AP PGECET 2025 Computer Science Syllabus

Engineering Mathematics Syllabus

Probability & Statistics	- Probability - Conditional probability - Probability density function - Mean/median/mode/ standard deviation - Random variables - Distributions/ Uniform, normal, exponential, Poisson
Set Theory & Algebra	- Sets - Relations - Functions - Groups - Partial orders - Lattice - Boolean algebra
Linear Algebra	- Algebra of matrices - Determinants - Systems of linear equations - Eigen values & Eigen vectors
Numerical Methods	- LU decomposition for systems of linear equations - Numerical solutions of non-linear algebraic equations by Secant - Bisection & Newton-Raphson methods - Numerical integration by trapezoidal & Simpson's rules
Calculus	- Limit/ continuity/ differentiability - Mean value theorems - Theorems of integral calculus - Evaluation of definite & improper integrals - Partial derivatives - Total derivatives - Maxima & minima

Computer Science & Information Technology Syllabus

Combinatorics	- Permutations - Combinations - Counting - Summation - Generating functions - Recurrence relations - Asymptotic
Graph Theory	- Connectivity - Spanning trees - Cut vertices & edges - Covering - Matching - Independent sets - Coloring - Planarity - Isomorphism
Mathematical Logic	- Propositional logic - First order logic
Digital Logic	- Logic functions - Minimization - Design & synthesis of combinational & sequential circuits - Number representation and computer arithmetic (fixed & floating point)
Computer Organization and Architecture	- Machine instructions & addressing modes - ALU and data path - CPU control design - Memory interface - I/O interface (interrupt & DMA mode) - Instruction pipelining - Cache and main memory - Secondary storage
Programming & Data Structures	- Programming in C - Functions - Recursion - Parameter passing

	- Scope - Binding - Abstract data types - Arrays - Stacks - Queues - Linked lists - Trees - Binary search trees - Binary heaps
Algorithms	- Analysis - Asymptotic notation - Notions of space & time complexity - Worst & average case analysis - Design: Greedy approach/dynamic programming/ divide & conquer - Tree and graph traversals - Connected components - Spanning trees - Shortest paths - Hashing/sorting/searching - Asymptotic analysis (best/worse/average cases) of time & space - Upper & lower bounds - Basic concepts of complexity classes - P, NP, NP-Hard, NP-Complete
Theory of Computation	- Regular languages and finite automata - Context-free languages & push down automata - Recursively enumerable sets & turing machines - Undecidability
Compiler Design	- Lexical analysis - Parsing - Syntax directed translation - Runtime environments - Intermediate & target code generation - Basics of code optimization

Operating System	- Processes - Threads - Inter-process communication - Concurrency - Synchronization - Deadlock - CPU scheduling - Memory management & virtual memory - File systems - I/O systems - Protection & security
Databases	- ER - model - Relational model (relational algebra, tuple calculus) - Database design (integrity constraints/ normal forms) - Query language (SQL) - File structures (sequential files, indexing, B and B+ trees) - Transactions & concurrency controls
Information System and Software Engineering	- Information gathering - Requirement and feasibility analysis - Data flow diagrams - Process specifications - Input/output design - Process life cycle - Planning & managing the project - Design/ coding/ testing/ implementation/ maintenance
Computer Networks	- ISO/OSI stack - LAN technologies (ethernet & token ring) - Flow and error control techniques - Routing algorithms - Congestion control - TCP/UDP & sockets - IP (v4) - Application layer protocols (icmp/ dns/ smtp/ pop/ ftp/ http) - Basic concepts of

	hubs/switches/gateways/routers ● Network security basic concepts of public key and private key cryptography ● Digital signature ● Firewalls
Web Technologies	● HTML ● XML ● Basic concepts of client-server computing