**Agnihotri Engineering & GATE Classes**

**Scripting success stories**

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| **COMPUTER SCIENCE AND INFORMATION TECHNOLOGY – CS & IT** |
| **Engineering Mathematics** |
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| **Mathematical Logic:** Propositional Logic; First Order Logic.  **Probability:** Conditional Probability; Mean, Median, Mode and Standard Deviation; Random Variables; Distributions; uniform, normal, exponential, Poisson, Binomial.  **Set Theory & Algebra:** Sets; Relations; Functions; Groups; Partial Orders; Lattice; Boolean Algebra.  **Combinatorics:** Permutations; Combinations; Counting; Summation; generating functions; recurrence relations; asymptotics.  **Graph Theory:** Connectivity; spanning trees; Cut vertices & edges; covering; matching; independent sets; Colouring; Planarity; Isomorphism.  **Linear Algebra:** Algebra of matrices, determinants, systems of linear equations, Eigen values and Eigen vectors.  **Numerical Methods:** LU decomposition for systems of linear equations; numerical solutions of non-linear algebraic equations by Secant, Bisection and Newton-Raphson Methods; Numerical integration by trapezoidal and 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. |
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| **GENERAL APTITUDE(GA):** |
| **Verbal Ability:** English grammar, sentence completion, verbal analogies, word groups, instructions, critical reasoning and verbal deduction. |
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| **Computer Science and Information Technology** |
| **Digital Logic:** Logic functions, Minimization, Design and synthesis of combinational and sequential circuits; Number representation and computer arithmetic (fixed and floating point).  **Computer Organization and Architecture:** Machine instructions and addressing modes, ALU and data-path, CPU control design, Memory interface, I/O interface (Interrupt and DMA mode), Instruction pipelining, Cache and main memory, Secondary storage.  **Programming and 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 and time complexity, Worst and average case analysis; Design: Greedy approach, Dynamic programming, Divide-and-conquer; Tree and graph traversals, Connected components, Spanning trees, Shortest paths; Hashing, Sorting, Searching. Asymptotic analysis (best, worst, average cases) of time and space, upper and lower bounds, Basic concepts of complexity classes P, NP, NP-hard, NP-complete.  **Theory of Computation:** Regular languages and finite automata, Context free languages and Push-down automata, Recursively enumerable sets and Turing machines, Undecidability.  **Compiler Design:** Lexical analysis, Parsing, Syntax directed translation, Runtime environments, Intermediate and target code generation, Basics of code optimization.  **Operating System:** Processes, Threads, Inter-process communication, Concurrency, Synchronization, Deadlock, CPU scheduling, Memory management and virtual memory, File systems, I/O systems, Protection and security.  **Databases:** ER-model, Relational model (relational algebra, tuple calculus), Database design (integrity constraints, normal forms), Query languages (SQL), File structures (sequential files, indexing, B and B+ trees), Transactions and concurrency control.  **Information Systems and Software Engineering:** information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and 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 and sockets, IP(v4), Application layer protocols (icmp, dns, smtp, pop, ftp, http); Basic concepts of hubs, switches, gateways, and 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. |