

PCB [2nd Half, Subjective Type]

Suggested CS Paper Syllabus for MTech 2023

Analytical Reasoning.

Data Structures: Array, Stack, Queue, Linked List, Binary Tree, Heap, AVL Tree, B-tree.

Discrete Mathematics: Recurrence Relations, Generating Functions.

Graph Theory: Paths and Cycles, Connected Components, Trees, Digraphs.

Design and Analysis of Algorithms: Asymptotic Notation, Searching, Sorting, Selection, Graph Traversal, Minimum Spanning Tree.

Formal Languages and Automata Theory: Finite Automata and Regular Expressions, Pushdown Automata, Context-free Grammar, Turing Machine, Elements of Undecidability.

Switching Theory and Logic Design: Boolean Algebra, Minimization of Boolean Functions, Combinational and Sequential Circuits - Synthesis and Design.

Computer Organization and Architecture: Number Representation, Computer Arithmetic, Memory Organization, I/O Organization, Microprogramming, Pipelining, Instruction Level Parallelism.

Operating Systems: Memory Management, Processor Management, Critical Section Problem, Deadlocks, Device Management, File Systems.

Database Management Systems: Relational Model, Relational Algebra, Relational Calculus, Functional Dependency, Normalisation (2NF, 3NF and BCNF).

Computer Networks: OSI, LAN Technology - Bus / Tree, Ring, Star; MAC Protocols; WAN Technology - Circuit Switching, Packet Switching; Data Communications - Data Encoding, Routing, Flow Control, Error Detection/Correction, Inter-networking, TCP/IP Networking including IPv4.

Suggested Non-CS Paper Syllabus MTech 2023

Analytical Reasoning

Discrete Mathematics: Permutations and Combinations, Recurrence Relations.

Linear Algebra: Algebra of Matrices, Determinant, Rank and Inverse of a Matrix, System of Linear Equations, Eigenvalues and Eigenvectors of Matrices, Properties of Symmetric and Idempotent Matrices.

Polynomials: Polynomials of a Single Variable, Binomial / Multinomial Theorem.

Elementary Discrete Probability Theory: Combinatorial Probability, Conditional Probability, and Bayes Theorem. Discrete Random Variables. Expectation and Variance of Discrete Random Variables.

Graph Theory: Graphs, Adjacency Matrix and Adjacency List representations of Graphs, Subgraphs, Connectivity, Trees and their Properties, Vertex Colouring, Planar Graphs.

Algorithmic Thinking: Asymptotic Notations, Searching, Sorting, Selection, Graph Traversal, Minimum Spanning Tree.

Basic Programming Concepts.

Linear Programming: LP / ILP formulations of Optimisation Problems.

Calculus: Sequences and their Properties. Series, Power Series, Taylor Series and Maclaurin Series, Convergence. Limits, Continuity, Differentiation and Integration of Functions. Maxima and Minima. Functions of Several Variables.

Formal Languages and Automata Theory: Finite Automata and Regular Expressions.

Elementary Set Theory.

Functions and Relations.

Elementary Number Theory: Divisibility, Congruences, Primality.