

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

CS- 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

Groups and rings, subgroups, generators and evaluation of powers, Cosets and Lagrange's theorem, permutation groups and Burnside'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, propositional 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.

CS-303 Computer Architecture

Unit -I

Computer Basics and CPU :-Basic computer data types, Complements, Fixed point representation, Von Newman model, various subsystems, CPU, Memory, I/O, System Bus, CPU and Memory registers, Program Counter, Accumulator, Instruction register, Micro operations, Register Transfer Language, Instruction Fetch, decode and execution, data movement and manipulation, Instruction formats and addressing modes of basic computer.

Unit –II

Control Unit Organization: Hardwired control unit, Micro programmed control unit, Control Memory, Address Sequencing, Micro Instruction formats, Micro program sequencer.

Computer Arithmetic:- Introduction, Addition and subtraction, Multiplication Algorithms (Booth Multiplication Algorithm), Division Algorithms, Floating Point Arithmetic operations, Decimal Arithmetic Unit.

Unit –III

Input-Output Organization:-Input-Output Interface, Asynchronous Data Transfer, Modes Of Transfer, Priority Interrupt, DMA, Input-Output Processor (IOP), CPU IOP Communication, Serial communication, simplex/half duplex and full duplex.

Unit –IV

Memory Organization Memory:- Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.

Multiprocessors:- Characteristics of Multiprocessors, Interconnection Structures, Inter-processor Communication , Cache Coherence, Shared Memory Multiprocessors.

Unit –V

Pipeline And Vector Processing:- Flynn's taxonomy, Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

Reference Books: -

1. M. Morris Mano, Computer System Architecture, Pearson
2. Andrew S. Tanenbaum and Todd Austin, Structured Computer Organization, Sixth Edition, PHI
3. M. Murdocca & V. Heuring, Computer Architecture & Organization, WILEY
4. John Hayes, Computer Architecture and Organization, McGraw-Hill

List of experiment (Expandable)

1. Write a program loop using a pointer and a counter to clear the contents of hex locations 500 to 5FF with 0.
2. Write an ALP to add two Double-Precision numbers.
3. Write a program that evaluates the logic ex-or of two logic operands.
4. Write a program for the arithmetic shift-left operation. Branch to OVF if an overflow occurs.
5. The following transfer statements specify a memory. Explain the memory operation in each case.
M[AR]↓R2 R3↓M[AR] M[R5]↓R5

CS- 304 Electronics Devices

Unit I : Semiconductor :-intrinsic and extrinsic, p-type and n-type, energy band diagrams, majority and minority carrier, 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-I characteristics, cut in voltages of Si and Ge diode, transition and diffusion capacitance, power dissipation.

Unit II : Semiconductor Diode:-Semiconductor diodes, ideal & practical diode equivalent circuit & frequency response, graphical analysis of diode circuits, diode applications, clipping and clamping circuits, half wave & full wave rectifier circuits with & without filters. Type of diodes and their applications, Signal diodes, Power Diode, Zener diode, Varactor diode, Schottky diode, PIN diode, Tunnel diode, Photo diode. Direct tunneling equivalent circuit, Tunnel diode oscillator; Solar Cell, LED, LEDs specification & geometry of LEDs, Colours of LEDs, LCD, Diffusion and Transition capacitance 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 Piecewise linear diode model, Clipping circuits, Clipping at two independent levels, Comparators, Sampling Gate, Rectifiers, Other full wave circuits, Capacitor filter additional diode circuits.

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 (P_{dmax} 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.

CS- 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

CS- 306 – Computer Programming –CP-I (C Programming)

UNIT I

Fundamentals of C Programming: History of C; Structure of a C Program; Data types; Constant & Variable, naming variables; Operators & expressions; Control Constructs – if-else, for, while, do-while; Case switch statement.

UNIT II

Arrays; Formatted & unformatted I/O; Type modifiers & storage classes; Ternary operator; Type conversion & type casting; Priority & associativity of operators.

UNIT III

Modular Programming: Functions; Arguments; Return value; Parameter passing – call by value, call by reference; Return statement; Scope, visibility and life-time rules for various types of variable.

UNIT IV

static variable; Calling a function; Recursion – basics, comparison with iteration, types of recursion- direct, indirect, tree and tail recursion, when to avoid recursion, examples.

UNIT V

Advanced Programming Techniques: Special constructs – Break, continue, exit(), goto & labels; Pointers - & and * operators, pointer expression, pointer arithmetic, dynamic memory management functions like malloc(), calloc(), free(); String; Pointer v/s array; Pointer to pointer; Array of pointer & its limitation; Function returning pointers; Pointer to function, Function as parameter.

UNIT VI

Miscellaneous Features: File handling and related functions; printf & scanf family; C preprocessor – basics, #Include, #define, #undef, conditional compilation directive like #if, #else, #elif, #endif, #ifdef and #ifndef; Variable argument list functions.

References:

1. Kernighan & Ritchie “The C programming language”, PHI
2. Schildt “C: The Complete reference” 4th ed TMH.
3. Cooper Mullish “The Spirit of C”, Jaico Publishing House, Delhi
4. Kanetkar Y. “Let us C”, BPB.