

SVKM's NMIMS University

Mukesh Patel School of Technology Management & Engineering, Mumbai

Department of Computer Engineering

Syllabus for PhD Entrance Test

Effective from May, 2025

SECTION- A

Section A will include 25 compulsory objective-type questions, each carrying 2 marks. It will be focused on research aptitude. The section will be general in nature and aims to evaluate the candidate's research aptitude, with emphasis on reasoning ability, data interpretation, and quantitative skills.

SECTION-B

Section B will comprise 25 compulsory objective-type questions, each carrying 2 marks, based on the following syllabus:

UNIT I- DATA STRUCTURES AND ALGORITHMS

Fundamental Data Structures: arrays, stacks, queues, linked lists ; Trees and Heaps: binary trees, BST basics ; Graphs: representation, BFS/DFS traversal; Searching and Sorting Algorithms: basic comparison-based techniques; Algorithm Analysis: time and space complexity, Big-O notation; Algorithmic Paradigms: divide-and-conquer, greedy, dynamic programming (introductory)

UNIT II- DATABASE SYSTEMS

ER modelling, relational schema, Relational algebra basics, SQL fundamentals, Normalization: 1NF–3NF, Transactions and ACID properties

UNIT III- AUTOMATA THEORY AND COMPILER DESIGN

Automata Theory: Regular languages, DFA/NFA, Regular expressions, equivalence CFGs and PDAs; Compiler Design: Compiler phases, Lexical and syntax analysis basics, Parsing Fundamentals, Syntax-directed translation

UNIT IV- OPERATING SYSTEMS AND COMPUTER ARCHITECTURE

Processes, threads, CPU scheduling basics, Process synchronization, Semaphores, deadlocks, Paging, Segmentation, virtual memory basics, File systems and I/O management fundamentals, Memory hierarchy: cache and virtual memory (introductory)

UNIT V- COMPUTER NETWORKS

OSI and TCP/IP models, Error detection/correction (parity, CRC), MAC protocols, IP addressing and Subnetting, Routing, TCP, UDP