BE-301 ENGINEERING MATHEMATICS – I
Unit I

Numerical analysis: Errors & Approximations, Solution of Algebraic & Trancedental Equations (Regula Falsi ,Newton-Raphson, Secant Method), Solution of simultaneous linear equatins by Gauss Elimination, Gauss Jordan, Crout's methods , Jacobi's and Gauss-Siedel Iterative methods
Definite Integrals : Definite Integrals as a limit of a sum, its application in Summation of Series.

Unit II

Calculus : Expansion of functions by Maclaurin's and Taylor's theorem. Partial differentiation, Euler's theorem and its application in approximation and errors, Maxima and Minima of function of two variables, Curvature: Radius of curvature.

Unit III

Differential Equations : Solution of Ordinary Differential Equations(Taylor's Series, Picard's Method, Modified Euler's Method, Runge-Kutta Method,Milne's Predictor & Corrector method), Correlation and Regression, Curve Fitting (Method of Least Square). Linear Differential Equations with Constant Coefficients, Cauchy's Homogeneous differential Equation, Simultaneous differential Equations, Method of Variation of Parameters.

Unit IV

Matrices : Rank, Nullity, Solution of Simultaneous equation by elementary transformation, Consistency of System of Simultaneous Linear Equation, Eigen Values and Eigen Vectors, Cayley -Hamilton Theorem and its Application to find the inverse.

Unit V

Graph Theory : Graphs, Subgraphs, Degree and Distance, Tree, cycles and Network, Algebra of Logic, Boolean Algebra, Principle of Duality, Basic Theorems, Boolean Expressions and Functions. Elementary Concept of Fuzzy Logic

References:
1. Higher Engineering Mathematics by B.S. Grewal, Khanna Publication.
2. Engineering Mathematics volume I & III by D.K. Jain
3. Engineering Mathematics volume I by D.C.Agrawal

IT- 302 Discrete Structures

Unit-I

Introduction of Sets : Sets, Type of Sets , Venn Diagrams, proofs of theorems on sets, Relation & Its types , composition of relations, Pictorial representation of relation, Equivalence relation, Partial ordering relation, Job-Scheduling problem,   Function & Its Type   composition of functions, recursively defined functions, pigeonhole principle. Theorem proving Techniques: Mathematical induction, contradiction.

Unit-II

Introduction to groups and rings, subgroups, generators and evaluation of powers, Cosets and Lagrange's theorem, permutation groups and burnicide's theorem, codes and group codes, isomorphism and automorphism, homomorphism and normal subgroups, rings, internal domains and fields, ring homomorphism, polynomial rings and cyclic codes.

Unit-III

Proposition, First order logic, logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Normal Forms, quantifiers & its Types. Introduction to finite state machine Finite state machines as models of physical system equivalence machines, Finite state machines as language recognizers

Unit-IV

Introduction of Graph : Definition of graphs, type of graph, Paths, Cycles and connectivity, Shortest path in weighted graph, Eulerian paths and circuits, Hamiltonian paths and circuits, Graph coloring, chromatic number, Isomorphism and Homomorphism of graphs.

Unit V

Boolean algebra, lattices and algebraic systems, principles of duality, Algebraic system v/s lattices, distributive and complemented lattices, Boolean lattices and Boolean algebra, uniqueness of finite Boolean algebra's, Boolean functions and Boolean expressions, prepositional calculus, design and implementation of digital networks switching circuits.

Reference's:

1. C.L.Liu, "Elements of Discrete Mathematics" Tata Mc Graw-Hill Edition.
2. Trembley, J.P & Manohar; "Discrete Mathematical Structure with Application CS", McGraw Hill.
3. Kenneth H. Rosen, "Discrete Mathematics and its applications", McGraw Hill.
4. Lipschutz; Discrete mathematics (Schaum); TMH
5. Deo, Narsingh, "Graph Theory With application to Engineering and Computer.Science.", PHI.
6. Krishnamurthy V; "Combinatorics Theory & Application", East-West Press Pvt. Ltd., New Delhi.
7. S k Sarkar " Discrete Mathematics", S. Chand Pub.

IT- 303 Data Structures

UNIT I

Data structures, Type of Data structure, ordered lists, operations in ordered list, sparse matrices, , arrays multi-dimensional arrays, linked lists, operations on linked list, doubly linked list and its operations, storage pools, garbage collection.

UNIT II

Stacks and Its Operations , applications of Stacks and queues and operation of queues, difference between Stacks and queues, Circular queues, Mazing problem, Prefix, postfix, infix notations

UNIT III

Trees, Type of Trees, applications of Trees , AVL Trees, B- Trees, binary tree, operations on binary tree , Spanning tree, cut sets, graphs, properties of graph, Planner graphs and its applications, Hamiltonian path and circuits Eularian paths and circuits.

UNIT IV

Sorting, Insertion Sort, Bubble Sort, selection sort Quick Sort, Merge Sort, Heap Sort, Radix sort, Searching & Hashing: Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation. Symbol Table, Static tree table, Dynamic Tree table.

UNIT V

Sequential Search, Binary Search, Other search techniques, Time complexity & memory requirements, Bubble Sort, Insertion sort, Quick sort, Selection sort, Merge sort, Heap sort, maxima and minima heap

References:

1. Data Structure by Tanenbaum
2. Data Structure by Horowitz & Sahan

List of Experiments (expandable):
    Programs in C relating to different theory units.

IT- 304 Electronics Devices

Unit I : Semiconductor :-intrinsic and extrinsic, p-type and n-type, energy band diagrams, majority and minoritycarrier, charge density in semiconductor, generation and recombination of charges, process of diffusion,diffusion and drift currents, Hall effects and its applications. p-n junction, depletion layer, potential barrier,electric field, forward and reverse biased junction, current components in p-n diode, current equation, V-Icharacteristics, cut in voltages of Si and Ge diode, transition and diffusion capacitance, powerdissipation,.

Unit II : Semiconductor Diode:-Semiconductor diodes, ideal & practical diode equivalentcircuit & frequency response, graphical analysis of diode circuits, diode applications, clipping andclamping circuits, half wave & full wave rectifier circuits with & without filters.Type of diodes and theirapplications, Signal diodes, Power Diode, Zener diode, Varactor diode, Schottky diode, PIN diode,Tunnel diode, Photo diode. Direct tunneling equivalent cirucuit, Tunnel diode oscillator; Solar Cell,LED, LEDs specification & geometry of LEDs, Colours of LEDs, LCD, Diffusion and Transitioncapacitance of P-N junction diode, Simple zener regulators.

Unit III: Diode Applications: p-n junction diode as rectifier, clipper and clamper, The diode as a circuit element,The Load line concept, The Pieceswise linear diode modal, Clipping circuits, Clipping at two independentlevels, Comparators, Sampling Gate, Rectifiers, Other full wave circuits, Capacitor filter additional diodescircuits.

Unit IV :Bipolar junction transistor - Construction, basic operation, current components and equations,. CB, CE and CC-configuration, input and output characteristics, Early effect, region of operation, active, cutoff and saturation region Ebers-Moll model, , power dissipation in transistor (Pdmax rating), Photo transistor, Uni-junction Transistor (UJT) : Principle of operation, characteristics.

Unit V : FET construction- Construction, n channel and p channel, characteristics, parameters, Equivalent model and voltage gain, Enhancement and depletion MOSFET and its Characteristics, analysis of FET in various configuration.

References:
1. Boylestad and Nashelsky: Electronic Devices and Circuit Theory, Pearson Education
2. Millman and Halkias: Integrated electronics, TMH
3. Graham Bell: Electronic Devices and Circuits, PHI
4. Sendra and Smith: Microelectronics, Oxford Press.
5. Donald A Neamen: Electronic Circuits Analysis and Design, TMH

List of Experiments
1. V-I characteristics of various Diodes (p-n, Zener, Varactor, Schottky, Tunnel, Photodiode etc)
2. Characteristics of Transistors (BJT and FET)
3 Applications of diodes and Design of various clipping and clamping circuits
4 Design half & full wave rectifier
5 Design & Analysis of transistor amplifier in CE, CB & CC configuration.
6 Design & Analysis of JFET Amplifier.
7 Design & Analysis of MOSFET Amplifier.

IT- 305 Object Oriented Design and Programming

Unit I
Concept of OOPS, Objects and classes, Objects as software units, Encapsulation and Information hiding, Objects instantiations and interactions, Object lifetime, Type of objects, Meta-class, Modeling the real world objects.

Unit II
Relationships of classes, Association of objects, Its types , Recursive Association, Multiplicities, Navigability, Named association, Aggregation of objects. Types of Aggregation, Delegation, Modeling Association and Aggregation.

Unit III
Polymorphism, Types of polymorphism, Static and dynamic polymorphism, Operator and Method overloading, Inheritance, Type of Inheritance, Inherited methods, Redefined methods, the protected interface, Abstract methods and classes, Public and protected properties, Private operations, Disinheritance, Multiple inheritance.

Unit IV
System Design- Devising an Architecture, Database Management Paradigm, Object Identity, Policies for Detailed Design Dealing with temporal data.

UNIT-V
Detailed Design:- Object Model Transformations, Elaborating the Object Model, Elaborating the Functional Model, Evaluating the Quality of a Design Model

References:
- Object-Oriented Modeling and Design by Michael Blaha / William Premerlani , Prentice Hall
- David Parsons; Object oriented programming with C++; BPB publication
- Object oriented programming in C++ by Robert Lafore: Galgotia
- Balagurusamy; Object oriented programming with C++; TMH