. A good ASP.NET learning project using C#, ASP.NET, SQL Server.
2. Personal Assistant: This is a small project for managing personal details. Current version of this project support AddressBook feature - Add, Edit and Manage contacts and addresses using VB.NET.
3. Address Book: This is a small project for managing contact details. This is a C# version of the 'Personal Assistant' project.
4. School Management System: This is a project for managing education institutes using C#.
5. ibrary Management System: This is an academic project for students using Java.
6. pider Alerts & Web services: This project communicates with web services and downloads Alerts from the web server using Java & XML.
7. atient Information System: This software can be used to keep track of the patients' information and treatment details in a hospital or clinic. Some of the advanced features include patient consulting, lab information, billing etc using JSP, Servlet & JDBC.
8. eb based Address Book: This application can be used to keep track of your contacts/addresses. N Tier architecture is used to separate data layer, business layer and UI layers.

Course Code: DIT-S510 **Breakup: 3 - 0 - 0 - 4**

Course Name: VLSI

Course Details:

- Introduction to VLSI; CMOS; design metrics
- Combinational logic, layout, design rules
- Manufacturing process;
- CMOS Transistor; Inverter;
- Low Power design strategies
- Circuit families; Static and Dynamic
- Sequential Circuits
- Clocking and Synchronization
- Deep sub-micron designs; design for performance
- Wires
- Adders, Multipliers, data paths
- Memory
- Emerging topics; Variability and Design for Manufacturing
- CMOS system design, Floor plan, Placement and routing, Project design

Books:

- CMOS VLSI Design: Circuits and Systems Perspective, by N Weste and D. Harris, Fourth edition, Addison Wesley (Pearson), 2010
- Digital VLSI Chip Design with Cadence and Synopsys CAD Tools by Erik Brunvand 2009 (Paperback)
- Digital Integrated Circuits, Jan M. Rabaey, Anantha Chandrakasan, and Borivoje Nikolic´. Second Edition, A Prentice-Hall, 2003

Course Code: DIT-S511 **Breakup: 3 - 0 - 0 - 4**

Course Name: DISTRIBUTED SYSTEMS

Course Details:

Characterization of Distributed Systems: Introduction, Examples of distributed systems, Resource sharing and the Web Challenges.**System Models:** Architectural models, Fundamental Models
Theoretical Foundation for Distributed System: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks, Causal ordering of messages, global state, termination detection.
Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms, performance metric for distributed mutual exclusion algorithms.
Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms.
Agreement Protocols: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem, Atomic Commit in Distributed Database system.
Distributed Objects and Remote Invocation: Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study.
Security: Overview of security techniques, Cryptographic algorithms, Digital signatures Cryptography pragmatics, Case studies: Needham Schroeder, Kerberos, SSL & Millicent.
Distributed File Systems: File service architecture, Sun Network File System, The Andrew File System, Recent advances.
Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control.
Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault - tolerant services, highly available services, Transactions with replicated data.
Distributed Algorithms: Introduction to communication protocols, Balanced sliding window protocol, Routing algorithms, Destination based routing, APP problem, Deadlock free Packet switching, Introduction to Wave & traversal algorithms, Election algorithm.
CORBA Case Study: CORBA RMI, CORBA services.

Books:

1. Singhal & Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill
2. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design",
Pearson Ed.
3. Gerald Tel, "Distributed Algorithms", Cambridge University

Course Code: DIT-S512 **Breakup: 3 - 0 - 0 - 4**

Course Name: NETWORK SECURITY

Course Details:

Unit-I
Introduction to security attacks, services and mechanism, Classical encryption techniques substitution ciphers and transposition ciphers, cryptanalysis, steganography, Stream and block ciphers. Modern Block Ciphers: Block ciphers principles, Shannon's theory of confusion and diffusion, fiestal structure, Data encryption standard(DES), Strength of DES, Idea of differential cryptanalysis, block cipher modes of operations, Triple DES 27

Unit-II
Introduction to group, field, finite field of the form GF(p), modular arithmetic, prime and relative prime numbers, Extended Euclidean Algorithm,
Advanced Encryption Standard (AES) encryption and decryption Fermat's and Euler's theorem, Primality testing, Chinese Remainder theorem, Discrete
Logarithmic Problem, Principals of public key crypto systems, RSA algorithm, security of RSA

Unit-III
Message Authentication Codes: Authentication requirements, authentication functions, message authentication code, hash functions, birthday attacks, security of hash functions, Secure hash algorithm (SHA) Digital Signatures: Digital Signatures, Elgamal Digital Signature Techniques, Digital signature standards (DSS), proof of digital signature algorithm,

Unit-IV
Key Management and distribution: Symmetric key distribution, Diffie-Hellman Key Exchange, Public key distribution, X.509 Certificates, Public key Infrastructure. Authentication Applications: Kerberos Electronic mail security: pretty good privacy (PGP), S/MIME.

Unit-V
IP Security: Architecture, Authentication header, Encapsulating security payloads, combining security associations, key management. Introduction to Secure Socket Layer, Secure electronic, transaction (SET).
System Security: Introductory idea of Intrusion, Intrusion detection, Viruses and related threats, firewalls

References:
1. William Stallings, "Cryptography and Network Security: Principals and Practice",
Pearson Education.
2. Behrouz A. Frouzan: Cryptography and Network Security, TMH
3. Bruce Schiener, "Applied Cryptography". John Wiley & Sons
4. Bernard Menezes," Network Security and Cryptography", Cengage Learning.
5. Atul Kahate, "Cryptography and Network Security", TMH

Course Code: DIT-S513 **Breakup: 3 - 0 - 0 - 4**

Course Name: MULTMEDIA SYSTEMS

Course Details:

Unit-I: Introduction

Introduction to Multimedia, Multimedia Information, Multimedia Objects, Multimedia in business and work. Convergence of Computer, Communication and Entertainment products Stages of Multimedia Projects Multimedia hardware, Memory & storage devices, Communication devices, Multimedia software's, presentation tools, tools for object generations, video, sound, image capturing, authoring tools, card and page based authoring tools.

Unit-II:
Multimedia Building Blocks Text, Sound MIDI, Digital Audio, audio file formats, MIDI under windows environment Audio & Video Capture**.**

Unit-III:
Data Compression Huffman Coding, Shannon Fano Algorithm, Huffman Algorithms, Adaptive Coding, Arithmetic Coding Higher Order Modelling. Finite Context Modelling, Dictionary based Compression, Sliding Window Compression, LZ77, LZW compression, Compression, Compression ratio loss less & lossy compression.

Unit-IV:
Speech Compression & Synthesis Digital Audio concepts, Sampling Variables, Loss less compression of sound, loss compression & silence compression.

Unit-V:
Images Multiple monitors, bitmaps, Vector drawing, lossy graphic compression, image file formatic animations Images standards, JPEG Compression, Zig Zag Coding, Multimedia Database. Content based retrieval for text and images, Video: Video representation, Colors, Video Compression, MPEG standards, MHEG Standard Video Streaming on net, Video Conferencing, Multimedia Broadcast Services, Indexing and retrieval of Video Database, recent development in Multimedia.

Books:
1. Tay Vaughan “Multimedia, Making IT Work” Osborne McGraw Hill.
2. Buford “Multimedia Systems” Addison Wesley.
3. Agrawal & Tiwari “Multimedia Systems” Excel.
4. Mark Nelson “Data Compression Book” BPB.
5. David Hillman “Multimedia technology and Applications” Galgotia Publications.
6. Rosch “Multimedia Bible” Sams Publishing.
7. Sleinreitz “Multimedia System” Addison Wesley.
8. James E Skuman “Multimedia in Action” Vikas.

Course Code: DIT-S514 **Breakup: 3 - 0 - 0 - 4**

Course Name: SYSTEM ANALYSIS AND DESIGN

Course Details:

Introduction to system analysis and design: Typical information system; typical cases for analysis; problem-solving steps; gathering information; starting a project. Requirements specifications: Feasibility analysis; Data flow diagrams; describing data; Entity relationship analysis; data dictionary ; physical and logical model of data; logical database design; and the importance of normalization; consider stations in file design ; role of database management system. Examples. Process Specifications: Structured English; decision tables and decision trees; input forms and output report design; validation of data; program design; control, audit, security and recovery considerations. Case study. Software design alternatives. System Implementation: Testing and quality assurance. Software maintenance. Role of project management in the system development cycle. Complete example. Production planning and control, Accounting principles : information flow; role of CAD/CAM; aggregate planning and master scheduling ; preparation of the master schedule, journalizing transactions; ledger posting and trail balance ; matching concept; capital and revenue; final accounts. Forecasting: Qualitative forecasting: time-series predication using regression;
seasonal and cyclic forecasting.

Text Books:

1. IT HAWRYSZKIEWYCZ Introduction to System Analysis and Design Prentice Hall of India.
2. S.N.Maheshwari An introduction to Accounting Vani Educational Books
3. D D Bedworth and J E Bailey Integrated Production Control Systems Wiley international Edition

List of practical:

1. Introducing the fundamentals of Visual Basic programming and its Environment to the user.
2. To study about the properties of command button, label and text box.
3. To study about different kinds of datatypes, operators and array used in visual basic programming. Also study about the variables and constants used in visual basic.
4. To study about different conditional statement and different loop structures used in visual basic program.
5. To study about Checkbox and Option button.
6. To study the properties of Combo Box and List Box.
7. To study about the properties of Scroll Bar and Timer Control.
8. To study about how to create Menu, Sub Menu and Pop-up Menu.
9. To study about the database connectivity with visual basic project.
10. To study about generating data report in visual basic

Course Code: DIT-S515 Breakup: 3 - 0 - 0 - 4

Course Name: EMBEDDED SYSTEM

Course Details:

Course Contents:

Current topics in the design, specifications and analysis of embedded systems. The course will have the contemporary coverage of topics such as specifications of embedded systems, analysis of embedded systems, interface to the real-time operating systems, design case studies, design methodologies, etc. Other topics may include verification of embedded systems like formal verification, co-simulation, etc., estimation of hardware and software costs, partitioning, synthesis (hardware, software, memory, bus), retargetable usage of the software, specification and verification of the OS schedules, hard and soft real-time operating systems, and fault tolerant systems.

Books and References:

1. D. Gajski, F. Vahid, S. Narayan, and J. Gong. Specification and Design of Embedded Systems, Prentice Hall.
2. Jorgan Syaunstrup and W. Wolf. Hardware Software Co-design: Principles and Practice, Kluwer Academic Publishers.
3. Articles in various journals and conference proceedings.

Course Code: DIT-S516 Breakup: 3 - 0 - 0 - 4

Course Name: REAL TIME SYSTEMS

Course Details:

Definition, Typical Real Time Applications: Digital Control, High Level Controls, Signal Processing etc., Release Times, Deadlines, and Timing Constraints, Hard Real Time Systems and Soft Real Time Systems, Reference Models for Real Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency. Common Approaches to Real Time Scheduling: Clock Driven Approach, Weighted Round Robin Approach, Priority Driven Approach, Dynamic Versus Static Systems, Optimality of Effective-Deadline-First (EDF) and Least-Slack-Time-First (LST) Algorithms, Offline Versus Online Scheduling, Scheduling Aperiodic and Sporadic jobs in Priority Driven and Clock Driven Systems. Effect of Resource Contention and Resource Access Control (RAC), Nonpreemptive Critical Sections, Basic Priority-Inheritance and Priority-Ceiling Protocols, Stack Based Priority-Ceiling Protocol, Use of Priority-Ceiling Protocol in Dynamic Priority Systems, Preemption Ceiling Protocol, Access Control in Multiple-Unit Resources, Controlling Concurrent Accesses to Data Objects. Multiprocessor and Distributed System Model, Multiprocessor Priority-Ceiling Protocol, Schedulability of Fixed-Priority End-to-End Periodic Tasks, Scheduling Algorithms for End-to-End Periodic Tasks, End-to-End Tasks in Heterogeneous Systems, Predictability and Validation of Dynamic Multiprocessor Systems, Scheduling of Tasks with Temporal Distance Constraints. Model of Real Time Communication, Priority-Based Service and Weighted Round-Robin Service Disciplines for Switched Networks, Medium Access Control Protocols for Broadcast Networks, Internet and Resource Reservation Protocols, Real ime Protocols, Communication in Multicomputer System, An Overview of Real Time Operating Systems.

Books:

1. Real Time Systems by Jane W. S. Liu, Pearson Education Publication.
2. Real-Time Systems: Scheduling, Analysis, and Verification by Prof. Albert M. K. Cheng, John Wiley and Sons Publications.

Course Code: DIT-S517 **Breakup: 3 - 0 - 0 - 4**

Course Name: Geographic Information systems (GIS)

Course Details:

- a gentle introduction to GIS
- geographical information and spatial data types
- hardware and software, GIS, steps in spatial data handling
- database management systems
- spatial referencing
- data quality, measures of location errors on maps
- satellite-based positioning
- spatial data input, data preparation
- point data transformation
- advanced operations on continuous field rasters
- analytical GIS capabilities, retrieval and classification, overlay functions
- neighbourhood operations, network analysis, error propagation
- data visualization.

Course Code: DIT-S518 **Breakup: 3 - 0 - 0 - 4**

Course Name: E-COMMERCE

Course Details:

UNIT I
Introduction
What is E-Commerce, Forces behind E-Commerce Industry Framework, Brief history of ECommerce, Inter Organizational E-Commerce Intra Organizational E-Commerce, and Consumer to Business Electronic Commerce, Architectural framework Network Infrastructure for E-Commerce Network Infrastructure for E-Commerce, Market forces behind I Way, Component of I way Access Equipment, Global Information Distribution Network, Broad band Telecommunication.

UNIT-II
Mobile Commerce
Introduction to Mobile Commerce, Mobile Computing Application, Wireless Application Protocols, WAP Technology, Mobile Information Devices, Web Security Introduction to Web security, Firewalls & Transaction Security, Client Server Network, Emerging Client Server Security Threats, firewalls & Network Security.

UNIT-III
Encryption
World Wide Web & Security, Encryption, Transaction security, Secret Key Encryption, Public Key Encryption, Virtual Private Network (VPM), Implementation Management Issues.

UNIT - IV
Electronic Payments
Overview of Electronics payments, Digital Token based Electronics payment System, Smart Cards, Credit Card I Debit Card based EPS, Emerging financial Instruments, Home Banking, Online Banking.

UNIT-V
Net Commerce
EDA, EDI Application in Business, Legal requirement in E -Commerce, Introduction to supply Chain Management, CRM, issues in Customer Relationship Management.

References:
1. Greenstein and Feinman, “E-Commerce”, TMH
2. Ravi Kalakota, Andrew Whinston, “Frontiers of Electronic Commerce”, Addision Wesley
3. Denieal Amor, “ The E-Business Revolution”, Addision Wesley
4. Diwan, Sharma, “E-Commerce” Excel
5. Bajaj & Nag, “E-Commerce: The Cutting Edge of Business”, TMH

Course Code: DIT-S5619 **Breakup: 3 - 0 - 0 - 4**

Course Name: Data Communication

Course Details:

UNIT 1: Introduction to Data Communication:

UNIT 2: Signals : Analog and Digital, periodic and aperiodic signals, analog signals, time and frequency domains, composite signals, digital signals.

UNIT 3: Data Transmission : Data transmission basics, asynchronous and synchronous transmission, error detection methods, data compression, transmission control circuits, communication control devices.

UNIT 4: Encoding and Decoding : Digital to digital conversion, analog to digital, digital to analog, analog to analog conversions.

UNIT 5: Modulation & Demodulation of Digital Signal: Interfaces and modems, digital data transmission, DTE – DCE interface, other interface standards, Modems: 56k modem, cable modem

UNIT 6: Multiplexing:-
Many to one/one to many, FDM, WDM, TDM, multiplexing application telephone system, DSL, FTTC.

UNIT 7: Introduction to Mobile Communication:

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

Course Code: DIT-S5620 **Breakup: 3 - 0 - 1 - 4**

Course Name: Analog Electronics Circuit

Course Details:

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

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

UNIT 3 :
The Transistor at low frequencies: Two port devices and the hybrid model, The h-parameter, determination of h-parameters from input and output characteristics, Analysis of a transistor amplifier circuit using h-parameters, the emitter follower (its modeling), miller's theorem and its dual, cascading transistor amplifier (upto 2 stages), simplified hybrid model, high input resistance transistor ckts-e.g. darlington, emmiter follower.

UNIT 4:
Field effect transistors: General description on FET, JFET operation, and its characteristic, MOSFET, The FET small signal model, The low
frequency CS and CD amplifiers at high frequencies.

UNIT 5:
Power amplifiers: Class A, class B, class C, class AB & push-pull amp., Oscillators: sinusoidal, phase shift, resonant-circuit, wein bridge, crystal oscillators.

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

Course Code: DIT-S5621 **Breakup: 3 - 0 - 1 - 4**

Course Name: Signal & Systems

Course Details:

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

UNIT 2:
Convolution of signals, Graphical & analytical methods of convolution, sampling theorem (time domain & frequency domain), Nyquist rate & Nyquist interval, Aliasing, Aperture effect, Recovery from sampled signal, Natural sampling, Flat top sampling, Time convolution theorem, Frequency convolution theorem.

UNIT 3:
Power & Energy signals, Energy & Power spectral densities of signals, Cross correlation, Auto correlation.

UNIT 4:
Systems & Filters: Linear system, Time invariant & LTI system, Impulse response, Causal systems, Filter characteristics of linear systems, Low pass filter High pass filters, Band pass filters, Band stop filters.

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

Course Code: DIT-S522 **Breakup: 3 - 0 - 0 - 4**

Course Name: Modeling & Simulation

Course Details:

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

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

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

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

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

Reference Books:
1) Geoftrey Gordon, "System Simulation", PHI
2) Narsingh Deo, "System Simulation with digital computer", PHI.
3) Averill M. Law, W. David Kelton, "Simulation Modelling and
Analysis",TMH.

Course Code: DIT-S523 **Breakup: 3 - 0 - 0 - 4**

Course Name: Artificial Neural Networks

Course Details:

UNIT 1:
Introduction to neural nets, Perceptrons and the LMS Algorithm. Back propagation Learning, Visually-Guided Robot Control.

UNIT 2:
Optimization Techniques, Overfitting, Cross-Validation, and Early Stopping, Simple Recurrent Networks, Pattern Classification, Language Processing Models.

UNIT 3:
Radial Basis Functions, The EM (Expectation-Maximization) Algorithm, Neural Networks for Control, Support Vector Machines, Time Series Prediction.

UNIT 4:
Shared Weight Networks, Competitive Learning and Kohonen Nets, Hebbian Learning and Principal Components Analysis, Hopfield Nets and Boltzmann Machines.

UNIT 5:
Mean Field Approximation, Helmholtz Machines; Minimum Description Length, Bayesian Networks, Computational Learning Theory, onnectionist Symbol Processing, Reinforcement Learning, Neurophysiology for Computer Scientists.

References:

1) Bishop, C. M. (1995) Neural Networks for Pattern Recognition,. Oxford University Press.
2) Optional enrichment: Anderson, J. A., and Rosenfeld, E.
3) Handout: Derivation of the backprop learning rule
4) Haykin, S. Neural Networks: A Comprehensive Foundation, 2nd edition.
5) Kearns, M. J., and Vazirani, U. V. An introduction to Computational Learning Theory,. Cambridge, MA: MIT Press.
6) Churchland, P.S. (1986) Neurophilosophy: Toward a Unified Science of the Mind-Brain.. Cambridge, MA: MIT Press.

Course Code: DIT-S524 **Breakup:** **3 - 0 - 0 - 4**

Course Name: Stochastic Models for Computer Applications

Course Details:

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

UNIT 2: Expectation:

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

UNIT 3: Conditional Expectation:

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

UNIT 4: STOCHASTIC Process:

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

UNIT 5: Discrete Parameter Markov Chains:

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

UNIT 6: Continuous Parameter Markov Chains:

Introduction, The Birth & Death Process, Non Birth & Death Processes, Markov Chains with Absorbing States.

Reference:-

1) Probability & Statistics with Reliability, Queuing & Computer Science Application: R. S. Trivedi, John Wiley & Sons.

2) Probability, Random Variables & Stochastic Processes: A. Papoulis, TMH

Course Code: DIT-S525 **Breakup: 3 - 0 - 0 - 4**

Course Name: TELECOMMUNICATION SWITCHING SYSTEMS

Course Details:

UNIT I

TELECOMMUNICATION SWITCHING SYSTEMS : Introduction, Elements of switching systems, switching network configuration, principles of cross bar switching.

UNIT II

Electronic space division switching, Time division switching, Combination switching.

UNIT III

TELEPHONE NETWORKS : Subscriber loop systems, switching hierarchy and routing, transmission plan, numbering plan, charging plans.

UNIT IV

SIGNALING TECHNIQUES : In channel signaling, common channel signaling. Network traffic load and parameters, grade of service and blocking probability.

UNIT V

DATA COMMUNICATION NETWORKS : Introduction, network architecture, layered network architecture, protocols, data communications hardware, data communication circuits.

UNIT VI

Public switched data networks, connection oriented & connection less service, Circuit Switching, packet switching and virtual circuit switching concepts, OSI reference model, LAN, WAN, MAN & Internet. Repeaters, Bridges, Routers and gate ways.

UNIT VII

INTEGRATED SERVICES DIGITAL NETWORK (ISDN) : Introduction, motivation, ISDN architecture, ISDN interfaces, functional grouping, reference points, protocol architecture, signaling, numbering, addressing, BISDN.

UNIT VIII

DSL Technology: ADSL, Cable Modem, Traditional Cable Networks, HFC Networks, Sharing, CM & CMTS and DOCSIS. SONET: Devices, Frame, Frame Transmission, Synchronous Transport Signals, STS I, Virtual Tributaries and Higher rate of service.

TEXT BOOKS :

1. Tele communication switching system and networks - Thyagarajan Viswanath, PHI, 2000.
2. Advanced electronic communications systems - Wayne Tomasi, PHI, 2004.

REFERENCES :

1. Digital telephony - J. Bellamy, John Wiley, 2nd edition, 2001.
2. Data Communications & Networks - Achyut. S.Godbole, TMH, 2004.
3. Principles of Communication Systems – H. Taub & D. Schilling , TMH, 2nd Edition, 2003.
4. Data Communication & Networking - B.A. Forouzan, TMH, 3rd Edition, 2004.
5. Telecommunication switching, Traffic and Networks - J E Flood, Pearson Education, 2002

Course Code: DIT-S526 **Breakup:** **3 - 0 - 0 - 4**

Course Name: Information Security and Cyber Laws

Course Details:

UNIT-I

History of Information Systems and its Importance, basics, Changing Nature of Information Systems, Need of Distributed Information Systems, Role of Internet and Web Services, Information System Threats and attacks, Classification of Threats and Assessing Damages Security in Mobile and Wireless Computing- Security Challenges in Mobile Devices, authentication Service Security, Security Implication for organizations, Laptops Security Concepts in Internet and World Wide Web: Brief review of Internet Protocols-TCP/IP, IPV4, IPV6. Functions of various networking components-routers, bridges, switches, hub, gateway and Modulation Techniques

UNIT-II

Basic Principles of Information Security, Confidentiality, Integrity Availability and other terms in Information Security, Information Classification and their Roles. 11 Security Threats to E Commerce, Virtual Organization, Business Transactions on Web, E Governance and EDI, Concepts in Electronics payment systems, E Cash, Credit/Debit Cards.

UNIT-III

Physical Security- Needs, Disaster and Controls, Basic Tenets of Physical Security and Physical Entry Controls, Access Control- Biometrics, Factors in Biometrics Systems, Benefits, Criteria for selection of biometrics, Design Issues in Biometric Systems, Interoperability Issues, Economic and Social Aspects, Legal Challenges Framework for Information Security, ISO 27001, SEE-CMM, Security Metrics, Information Security Vs Privacy

UNIT-IV

Model of Cryptographic Systems, Issues in Documents Security, System of Keys, Public Key Cryptography, Digital Signature, Requirement of Digital Signature System, Finger Prints, Firewalls, Design and Implementation Issues, Policies Network Security- Basic Concepts, Dimensions, Perimeter for Network Protection, Network Attacks, Need of Intrusion Monitoring and Detection, Intrusion Detection Virtual Private Networks- Need, Use of Tunneling with VPN, Authentication Mechanisms, Types of VPNs and their Usage, Security Concerns in VPN

UNIT-V

Laws, Investigation and Ethics: Cyber Crime, Information Security and Law, Types & overview of Cyber Crimes, Cyber Law Issues in E-Business Management Overview of Indian IT Act, Ethical Issues in Intellectual property rights, Copy Right, Patents, Data privacy and protection, Domain Name, Software piracy, Plagiarism, Issues in ethical hacking.

References :

1. Godbole," Information Systems Security", Willey
2. Merkov, Breithaupt," Information Security", Pearson Education
3. Yadav, "Foundations of Information Technology", New Age, Delhi
4. Schou, Shoemaker, " Information Assurance for the Enterprise", Tata McGraw Hill
5. Sood,"Cyber Laws Simplified", Mc Graw Hill
6. Furnell, "Computer Insecurity", Springer
7. IT Act 2000

Course Code: DIT-S527 **Breakup:** **3 - 0 - 0 - 4**

Course Name: Digital Signal Processing

Course Details:

1. Discrete Fourier Transform:
Frequency Domain Sampling: The Discrete Fourier Transform Frequency- Domain Sampling and Reconstruction of Discrete-Time Signals. The Discrete Fourier Transform (DFT). The DFT as a linear Transformation. Relationship of the DFT to Other Transforms. Properties of the DFT. Periodicity, Linearity, and Symmetry Properties. Multiplication of two DFTs and Circular Convolution. Additional DFT Properties. Frequency analysis of signals using the DFT.

2. Efficient Computation of DFT Efficient Computation of the DFT: FFT Algorithms, Direct Computation of the DFT. Radix-2 FFT algorithms. Efficient computation of the DFT of two real sequences, computations, Efficient computation of the DFT of a 2NPoint real sequences, Gortezel Algorithm, Chirp Z-transform algorithm.

3. Basic IIR Filter Structures:
Direct forms (I & II), cascade and parallel realizations. Signal flow graph, Transposed structure, Basic FIR filter structures-. Direct form structure, frequency sampling structure, Lattice structure, Linear phase FIR structure . FIR structures.

4. Symmetric and Anti-symmetric FIR Filters, Design of Linear-Phase FIR Filters Using Windows, Design of Linear-Phase FIR Filters by the
Frequency Sampling Method, Design of FIR, Equiripple filter design Differentiators. Design of Hilbert Transformers.

5. Design of IIR Filters From Analog Filters: IIR Filter Design by Approximation of Derivatives, IIR Filter Design by Impulse Invariance. IIR
Filter Design by the Bilinear Transformation. The Matched-z Transformation, Characteristics of Commonly Used Analog Filters. Application of above technique to the design of Butterworth & Chebyshev filters.

Text Books:
1. Proakis, J.G. & Manolakis, D.G., “Digital Signal Processing: Principles Algorithms and Applications”, Prentice Hall (India).
Reference Books:
1. Sanjit K. Mitra, “Digital Signal Processing”, Third Edition, TMH, 2005
2. Oppenheim A.V. & Schafer, Ronald W., “Digital Signal Processing”, Pearson Education.
3. Rabiner, L.R. and Gold B., “Theory and applications of DSP”, PHI.
4. DeFatta, D.J., Lucas, J.G. & Hodgkiss, W.S., “Digital Signal Processing”, John Wiley & Sons

Math Electives

Course code: MTH-S502 **Breakup: 3 – 1 – 0 – 4**

Course name: Operations Research

Course Details:

UNIT- I
Introduction: Uses, scope and applications of operations research.
Linear Programming: Mathematical formulation of Linear programming problems. Solution of LPP by Graphical method, Simplex method, Duality in Linear Programming Problem, Dual Simplex method, Sensitivity analysis.

UNIT-II
Transportation Problems: Various methods for finding initial basic feasible solution and optimal solution .
Assignment Problems: Hungarian method for solving assignment problems.
Sequencing problem: Basic assumptions, n- jobs on two machine, n- jobs on three machines, two jobs on three machines.

UNIT-III
Game Theory: Two persons zero sum game, pure and mixed strategy games, saddle point, solutions of a game with or without saddle point ,dominance rule, different methods of solving (Algebraic, Graphical, Linear programming).
Inventory Control Models: Deterministic EOQ inventory models.

UNIT-IV
Network Models: Minimal spanning tree algorithm, Shortest route problem, Maximal flow model.
Project Management: Phases of project management, guidelines for network construction, CPM and PERT.

Text Books and Reference :

1. Wayne L. Winston,"Operations Research" Thomson Learning,2003.
2. Hamdy H. Taha, "Operations Research-An Introduction" Pearson Education,2003.
3. R. Panneer Seevam, "Operations Research" PHI Learning, 2008.
4. V.K.Khanna, "Total Quality Management" New Age International, 2008.
5. Kanti swroop , Manmohan and Gupta-operations research , sultan chand & sons new delhi.
6. V.K.Kapoor- operations Research (S.Chand,4^{th} Edition)

Course Code: MTH-S503 **Breakup: 3 – 2 – 0 – 4**

Course Name: Graph Theory

Course Details:

Unit –I

Graphs, Sub graphs, Some basic properties, Different types of graphs (Regular, Bipartite, Induced, Quotient etc) walks, paths & circuits, connected graphs, disconnected graphs and its components, Euler graphs and its properties, Fluery's algorithms and Chinese postman problem Operation on graphs, Hamiltonian graphs and its properties, Hamiltonian paths and circuits, the traveling sales man problem. Shortest distance algorithms (Dijkstra's) .

Unit –II

Cuts sets and cut vertices, some properties, all cut sets in a graph, fundamental circuits and cut sets , connectivity and separability , Rank, Nullity of a graph.

Digraphs : Definition, Types of Digraphs, Digraphs and Binary relations, Directed path and connectedness, Euler Digraphs.

Unit- III

Trees and its characterization, Distance, Height, Diameters, Radius of a tree, Weighted Tree, Rooted and Binary trees, Spanning trees , Weighted spanning tree , Minimum weight spanning tree algorithms prim's and Kruskal's. Chords, Branches, Fundamental circuits.

Unit –IV

Matrix representation of graphs : Incidence, Adjacency, Circuit, Cut-set and Path matrices and their properties. Matrix representation of Digraphs (Adjacency matrix).

Unit –V

Planarity: Planer graphs, Regions, Euler formula, Kuratowski two graphs, Characterization of planarity, detection of planarity, Thickness and Crossings number of a graph.

Colouring of graphs: Vertex colouring , Edge colouring, Five colour Theorem, Chromatic number, chromatic polynomials, Methods of finding the chromatic polynomial, Chromatic partitioning, Independence number and Covering number.

Matchings , Maximal matching, Augmenting path, Hall's marriage problem

Unit -VI

Enumeration : counting labelled and unlabelled graphs and trees. Cycle index, Figure counting series, Configuration counting series, Polya's Theorem(without Proof). Application to simple and multiple graphs with at most two edges between vertices.

Transportation networks : Network flows, Max flow-Min cut Theorem.

Text Books and Reference :

1. Deo, N, Graph theory with applications to Engineering and Computer Science, PHI
2. V. Balakrishnan, Schaum's Outline of Graph Theory, TMH
3. Robin J. Wilson, Introduction to Graph Theory, Pearson Education
4. Harary, F, Graph Theory, Narosa
5. Geir Agnarsson, Graph Theory: Modeling, Applications and Algorithms, Pearson Education
6. Bondy and Murthy: Graph theory and application. Addison Wesley

Course Code: MTH-S504 Breakup: 3 – 1 – 0 – 4

Course Name: Probability & Statistics

Course Details:

UNIT- I
Joint Distribution Functions, Necessary and Sufficient conditions for independence of random variables, Central Limit Theorem, Statistic, Sufficient Statistic.

UNIT- II
Estimation Theory; Methods of Estimation, Unbiased, Consistent, Maximum likelihood estimators, Minimum Variance, Unbiased Estimators .

UNIT- III
Testing of Hypotheses; Simple and Composite Hypotheses, Two types of error, Power of a test, Neyman Pearson Lemma for most powerful Tests, Application of the Lemma, Various tests of significance for the mean and variance, Contingency tables and X^2 - tests. Confidence Interval Estimation .

Text Books and Reference :

1. V.K.Rohatgi & Saleh: An introduction to Probability and statistics, Wiley Eastern
2. Ramana: Higher Engineering Mathematics, McGraw Hill
3. E. Kreyszig, Advanced Engineering Mathematics (Chapter 22), John Wiley & Sons, 2005.