Syllabus for the post of Lecturer
Notification Sl. No. 1
Qualification – I class Master Degree in Computer Science

Introduction to Computer Science

- Basics of computers and computation
- History and evolution of computers
- Overview of operating systems, software, and hardware
- Introduction to algorithms and programming languages

Programming Fundamentals

- Introduction to programming languages (e.g., Python, C, Java)
- Data types, variables, and operators
- Control structures: conditional statements and loops
- Functions, arrays, and strings
- Object-oriented programming concepts: classes, objects, inheritance, polymorphism

Data Structures and Algorithms

- Introduction to data structures: arrays, linked lists, stacks, queues, trees, graphs
- Algorithm analysis and complexity (Big O notation)
- Sorting algorithms (e.g., bubble sort, quicksort, mergesort)
- Searching algorithms (linear search, binary search)
- Graph algorithms (DFS, BFS, shortest paths)

Mathematics for Computer Science

- Discrete mathematics: logic, set theory, combinatorics, graph theory
- Linear algebra
- Calculus
- Probability and statistics
- Mathematical foundations for algorithms

Computer Organization and Architecture

- Basics of digital logic
- Computer architecture: CPU, memory, input/output systems
- Assembly language and machine code
- Microprocessors and microcontrollers

Operating Systems

- Principles of operating systems
- Processes and threads
- Memory management
- File systems
- Synchronization and concurrency
- Security and protection

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Database Systems

- Fundamentals of database systems
- Relational database design and SQL
- NoSQL databases
- Transactions and concurrency control
- Data warehousing and data mining

Software Engineering

- Software development life cycle
- Requirements engineering
- Design patterns and principles
- Software testing and quality assurance
- Project management

Computer Networks

- Basics of networking
- OSI and TCP/IP models
- Routing and switching
- Network security
- Wireless and mobile networks

Web Technologies

- HTML, CSS, and JavaScript
- Server-side scripting (e.g., PHP, Node.js)
- Web frameworks (e.g., Django, Flask for Python; Spring for Java)
- Web services and APIs
- Web security

Advanced Technology

- Artificial Intelligence and Machine Learning
- Cybersecurity
- Cloud computing
- Mobile application development
- Data Science
- Internet of Things (IoT)