

Syllabus for Ph.D. written test

- 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, the 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.
- Programming and Data Structures:
 - Programming in C. Recursion. Arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs.
- 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, and shortest paths.
- 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.

Pallabi

B

Nirbhay

A

Sushant

Pr