101MCA: INTRODUCTION TO INFORMATION TECHNOLOGY

UNIT 1: Introduction: Basic concepts of information technology, concepts of data and information data processing, history of computers, organization of computers, input and output devices, storage devices and file organization.

UNIT 2: Software concepts: System software, application software, utility packages, compilers, interpreters, operating systems. Elementary commands of DOS, Windows and Unix operating system (file handling, directory management and general purpose user interfacing commands).

UNIT 3: Computer languages: machine language, assembly languages, high level languages, fourth generation languages. General concepts of OOPS (Object oriented programming) and SQL/Structured Query Languages.


UNIT 5: State of the art application of IT: Application of IT in business, education, industry, home and training, entertainment, science and engineering and medicine. Multimedia data types(graphics, images, audio, video), virtual reality applications, Internet, World Wide Web(WWW), Domain names, e-mail, teleconferencing, e-commerce, hypermedia, data warehousing.

References:
UNIT 1: Sets Relations and Functions: Sets, Subsets, Power-Sets, Complement, Union and intersection, Demorgan’s law, Cardinality, relations: Cartesian Products, relations relational Matrices, properties of relations, equivalence relation, Functions: Injection, Surjection, Bijection, Composition of Functions, Permutations, Cardinality, the characteristic functions, Recursive definitions, finite induction, Lattices & Boolean Algebra.

UNIT 2: Axiomatic definition of Boolean algebra as algebraic structures with two operations, Propositional functions, Logical connections, Truth values and Truth Table, the algebra of prepositional functions—the algebra of truth values—Applications (switching circuits, Basic Computer Components).

Groups and Fields:

UNIT 3: Groups: Group axioms—permutation groups, Subgroups, Co-sets, Normal Subgroups, Free semi groups, Modular arithmetic grammars, language.

UNIT 4: Fields: Definition, structure, minimal polynomials, irreducible polynomials, primitive Elements, polynomial roots, Applications (Error Correcting Codes Sequence generation).

UNIT 5: Graphs: Finite graphs, incidence and degree, isomorphism, subgraphs and union of graphs, Connectedness, walks paths and circuits, Eulerian graphs, Trees properties of trees, pendant vertices in a tree, Center of tree, Spanning trees and Cut vertices, Binary tree, Matrix representation of a graph, Incidence, Adjacency matrices and their properties, Applications of graphs in Computer Science.

REFERENCES:

2. "Discrete Mathematics" by K.A. Ross and C.R.B. With
UNIT 1: An Overview: Problem identification, analysis, design, coding, testing & debugging, implementation, modification & maintenance; algorithm & flowcharts; Characteristics of a good program: accuracy, simplicity, robustness, portability, minimum resource & time requirement, modularization. Rules/conventions of coding, documentation, naming variables; Top down design; Bottom up design.

UNIT 2: Fundamentals of C Programming: History of C; structure of a C program; Data types, Constants & Variables, Operators & expressions; Control Constructs - if-else, for, while, do-while; Case statement; Arrays; Formatted and unformatted I/O; Type modifiers & storage classes; Ternary operator; Type conversion & type casting; Priority & associativity of operators.

UNIT 3: 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, static variable; Calling a function; Recursion - basics, comparison with iteration, tail recursion, when to avoid recursion examples.

UNIT 4: Advanced Programming techniques: Special constructs - break, continue, exit, goto & label, pointers & and * operator; expression; pointer arithmetic; dynamic memory management functions like malloc(), calloc(), free(); string(); pointer v's array: pointer to pointer, array of pointers and its limitations; function returning pointer, pointer to function, function as parameter; structure-basic, declaration, membership operator, pointer to structure, referential operator, self referential structure, structure within structure, array in structure, array of structure; union-basic, declaration, enumerated data type; Typedef; command line arguments.

UNIT 5: Miscellaneous Features: File handling and related functions, printf and scanf family C preprocessor- basics, #include, #define, #undef; Conditional compilation directive like #if, #else, #elif, #endif, ifdef, ifndef, variable argument list functions.

References:
1. The C Programming Language - B.W. Kernighan & D.M. Ritchie
2. The Spirit of C - Cooper, Mullish
3. Kanetkar Y: Let us C
4. Kanetkar Y: Pointers in C
UNIT 1: Representation of information: number system, integer and floating point representation, character codes (ASCII, EBCDIC), error detection and correction codes.

UNIT 2: Basic Building Blocks: Boolean algebra, combinational blocks: gates, multiplexers, decoders etc. Sequential building blocks: flip-flops, registers, counters, ALU, Random Access Memory etc.

UNIT 3: Register Transfer Language and micro operations: concept of bus, data movement among registers, a language to represent conditional data transfer, data movement from/to memory, arithmetic and logical operations along with register transfer, timing in register transfer.

UNIT 4: Architecture of a simple processor: A simple computer organization and instruction set, instruction format, addressing modes, instruction execution, in terms of micro instructions, concept of interrupt and simple I/O organization, implementation of processor using the building blocks.

UNIT 5: Assembly Language Programming: detailed study of 8086/8088 assembly language instruction set, loops and comparisons, condition and procedure, arithmetic and operator assembly language, illustrations using typical programs like: table search, subroutines, symbolic and numerical manipulations and I/O.

Memory Organization: basic cell of static and dynamic RAM, building large memories using chips, associative memory, cache memory organizations, virtual memory organization.

References:

2. Liu and Gibson, "8086/8088 Microprocessor Assembly Language.
3. Bartee, "Digital computer Fundamentals".
4. Malvino, "Digital computer Electronics".
165MCA: ORAL AND WRITTEN COMMUNICATION

UNIT 1: Meaning and process of communication, importance of effective communication. Communications situation and communication skills, barriers to communications.

UNIT 2: Objectives of communication, types of communication, principal of communication, essential of effective communication.

UNIT 3: Media of communication: written, oral, face to face, visual, audio visual; merits and demerits of written and oral communication, preparing for oral presentation, conducting presentations.

UNIT 4: Developing communication skills, interview how to face and how to conduct. Preparing of bio-data, seminar, paper, bibliography, group discussion, official correspondence.

UNIT 5: Mechanics of writing paragraphing, precise, report writing, technical reports, length of written reports, organizing reports, writing technical reports.

References:
4. Business communication: Strategy and Skill

Note: Rehearsal / Practice: Group Discussions, Interview, seminars will be arranged.