GOVT. POST GRADUATE NEHRU COLLEGE, JHAJJAR
Department of Computer Science

Lesson Plan

Class – BCA ***Semester -5th***

Name of Teacher… *Manoj Kumar*

Subject/Paper- Cloud Computing 25BCA405DS03

Month	Subject Matter/ Syllabus
August	Fundamentals of Cloud Computing Definitions, history, and evolution of cloud computing. Overview of cloud service models: IaaS, PaaS, SaaS. Deployment models: public, private, hybrid, and multi-cloud. Key architectural principles: virtualization, elasticity, resource pooling, and scalability. Review of leading cloud providers and market trends.
September	Cloud Infrastructure and Virtualization Technologies: Virtualization fundamentals: hypervisors (Type-1 and Type-2), virtual machines, and containers (Docker, Kubernetes). Cloud networking: Software-defined networking (SDN), network virtualization, and load balancing. Cloud storage solutions: distributed storage, object storage (e.g., Amazon S3, OpenStack Swift). Cloud orchestration and resource provisioning tools. Emerging concepts: Serverless computing and Function as a Service (FaaS).
October	Cloud Security, Privacy, and Governance: Threats and vulnerabilities in cloud environments. Cloud security fundamentals: Encryption, identity and access management (IAM), and secure communication protocols. Privacy challenges and data protection techniques in the cloud. Legal and regulatory frameworks (e.g., GDPR, HIPAA, CCPA, IT Act 2000, IT Rules 2011, etc) and their implications for cloud deployments. Governance, compliance, and cost management in cloud environments.
November	Advanced Topics and Emerging Trends in Cloud Computing Performance optimization and cost-efficiency in cloud systems. Big Data and Analytics in the cloud. Edge computing and IoT integration with cloud platforms. Cloud-native architectures and serverless computing. Case studies and practical labs on deploying cloud-based applications. Future trends: multi-cloud management, hybrid cloud strategies, and emerging research directions (e.g., quantum cloud computing).
December	Revision

Signature

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GOVT. POST GRADUATE NEHRU COLLEGE, JHAJJAR
Department of

Lesson Plan

Class –4-year B.Sc. (Physical Science) Program ***Semester -3rd***

Name of Teacher… *Manoj Kumar*

Subject/Paper- Data Structures and Algorithms 25CSCM403DS01

Month	Subject Matter/ Syllabus
August	Introduction to Data Structures: Classification of Data Structures, Application of Data Structure Algorithms: Role of algorithms in computing, Complexity of algorithms, analysing algorithms, designing algorithms, asymptotic notation. Arrays: One Dimensional Arrays, Two Dimensional Arrays and Multi-Dimensional Arrays, Sparse Matrices. Searching& Sorting: Linear and Binary Search, Sorting: Selection, Insertion, Bubble, Merge Sort and Quick Sort, Radix Algorithms
September	Stacks: Definition, Implementation of Stacks and its Operations, Evaluation of Infix, Prefix and Postfix Expression, Inter-conversion of Infix, Prefix and Postfix Expression, Queues: Definition, Sequential Implementation of Linear Queues and its Operations, Circular Queue, Dequeue and Priority Queues and its Implementation, Application of Queues.
October	Linked List: Need of Dynamic Data structures, Singly Linked list; Operations on list, Linked Stack and Queues. Polynomial representation and manipulation using linked lists. Traversing, Insertion, Deletion Operations on Single Link Lists. Comparison between Static and Dynamic, Implementation of Linked List. Circular Linked List: Circular linked list, doubly linked lists, Dynamic implementation of Primitive Operation on Circular and Doubly Link Lists.
November	Trees: Definition, Basic Terminology, Binary tree, External and Internal Nodes, Static and Dynamic Implementation of a Binary tree, Primitive Operations on Binary trees. Binary Tree Traversal: Pre-Order, In-order and Post Order Traversal. Representation of Infix, Post-fix and Prefix Expression using Trees.
December	Binary Search trees: B++ trees, AVL Trees, Threaded Binary trees, Balanced multi-way search trees, Implementation of Heap Sort Algorithm. Graphs: Basic Terminology, Definition of Undirected and Directed Graphs, Memory Representation of Graphs, Minimum -Spanning Trees, Warshal Algorithm, Graph Traversal Algorithms: Breath First and Depth first.

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GOVT. POST GRADUATE NEHRU COLLEGE, JHAJJAR

Department of C.S.

Lesson Plan

Class – M.Sc Computer Science **Semester -1st**

Name of Teacher… *Manoj Kumar*

Subject/Paper- Database Management Systems Course Code 24MSCCS201DS05

Month	Subject Matter/ Syllabus
August	Introduction: Characteristics of database approach, data models, DBMS architecture and data independence. Database Languages, Classification of DBMS, Database Users and Administrator.
September	DBMS Environment: Database Access for applications Programs, Transaction Management, Database system Structure, Storage Manager, Query Processor. E-R Modeling: Entity types, Entity set, attribute and key, Relationships, Relation types, Roles and Structural constraints, Weak entities, Enhanced ER Model.
October	Relational Model: Introduction to the Relational Model, Integrity Constraint over Relations, Enforcing Integrity constraints, Querying relational data, Introduction to views, Destroying/altering Tables and Views. Relational Algebra and Calculus: Relational Algebra, Set operations, Selection and projection, renaming, Joins, Division, Examples of Algebra overviews, Relational calculus: Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and Calculus.
November	Schema Refinement & Normalization: Problems Caused by redundancy, Schema refinement in Database Design, Decompositions & its properties, Problem related to decomposition, Functional Dependency. Normalization: First, Second, Third Normal forms, BCNF, Lossless join Decomposition, Dependency preserving Decomposition, Multi valued Dependencies, Fourth Normal Form. Transaction Management: ACID Properties, Transactions and Schedules, Concurrent Execution of transaction, Serializability and recoverability.
December	Concurrency Control: Introduction to Lock Management, Lock Conversions, Dealing with Dead Locks, Concurrency without Locking, Recovery Techniques, Database Security. Introduction to MySQL/Oracle: Working with MySQL/Oracle. Getting started, Modules of MySQL/Oracle, Invoking SQL*Plus/MySQL Command-line client ('mysql'), Data types, Data Constraints, Operators, manipulation - Create, Modify, Insert, Delete and Update; Searching, Matching and Oracle Functions.

Signature

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GOVT. POST GRADUATE NEHRU COLLEGE, JHAJJAR

Department of C.S

Lesson Plan

Class – M.Sc Computer Science **Semester -1st**

Name of Teacher… *Manoj Kumar*

Subject/Paper- Computer Networks Course Code 24MSCSCS201DS02

Month	Subject Matter/ Syllabus
August	Introduction to Computer Network: Types of Networks, Network Topologies, OSI and TCP/IP Reference Models;
September	Data Communications Concepts: Digital Vs. Analog communication; Parallel and Serial Communication; Synchronous, Asynchronous and Isochronous Communication; Communication modes: simplex, half duplex, full duplex; Multiplexing; Transmission media: Wired-Twisted pair, Coaxial cable, Optical Fibre, Wireless transmission: Terrestrial, Microwave, Satellite, and Infrared.
October	Communication Switching Techniques: Circuit Switching, Message Switching, Packet Switching. Data Link Layer Fundamentals: Framing, Basics of Error Detection, Forward Error Correction, Cyclic Redundancy Check codes for Error Detection, Flow Control. Media Access Protocols: ALOHA, Carrier Sense Multiple Access (CSMA), CSMA with Collision Detection (CSMA/CD), Token Ring, Token Bus.
November	High-Speed LAN: Standard Ethernet, Fast Ethernet, Gigabit Ethernet, 10G; Wireless LANs: IEEE 802.11, Bluetooth. Network Layer: IP Addressing and Routing, Network Layer Protocols: IPv4 (Header Format and Services), ARP, ICMP (Error Reporting and Query message); IPv6 (Header Format and Addressing).
December	Transport Layer: Process-to-Process Delivery: UDP, TCP; Application Layer: Domain Name System (DNS); SMTP; HTTP; WWW. Network Security: Security Requirements and attacks; Cryptography: Symmetric Key (DES, AES), Public Key Cryptography (RSA); Firewall.

Signature

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