

Syllabus for DPAT 2026

Programme: Master of Technology (Computer Science & Engineering)

Programming & Data Structures

Variables, Data Types, Operators, Expressions, Operator Precedence, Arrays, Pointers, Functions, Function Pointers, Recursion, Memory Allocation, sizeof(), Basic Programs. Arrays, Linked Lists, Stacks, Queues, Circular Queue, Priority Queue, Trees, Binary Trees, Binary Search Trees, Heap, Hashing, Collision Resolution, Graph Representation, Applications of Data Structures

Design and Analysis of Algorithms

Time Complexity, Space Complexity, Asymptotic Notations (Big O), Best/Average/Worst Case Analysis, Searching (Linear, Binary, Jump Search), Sorting (Insertion, Selection, Merge, Quick), Divide & Conquer, Greedy Method, Dynamic Programming, Recurrence Relations

Operating Systems

Process Management, Process States, CPU Scheduling (FCFS, SJF, Priority, Round Robin), Context Switching, Deadlock, Starvation, Aging, Synchronization, Semaphores, Critical Section, Memory Management, Virtual Memory, Paging, Segmentation, Page Replacement Algorithms, File Systems, Disk Scheduling, Interrupts, DMA, Banker's Algorithm

Database Management Systems (DBMS)

ER Model, Relational Model, SQL (DDL, DML, DCL), SELECT, WHERE, COUNT(), JOINS, ALTER, DELETE, TRUNCATE, GRANT, Keys, Candidate Key, Composite Key, Functional Dependency, Normalization (1NF, 2NF, 3NF, BCNF, 4NF), Transactions, ACID Properties, Concurrency Control, Indexing, Query Processing, Relational Algebra

Computer Networks

OSI Model, TCP/IP Model, Routing Algorithms (Distance Vector, Link State, Bellman-Ford, Dijkstra), Ethernet, CSMA/CD, DNS, SMTP, HTTPS, IPv4 Addressing, TCP Header, Flow Control, Packet Switching, Firewalls, Network Security Basics

Computer Organization & Architecture (COA) and Digital Logic Design

Memory Devices, Secondary Storage, Storage Hierarchy, Performance Metrics, Basic Hardware Components, CPU Organization, ALU, Control Unit, Instruction Cycle, Program Counter, Addressing Modes, Cache Memory, Memory Hierarchy, Instruction Pipelining, Floating Point Arithmetic, Ripple Carry Adder, Performance Measures. Boolean Algebra, Boolean Functions, Logic Gates, Functional Completeness, Hazard Elimination, Karnaugh Map Concepts, Moore Machine, Combinational Logic

Theory of Computation (TOC) and Compiler Design (Basic Concepts)

DFA, NFA, Regular Expressions, Context Free Grammar, Pushdown Automata (PDA), Turing Machine, Recursive and Recursive Enumerable Languages, Chomsky Normal Form (CNF), Language Classes. Grammar Basics, Parsing Concepts, Context-Free Grammar, CNF Conversion (Introductory Level)

Discrete Mathematics, Information Security & Cryptography

Graph Representation, BFS, DFS, Trees, Complete Graphs, Graph Traversals, Huffman Coding, Basic Counting Concepts. Digital Certificates, Public Key Cryptography, HTTPS, Firewall, Man-in-the-Middle Attack, Authentication, Basic Network Security