

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Indian Institute of Technology (Banaras Hindu University)
Varanasi – 221 005

Syllabus for Written Test:

Part-1: General Aptitude Test (15 Questions, 30 Marks)

Part-2: Computer Science and Engineering-along the line of GATE-2017 Syllabus (CS) (35 Questions, 70 Marks)

B. For Students to be admitted through External Registration Category/ Sponsored Category/Part-Time Category/ outstanding candidates from Premier Institution Category (as per Eligibility criteria laid down in admission brochure)

No Written Test. Selection will be based on only interview marks.

Interview Marks: 100

Cut-off qualifying marks in interview: 40 Marks

Part-II: Detailed Syllabus for Written Test for Regular Students

Part-1: General Aptitude Test (15 Questions, 30 Marks)

Numerical Ability and quantitative aptitude, VERBAL & NON VERBAL REASONING, research aptitude related questions.

Part-2: Computer Science and Engineering-along the line of GATE-2017 Syllabus (CS)

Total: 35 Questions, 70 Marks,

There are 10 sections in Part-2 and there will be approximately 3-4 questions from each section.

Section1: Engineering Mathematics Discrete Mathematics:

Propositional and first order logic. Sets, relations, functions, partial orders and lattices. Groups. Graphs: connectivity, matching, coloring.

Combinatorics: counting, recurrence relations, generating functions. Linear Algebra: Matrices, determinants, system of linear equations, eigenvalues and eigenvectors, LU decomposition.

Calculus: Limits, continuity and differentiability. Maxima and minima. Mean value theorem. Integration.

Probability: Random variables. Uniform, normal, exponential, poisson and binomial distributions. Mean, median, mode and standard deviation. Conditional probability and Bayes theorem.

Section 2: Digital Logic Boolean algebra. Combinational and sequential circuits. Minimization. Number representations and computer arithmetic (fixed and floating point).

Section 3: Computer Organization and Architecture Machine instructions and addressing modes. ALU, data-path and control unit. Instruction pipelining. Memory hierarchy: cache, main memory and secondary storage; I/O interface (interrupt and DMA mode).

Section 4: Programming and Data Structures Programming in C. Recursion. Arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs.

Section 5: Algorithms Searching, sorting, hashing. Asymptotic worst case time and space complexity. Algorithm design techniques: greedy, dynamic programming and divide-and-conquer. Graph search, minimum spanning trees, shortest paths.

Section 6: Theory of Computation Regular expressions and finite automata. Context-free grammars and push-down automata. Regular and context-free languages, pumping lemma. Turing machines and undecidability.

Section 7: Compiler Design Lexical analysis, parsing, syntax-directed translation. Runtime environments. Intermediate code generation.

Section 8: Operating System Processes, threads, inter-process communication, concurrency and synchronization. Deadlock. CPU scheduling. Memory management and virtual memory. File systems.

Section 9: Databases ER-model. Relational model: relational algebra, tuple calculus, SQL. Integrity constraints, normal forms. File organization, indexing (e.g., B and B+ trees). Transactions and concurrency control.

Section 10: Computer Networks Concept of layering. LAN technologies (Ethernet). Flow and error control techniques, switching. IPv4/IPv6, routers and routing algorithms (distance vector, link state). TCP/UDP and sockets, congestion control. Application layer protocols (DNS, SMTP, POP, FTP, HTTP). Basics of Wi-Fi. Network security: authentication, basics of public key and private key cryptography, digital signatures and certificates, firewalls.