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**

<table>
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<tr>
<th>Course Code</th>
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**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

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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:
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, friction 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
3. Concept of physics (I & II): H. C. Verma
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)
   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)
   Apparatus Used (Electrical Vibrator, String, Pulley, Small Pan, Weight Box & Physical Balance)
   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


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.


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.


Text Books and References:
2. Raghuwanshi, B S “Workshop Technology; vol. I & II” Dhanpat Rai & Sons

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:
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.
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


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:

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, Ampère’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
Course Code: PHY-S102P  Breakup: 0 – 0 – 3 – 2

Course Name: Physics Lab-II

Course Details:

   **Apparatus Used** (Traveling Microscope, Support for Glass Plate inclined at 45° to the Vertical, Short Focus Convex Lens, Sodium Lamp, Plano Convex Lens, An Optically Plane Glass Plate)

   **Apparatus Used** (Spectrometer, Glass Prism, Reading Lens, Mercury Lamp)

   **Apparatus Used** (Spectrometer, Diffraction Grating, Mercury Lamp)

   **Apparatus Used** (Ballistic Galvanometer, Morse key, Damping key, Condenser, Rheostat, Volt Meter, Storage Battery, Connection Wires)

   **Apparatus Used** (Carey Foster’s Bridge, Laclanche cell, Resistance Box, Galvanometer, Plug Key, Copper Strip)

   **Apparatus Used** (Sodium Lamp, Biprism, Convex Lens, Optical Bench with Four Uprights)

   **Apparatus Used** (Stewart and Gee type Tangent Galvanometer, Storage Battery, Commutator, Ammeter, Rheostat, One way Plug Key, Connection Wires)

   **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:
Structure of coordination compounds corresponding to coordination number up to 6, Types 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$_4$)$_2$SO$_4$.6H$_2$O) 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

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:**
Course Code: ESC-S101T

Breakup:  3 – 1 – 0 – 3

Course Name: Basic Electrical & Electronics Engineering

Course Details:

Unit – I

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:

5. Del Toro : Principles of Electrical Engg. – PHI
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:

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.
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.
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.
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 recursive numbers up to n using Sieve of Eratosthenes method.
60. Write a C++ program
61. EOF--[if !supportLists]-->a) EOF--[endif]-->To write an object to a file.
62. EOF--[if !supportLists]-->b) EOF--[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: -


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

Course Name: DATA STRUCTURES

Course Details:

UNIT - I
Introduction: Basic Terminology, Elementary Data Organization, Structure operations, Algorithm Complexity and Time-Space trade-off

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

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

Reference text books:

Supplementary reference books:
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

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, Trigonometric series, Fourier series of period $2\pi$, 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 functions, Binomial, Poisson and Normal distributions.

Text Books and Reference:
Course Code: ESC-S201  
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**: Introduction, 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**:
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 ( performance, address mapping and replacement) Auxiliary memories: magnetic disk, magnetic tape and optical disks Virtual memory: concept implementation.

Unit-V Input / Output:

Books
Course Code: DIT-S204
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
Course Code: DIT-S206T

Course Name: SOFTWARE ENGINEERING

Course Details:

Unit-I: Introduction

Unit-II: Software Requirement Specifications (SRS)

Unit-III: Software Design

Unit-IV: Software Testing

Unit-V: Software Maintenance and Software Project Management

Reference Books:
5. Ian Sommerville, Software Engineering, Addison Wesley.
6. Pankaj Jalote, Software Engineering, Narosa 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.
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]
Course Code: MTH-S301
Breakup: 3 – 1 – 0 – 4

Course Name: Discrete Mathematics

Course Details:

Unit-I

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, Characterization theorems, Connectedness, Euler graphs, Hamiltonian graphs, Travelling salesman problem, Shortest distance algorithm (Dijkstra’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
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:

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
5. Douglas V. Hall, Microprocessors and Interfacing Programming and Hardware, Tata McGraw-Hill, 1999
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:


Books and References: -


References:
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

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”, Addison Wesley
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  

Unit - II  

Unit - III  

Unit - IV  

Unit - V  

Suggested Books And References:  
4. Tannenbaum, "Operating System Design and Implementation", PHI.  
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

Unit-II

Unit - III

Unit - IV

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

Course Name: COMPUTER NETWORKS

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

UNIT II

UNIT III

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

REFERENCE:
3. Joel Sklar , “Principal of web Design” Vikash and Thomas Learning
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
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**  

**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**  
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:


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
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

UNIT-II: Project Organization and Scheduling

UNIT-III: Project Monitoring and Control

UNIT-IV: Software Quality Assurance and Testing

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
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

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.
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: -

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:-
2. Matthew, ”Beginning Linux Programming”, SPD/WROX
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.

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:
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 3O1ving 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

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, 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.
Course Code: DIT-S509T Breakup: 3 - 1 - 0 - 3

Course Name: DOT NET

Course Details:

UNIT 1: The .NET Framework:

UNIT 2: C# Basics:
Introduction., .Data Type, Identifiers, Variables & 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) 'Understanding .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. Library Management System: This is an academic project for students using Java.
6. Spider Alerts & Web services: This project communicates with web services and downloads Alerts from the web server using Java & XML.
7. Patient 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)
Course Code: DIT-S511    Breakup: 3 - 0 - 0 - 4
Course Name: DISTRIBUTED SYSTEMS

Course Details:


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 deadlock detection, distributed deadlock detection, path pushing algorithms, edge chasing algorithms.


Distributed Objects and Remote Invocation: Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study.


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.


CORBA Case Study: CORBA RMI, CORBA services.

Books:
3. Gerald Tel, "Distributed Algorithms", Cambridge University
Course Code: DIT-S512

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
System Security: Introductory idea of Intrusion, Intrusion detection, Viruses and related threats, firewalls

References:
2. Behrouz A. Frouzan: 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:


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:

4. Mark Nelson “Data Compression Book” BPB.
5. David Hillman “Multimedia technology and Applications” Galgotia Publications.
7. Sleinreitz “Multimedia System” Addison Wesley.
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

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:

3. Articles in various journals and conference proceedings.

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

Course Name: REAL TIME SYSTEMS

Course Details:


Books:

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

UNIT-II
Mobile Commerce

UNIT-III
Encryption

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:
2. Ravi Kalakota, Andrew Whinston, “Frontiers of Electronic Commerce”, Addision Wesley
4. Diwan, Sharma, “E-Commerce” Excel
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

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 rectifiers, 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 ckt-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:

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, uncertainties in activityduration, resource allocation and consideration, Simulation languages, object oriented simulation.

Reference Books:
1) Geoffrey Gordon, “System Simulation”, PHI
2) Narsingh Deo, “System Simulation with digital computer”, PHI.
Course Code: DIT-S523    Breakup: 3 - 0 - 0 - 4

Course Name: Artificial Neural Networks

Course Details:

UNIT 1:

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:
2) Optional enrichment: Anderson, J. A., and Rosenfeld, E.
3) Handout: Derivation of the backprop learning rule
Course Code: DIT-S524          Breakup:     3 - 0 - 0 - 4

Course Name: Stochastic Models for Computer Applications

Course Details:

UNIT 1: Bivariate 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:

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:

UNIT 6: Continuous Parameter Markov Chains:

Reference:-
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

TEXT BOOKS :

REFERENCES :
Course Code: DIT-S526  Breakup:  3 - 0 - 0 - 4
Course Name: Information Security and Cyber Laws

Course Details:

UNIT-I

UNIT-II

UNIT-III

UNIT-IV

UNIT-V

References:
3. Yadav, "Foundations of Information Technology", New Age, Delhi
7. IT Act 2000
Course Code: DIT-S527   Breakup: 3 - 0 - 0 - 4

Course Name: Digital Signal Processing

Course Details:

1. Discrete Fourier Transform:

2. Efficient Computation of DFT

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.


Text Books:

Reference Books:
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.

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 :

5. Kanti swroop , Mannmohan and Gupta-operations research , sultan chand & sons new delhi.
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  

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

Text Books and Reference :
1. V.K.Rohatgi & Saleh: An introduction to Probability and statistics, Wiley Eastern