

SYLLABUS FOR LAB ASSISTANT

(COMPUTER SCIENCE ENG.& INFORMATION TECHNOLOGY)

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Syllabus of Lab assistant for Computer Application/ Computer Science & Engineering/ Information Technology

Basics of Computer Science:

Computer Fundamentals: Understanding of hardware components like CPU, memory (RAM, ROM), storage devices (HDD, SSD), and input/output devices. Number Systems: Binary, octal, hexadecimal, conversions, and basic arithmetic operations in these number systems.

Operating Systems:

Types of Operating Systems: Batch, multiprogramming, real-time, and distributed OS. Process Management: Process scheduling (e.g., FCFS, SJF, and Round Robin), threads, synchronization, and deadlocks. Memory Management: Paging, virtual memory.

Data Structures and Algorithms:

Data Structures: Arrays, linked lists, stacks, queues, trees, graphs, hash tables, and their applications. Algorithms: Sorting (quick sort, merge sort, bubble sort), searching (binary search, linear search), and time complexity (Big O notation).

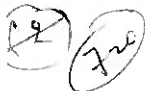
Database Management Systems (DBMS):

SQL: Basic queries (SELECT, INSERT, UPDATE, DELETE), relational algebra, normalization (1NF, 2NF, 3NF, BCNF). Database Design: Entity-relationship (ER) models, database schemas, integrity constraints. Transactions: ACID properties, concurrency control, and recovery methods.

Networking and Internet:

Networking Basics: Types of networks (LAN, WAN, MAN), IP addressing (IPv4, IPv6), subnetting, and networking devices like routers, switches, and hubs. Protocols: TCP/IP, HTTP, HTTPS, FTP, SMTP, DNS, DHCP. OSI

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Model: Understanding the seven layers (Physical, Data Link, Network, Transport, Session, Presentation, and Application). Wireless Networks: Basics of Wi-Fi, Bluetooth, and cellular technologies (4G, 5G).

Cyber security Basics:

Threats and Vulnerabilities: Types of malware (viruses, trojans, worms), phishing, DoS attacks. Security Measures: Encryption, firewalls, antivirus software, and secure programming practices. Digital Certificates and Authentication: SSL/TLS, public key infrastructure (PKI), hashing algorithms (MD5, SHA).

Programming Fundamentals:

Languages: Basics of programming languages like C, C++, Python, or Java. Syntax and Semantics: Variables, data types, operators, control structures (if-else, loops), functions. Object-Oriented Programming (OOP): Classes, objects, inheritance, polymorphism, encapsulation.

Software Engineering:

Software Development Life Cycle (SDLC): Phases like planning, design, coding, testing, and maintenance. Agile and Waterfall Models: Comparison and real-world applications. Testing: Types of testing (unit, integration, system), black-box vs white-box testing.

Web Development Basics:

HTML/CSS: Basic structure of web pages, styling, and layout techniques. JavaScript: Client-side scripting, event handling, and DOM manipulation. Databases (MySQL, MongoDB).

Software and Hardware Tools:

Microsoft Office Suite: Proficiency in Word, Excel, and PowerPoint. Operating System Tools: Command-line interfaces in Linux/Windows, basic scripting (bash, batch files). Computer Maintenance: Troubleshooting hardware and software issues, installation of OS, drivers, and software.

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Networking: Setting up routers, modems, basic network troubleshooting, and configuring network settings. Peripheral Management: Managing printers, scanners, and other laboratory equipment. Coding: Writing programs to demonstrate problem-solving skills.
