



YOUR CAREER QUEST ENDS HERE

GATE  
COMPUTER  
SCIENCE AND  
INFORMATION  
TECHNOLOGY  
SYLLABUS

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**“All the best for a bright future!**

**May there be success at every turn of life and all your dreams come true.”**

## Section 1: Engineering Mathematics

### Discrete Mathematics:

1. Propositional and first order logic.
2. Sets, relations, functions, partial orders and lattices.
3. Groups.
4. Graphs: connectivity, matching, colouring.
5. Combinatory: counting, recurrence relations, generating functions.

### Linear Algebra:

1. Matrices, determinants, system of linear equations, eigenvalues and eigenvectors, LU decomposition.

### Calculus:

1. Limits, continuity and differentiability. Maxima and minima. Mean value theorem.
2. Integration.

### Probability:

1. Random variables.
2. Uniform, normal, exponential, Poisson and binomial distributions.
3. Mean, median, mode and standard deviation. Conditional probability and Bayes theorem.

## Section 2: Digital Logic

1. Boolean algebra.
2. Combinational and sequential circuits.
3. Minimization.
4. Number representations and computer arithmetic (fixed and floating point).

### **Section 3: Computer Organization and Architecture**

1. Machine instructions and addressing modes.
2. ALU, data\_path and control unit.
3. Instruction pipelining.
4. Memory hierarchy: cache, main memory and secondary storage; I/O interface (interrupt and DMA mode).

### **Section 4: Programming and Data Structures**

1. Programming in C.
2. Recursion.
3. Arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs.

### **Section 5: Algorithms**

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

### **Section 6: Theory of Computation**

1. Regular expressions and finite automata.
2. Context-free grammars and push-down automata.
3. Regular and context-free languages, pumping lemma.
4. Turing machines and undecidability.

### **Section 7: Compiler Design**

1. Lexical analysis, parsing, syntax-directed translation. Runtime environments.
2. Intermediate code generation.

### **Section 8: Operating System**

1. Processes, threads, inter\_process communication, concurrency and synchronization.
2. Deadlock.
3. CPU scheduling. Memory management and virtual memory.
4. File systems.

## Section 9: Databases

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

## Section 10: Computer Networks

1. Concept of layering.
2. LAN technologies (Ethernet).
3. Flow and error control techniques, switching. IPv4/IPv6, routers and routing algorithms (distance vector, link state).
4. TCP/UDP and sockets, congestion control.
5. 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.

“Best of Luck”