



SDGI GLOBAL UNIVERSITY (SGU)

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SYLLABUS FOR Ph.D. ENTRANCE EXAMINATION 2024-25 COMPUTER SCIENCE & ENGINEERING

Discrete Mathematics

- Set theory, relations, and functions
- Graph theory
- Logic and proofs (induction, contradiction)

Data Structures and Algorithms

- Basic data structures (arrays, linked lists, stacks, queues, trees, graphs)
- Algorithm design techniques (divide and conquer, dynamic programming, greedy algorithms)
- Time and space complexity analysis

Theory of Computation

- Finite automata and regular languages
- Context-free grammars and pushdown automata
- Turing machines and decidability
- Complexity classes (P, NP, NP-completeness)

Operating Systems

- Process management and scheduling
- Memory management (paging, segmentation)
- File systems and I/O management
- Concurrency and synchronization

Computer Networks

- Network architectures (OSI and TCP/IP models)
- Protocols (HTTP, FTP, TCP, UDP)
- Routing and switching
- Network security fundamentals

Database Systems

- Database design (ER models, normalization)
- SQL and querying
- Transaction management
- NoSQL databases and data warehousing

Software Engineering

- Software development life cycle
- Design patterns
- Testing methodologies
- Agile and DevOps practices

Machine Learning and Artificial Intelligence

- Basic concepts of supervised and unsupervised learning
- Neural networks and deep learning
- Common algorithms and applications