

MTH-301 COMPUTATIONAL TECHNIQUES

UNIT I

MATRICES:- Eigenvalues and Eigenvectors of a real matrix , Characteristic equation , Properties of Eigenvalues and eigenvectors, Cayley-Hamilton Theorem, Diagonalization of matrices, Reduction of a quadratic form to canonical form by orthogonal transformation

UNIT II

INFINITE SERIES:- Sequences, Convergence of series, General properties, Series of positive terms , Tests of convergence (Comparison test, Integral test, Comparison of ratios and D'Alembert's ratio test), Alternating series, Series of positive and negative terms, Absolute and conditional convergence, Power Series, Convergence of exponential, logarithmic and Binomial Series.

UNIT III

FUNCTIONS OF SEVERAL VARIABLES:- Limits and Continuity, Partial derivatives, Homogeneous functions and Euler's theorem, Total derivative, Differentiation of implicit functions, Change of variables, Partial differentiation of implicit functions, Taylor's series for functions of two variables. Errors and approximations, Maxima and minima of functions of two variables

UNIT IV

IMPROPER INTEGRALS:- Improper integrals of the first and second kind and their convergence, Evaluation of integrals involving a parameter by Leibnitz rule – Beta and Gamma functions, Properties, Evaluation of integrals using Beta and Gamma functions, Error functions.

UNIT V

MULTIPLE INTEGRALS:- Double integrals , Change of order of integration ,Area enclosed by plane curves, Triple integrals, Volume of Solids, Change of variables in double and triple integrals, Area of a curved surface.

TEXT BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 40th Edition, 2007.
2. Ramana B.V., "Higher Engineering Mathematics", Tata McGraw Hill Co. Ltd.,

ITC- 302 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 Pieces wise linear diode modal, Clipping circuits, Clipping at two independent levels, Comparators, Sampling Gate, Rectifiers, Other full wave circuits, Capacitor filter additional diodes 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 (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.
8. Design Zener diode as voltage regulator.
9. Design of clipper Circuit.
10. Design of clamper Circuit.

ITC-303 - DIGITAL CIRCUITS

UNIT-I

Number System & Boolean Algebra:- Review of number system; types and conversion, codes. Boolean algebra: De-Morgan's theorem, switching functions and simplification using K-maps & Quine McCluskey method.

UNIT-II

Combinational Circuits:- Logic gates, Half and Full adders, Half and Full Subtractors Series & parallel addition, BCD adders, Look-ahead carry generator, comparators, code converters, multiplexers and demultiplexers, Function realization using gates & multiplexers, encoders, decoders.

UNIT-III

Sequential Circuits:-Flip flops:- S-R, D, J-K and T Flip Flop, Shift Register, Analysis of synchronous sequential circuits; design of synchronous sequential circuits – Counters, types of counters.

UNIT-IV

Programmable Logic Devices, Memory and Logic Families Memories:- ROM, PROM, EPROM, PLA, PLD, FPGA, Logic families: RTL, DTL, All types of TTL circuits, ECL, I²L, PMOS, NMOS & CMOS logic.

Multivibrator:- Monostable, Bistable, & Astable multivibrator, Schmitt trigger circuits & Schmitt-NAND gates.

UNIT-V

A/D Converter and D/A Converter:- Introduction of Analog to Digital & Digital to Analog converters, sample & hold circuits and V-F converters.

References:

1. M. Mano; "Digital Logic & Computer Design"; PHI.
2. Malvino & Leach; "Digital Principles & Applications"; TMH
3. W.H. Gothman; "Digital Electronics"; PHI.
4. Millman & Taub; "Pulse, Digital & Switching Waveforms"; TMH
5. Jain RP; Modern digital Electronics; TMH
6. R.J. Tocci, "Digital Systems Principles & Applications".

List of Experiments:

1. To study and test of operation of all logic gates for various IC's (IC#7400,IC#7403,IC#7408, IC#74332,IC#7486).
2. Verification of Demorgan's theorem.
3. To construct half adder and full adder.
4. To construct half and full subtractor circuits
5. Verification of versatility of NAND & NOR gate.
6. Design a Multiplexer/ Demultiplexer.
7. To demonstrate the operation of RS, JK and D flip-flops.
8. To study 4-bit magnitude comparator.
9. To study operation of binary and decade counter.
10. To study Analog to Digital & Digital to Analog converters

ITC- 304 –PROGRAMMING LANGUAGE IN C

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

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. 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 III

Arrays: Arrays: Introduction to Arrays, Array Declaration, Single and Multidimensional Array, Memory Representation, Strings, String handling functions.

Pointers: Introduction to Pointers, Address operator and pointers, Declaring and Initializing pointers, Assignment through pointers. Pointer v/s array; Pointer to pointer; Array of pointer & its limitation; Function returning pointers; Pointer to function, Function as parameter.

UNIT IV

Structure and Union: Declaration of structure, Accessing structure members, Structure Initialization, Union.

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();

UNIT V

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. Kerninghan & 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.

List of Experiment

1. WAP to perform arithmetic operations (Addition, Subtraction, Multiplication, Division) on two numbers.
2. WAP to calculate gross salary of an employee [using formula: gross_sal = basic_sal+hra+da].
3. WAP to calculate area of circle.
4. WAP to evaluate marks of student for 3 subjects, calculate percentage and display their grades.

	Marks	grades
CASE -1:	90-100	A
CASE -2:	80-89	B
CASE -3:	65-79	C
CASE -4:	Otherwise	D

5. WAP to determine sum of odd series from 1 to N
6. WAP to calculate factorial of a number.
7. WAP to print Fibonacci series up to N. [E.g. - 0 1 1 2 3 5.....]
8. WAP to identify whether given number is prime or not.
9. WAP to identify whether given number is even or odd.
10. WAP to print whether given year is leap year or not.
11. WAP to check whether the 5 digit number is palindrome or not [A palindrome number or numeral palindrome is a number that remains the same when its digits are reversed. Like 16461, for example, it is "symmetrical".].
12. WAP to check whether 5 number entered is Armstrong number or not.[An Armstrong number is an n-digit number that is equal to the sum of the nth powers of its digits. Like 153]
13. WAP to find the sum of the digits of a number.
14. WAP to input 3 sides of triangle and identify the type of triangle.
15. WAP to input 5 digit numbers and find the sum of the first and last digit.
16. WAP to check whether the number is power of 2 or not.
17. WAP to find out GCD of two numbers.
18. WAP to check whether given number is perfect power of any natural number.

ITC-305 OPERATING SYSTEM

UNIT I

Introduction:- History of operating System, Types of Operating System: Batch Processing, Real Time, Multitasking & Multiprogramming, Time-sharing system, Operating system services, Operating system structure, System Call & System Boots, Operating system design & Implementations, System protection, Buffering & Spooling.

UNIT II

Processes Management:- The Process concept, The process control block, Systems programmer's view of processes, Operating system services for process management, Scheduling algorithms, First Come first serve, Round Robin, Shortest run time next, Highest response ratio next, Multilevel Feedback Queues, Performance evaluation of scheduling algorithms stated above.

UNIT III

Deadlock:- Characterization, Methods for deadlock handling, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock, Process Management in Linux.

File Management:- File system, access methods, free space managements, allocation methods, directory systems, protection, organization, sharing & implementation issues, Disk & Drum Scheduling, File system in Linux & Windows

UNIT IV

I/O Management:- I/O devices organization, I/O devices organization, I/O buffering, I/O Hardware, Kernel I/O subsystem, Transforming I/O request to hardware operations.

Device Management:- Path managements, Sub module, Procedure, Scheduler, Handler, Interrupt Service Routine.

UNIT V

Memory Management:- Memory Hierarchy, MFT & MVT, logical and physical address space, Concept of swapping and Paging, Memory management without swapping or paging, contiguous and non-contiguous allocation, segmentation, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation and paging combined with segmentation. Structure & implementation of Page table, Virtual memory, Cache Memory Organization.

REFERENCES:

1. Silberschatz, "Operating system", Willey Pub.
2. Stuart, "Operating System Principles, Design & Applications", Cengage Learning.
3. Tannanbaum, "Modern operating system", PHI Learning.
4. Dhamdhere, "Operating System", TMH.
5. Achyut S Godbole, "Operating System", TMH.

List of Experiment

1. Write a program to implement FCFS CPU scheduling algorithm.
2. Write a program to implement SJF CPU scheduling algorithm.
3. Write a program to implement Priority CPU Scheduling algorithm.
4. Write a program to implement Round Robin CPU scheduling algorithm.
5. Write a program to compare various CPU Scheduling Algorithms over different Scheduling Criteria.
6. Write a program to implement classical inter process communication problem (producer consumer).
7. Write a program to implement classical inter process communication problem (Reader Writers).
8. Write a program to implement classical inter process communication problem (Dining Philosophers).
9. Write a program to implement & Compare various page replacement algorithms.
10. Write a program to implement & Compare various Disk & Drum scheduling Algorithms
11. Write a program to implement Banker's algorithms.
12. Write a program to implement Remote Procedure Call.
13. Write the Devices Drivers for any Device or peripheral.

ITC-306 DATA STRUCTURES & ALGORITHMS

UNIT I

Introduction: 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

Stack: 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: Concept of 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 & Searching : 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

Sorting & Searching Technique: 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 Experiment

1. Write a program to insert an element in one dimensional array.
2. Write a program to delete an element in one dimensional array.
3. Write a program to traverse an element in array.
4. Write a program to merging a two array.
5. Write a program to insert node from a link list.
6. Write a program to delete node from a link list.
7. Write a program to infix to postfix Expression.
8. Write a program to doubly link list and to perform traverse & insertion in it.
9. Write a program to implementing stack Operation push, pop & display.
10. Write a program of C on perform simple queue in array using program.
11. Write a program of C on perform D-queue in array using program.
12. Write a program of C on perform C-queue in array using program.
13. Write a program of C on perform binary tree traversal.
14. Write a program of C perform binary search tree traversal in C program.