COMPUTER FUNDAMENTAL AND PROGRAMMING IN C
MCA-101

UNIT-I

Introduction to programming& Basics of C: Fundamentals of C Programming: History of C; Structure of a C Program Concepts of Algorithm and Flowcharts, Process of compilation, Generation of languages, Basic features of C Language like Identifier, Keywords, Variable, data types, Operators and Expression. Basic screen and keyboard I/O

UNIT-II

Control Statements: Test Conditions, Conditional execution and selection, Iteration and Repetitive Executions, Nested loops.

Arrays: Introduction to contiguous data types. One dimensional arrays, multidimensional arrays, Array as strings, multidimensional character arrays. Operations on strings.

UNIT-III

Functions: Concept of modular programming, Using functions, Scope of data, Recursive functions. Command line arguments.

Pointers: Need of pointer, Types and uses of pointer, Array and Pointers, Pointers and strings, Pointer to Pointer, Pointers and functions, other aspect of pointers.

UNIT-IV

Dynamic memory management: dynamic memory management functions like malloc(), calloc(), free();
User Defined Data Types: Introduction to structures, usage of structure, nested structures, Union and its usage, Enumeration types, bit fields.

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.

Reference:-

1.Programming in ANSI C, by Balagurusamy, Publisher - Tata McGraw Hill.
2. Computer Science: A Structured Programming Approach Using C, by Behrouz A. Forouzan & Richard F. Gilberg, Publisher – Thomson Education.
3. Programming with ANSI and Turbo C, by Ashok N Kamthane, Publisher – Pearson Education.
4. Let us C, by Yashwant Kanitkar, Publisher – BPB Publication

COMPUTER ORGANIZATION AND ARCHITECTURE
MCA-102

Unit-I

Information Representation: Number systems, BCD codes, error detecting and correcting codes. Binary arithmetic operations, Booths multiplication.
Binary Logic: Boolean algebra, Boolean functions, truth tables, canonical and standard forms, simplification of Boolean functions, digital logic gates. Encoders, decoders, multiplexers, demultiplexers and comparators.

UNIT-II

Register Transfer Language, Bus and Memory Transfers, Bus Architecture, Bus Arbitration, Arithmetic Logic, Shift Microoperation, Arithmetic Logic Shift Unit, Arithmetic Algorithms (addition, subtraction, Booth Multiplication), IEEE standard for Floating point numbers.

UNIT-III

Control Design: -Hardwired & Micro Programmed (Control Unit): Fundamental Concepts (Register Transfers, Performing of arithmetic or logical operations, Fetching a word from memory, storing a word in memory), Execution of a complete instruction, Multiple-Bus organization, Hardwired Control, Micro programmed control(Microinstruction, Microprogram sequencing, Wide-Branch addressing, Microinstruction with Next-address field, Prefetching Microinstruction).

UNIT-IV

Processor Design: -Processor Organization: General register organization, Stack organization, Addressing mode, Instruction format, Data transfer & manipulations, Program Control, Reduced Instruction Set Computer.

UNIT -V

Input-Output Organization: I/O Interface, Modes of transfer, Interrupts & Interrupt handling, Direct Memory access, Input-Output processor, Serial Communication.
Memory Organization: Memory Hierarchy, Main Memory (RAM and ROM Chips), Auxiliary memory, Cache memory, Virtual Memory, Memory management hardware.

Reference Books:

1.Computer System Architecture, Morris Mano, PHI
2.Computer Organization, Hamacher, MGH
3. Computer Architecture, Carter, Schaum Outline Series, TMH
4.System Architecture, Buad, VIKAS
5.The Fundamentals of Computer Organization, Raja Rao, Scitech
6.Computer Organization & Design, Pal Chowdhury, PHI

SOFTWARE ENGINEERING
MCA-103

UNIT-I

Introduction to Software Engineering: Software crisis, Software engineering Approach and Challenges, Software development process models with comparison: Waterfall, Rapid prototyping, Timeboxing and Spiral Models, and Automation through software environments.

UNIT-II

Planning the Software Project: Cost Estimation, Planning Schedule, Staffing, Project Monitoring, Quality Assurance and Risk Management.

UNIT-III

Structured Analysis: Initial Investigation, Feasibility study, Traditional and modern methods of requirement determination, SRS, Structuring the requirements: Process modeling, logic modeling, conceptual data modeling, Metrics. Validation VS verification

UNIT-IV

Design Fundamentals: Function and Object Oriented Design concepts, Verification and Metrics.
Coding and Maintenance: Coding Process, Metrics, Testing fundamentals, Types of Testing, Metrics, Types of Maintenance.

UNIT-V

Software Re-Engineering: Source Code Translation, Program Restructuring, Data Re-Engineering, Reverse Engineering.

Reference Books:

1.Software Engineering, Rogers G. Pressman, MH
2.Fundamentals of Software Engineering,2nd Ed. ,Ghezzi,PHI
3. Software Engineering, Pankaj Jalote, PHI
4. Software Engineering: Rajib Mall

DISCRETE MATHEMATICAL STRUCTURE
MCA-104

Unit-I:
Set Theory: Definition of sets, countable and uncountable sets, Venn Diagrams, proofs of some general identities on sets
Relation: Definition, types of relation, composition of relations, Pictorial representation of relation, equivalence relation, partial ordering relation.
Function: Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions.

Unit-II:
Algebraic Structures: Definition, Properties, types: Semi Groups, Monoid, Groups, Abelian group, properties of groups, Subgroup, cyclic groups, Cosets, factor group, Permutation groups, Normal subgroup, Homomorphism and isomorphism of Groups, example and standard results, Rings and Fields: definition and standard results.

Unit-III:
Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, and complemented lattices.
Boolean Algebra: Basic definitions, Sum of Products and Product of Sums, Form in Boolean Algebra, Logic gates and Karnaugh maps.

UNIT-IV
Graphs: Simple graph, multi graph, graph terminology, representation of graphs, Bipartite, Regular, Planar and connected graphs, connected components in a graph, Euler graphs, Hamiltonian path and circuits, Graph coloring, chromatic number, isomorphism and Homomorphism of graphs.
Tree: Definition, Rooted tree, properties of trees, binary search tree, tree traversal.

Unit-V:
Propositional Logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Universal and existential quantifiers.

Reference Books:
1. Discrete Mathematics and Its Applications, By Kenneth H Rosen, McGraw Hill, Sept.2002.
2. Discrete Mathematical Structures with Applications to Computer Science, By J. P. Tremblay, R. Manohar, McGraw Hill Pub, 1975.
3. Graph Theory With Applications to Engineering and Computer Science, By Prentice Hall, Englewood Cliffs, N. J, 1974
4. Combinatorics: Theory and Applications, By V. Krishnamurthy, East-West Press Pvt. Ltd., New Delhi, 1986.

BUSINESS ENGLISH AND COMMUNICATION
MCA-105

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); Importance of technical communication; Barriers to Communication.

UNIT - II

Constituents of Technical Written Communication: Words and Phrases: Word formation. Synonyms and Antonyms; Homophones; Select vocabulary of about 500-1000 New words; Requisites of Sentence Construction: Paragraph Development: Techniques and Methods -Inductive, Deductive, Spatial, Linear, Chronological etc; The Art of Condensation- various steps.

UNIT - III

Forms of Technical Communication: Business Letters: Sales and Credit letters; Letter of Enquiry; Letter of Quotation, Order, Claim and Adjustment Letters; Job application and Resumes.
Official Letters: D.O. Letters; Govt. Letters, Letters to Authorities etc.
Reports: Types; Significance; Structure, Style & Writing of Reports.
Technical Proposal; Parts; Types; Writing of Proposal; Significance.
Technical Paper, Project. Dissertation and Thesis Writing: Features, Methods & Writing.

UNIT - IV

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 - V

Value- Based Text Readings:

Following essays form the suggested text book with emphasis on Mechanics of writing,
(i) The Aims of Science and the Humanities by M.E. Prior
(ii) The Language of Literature and Science by A.Huxley
(iii) Man and Nature by J.Bronowski
(iv) The Mother of the Sciences by A.J.Bahm
(v) Science and Survival by Barry Commoner
(vi) Humanistic and Scientific Approaches to Human Activity by Moody E. Prior
(vii) The Effect of Scientific Temper on Man by Bertrand Russell.

Reference Books

1. Effective Technical Communication by Barun K. Mitra, Oxford Univ. Press, 2006, New Delhi
2. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., New Delhi.
3. How to Build Better Vocabulary by M.Rosen Blum, Bloomsbury Pub. London.
4. Word Power Made Easy by Norman Lewis, W.R.Goyal Pub. & Distributors; Delhi.
5. Developing Communication Skills by Krishna Mohan, Meera Banerji- Macmillan India Ltd. Delhi.
6. Manual of Practical Communication by L.U.B. Pandey & R.P. Singh; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, Delhi.