LESSON PLAN 2025-26(SUMMER)

NAME OF THE TEACHER : DEEPAK KUMAR BARDA,STAGE-II(CSE)

Subject: CLOUD COMPUTING**(TH3)**
Program: Diploma in Computer Science and Engineering
Semester: 6th
Total Contact Hours: 60
Total Marks: 100
Assessment: Internal Assessment – 20, End Term – 80

After completion of this course the student will be able to:
CO1: Understand the fundamental characteristics, history, and reference models of cloud computing.
CO2: Analyze cloud architecture, interoperability, scalability, and fault tolerance mechanisms.
CO3: Apply cloud management strategies and understand virtualization technologies and data center architectures.
CO4: Evaluate virtualization techniques, cloud security principles, and security architectures.
CO5: Explore market-based cloud management, cloud federation, and big data processing using Hadoop.

Lesson No.	UNIT	Topic/Sub-Topic	Learning Objective	Activity	Homework	COURSE OBJECTIVE
UNIT-1-: Introduction To Cloud Computing(05 Periods)						
1	I	1.1 Historical development, 1.2 Vision of Cloud Computing	Trace the evolution of cloud computing.	Timeline creation of Cloud history.	Read Ch 1 of Text 1.	CO1
2	I	1.3 Characteristics of Cloud Computing	Identify key characteristics like elasticity and self-service.	Group discussion on "Why Cloud?"	List 5 real-world cloud apps.	C01
3	I	1.4 Cloud Computing Reference Model	Understand the layers of the cloud reference model.	Draw the Reference Model.	Practice drawing the model.	C01
4	I	1.5 Cloud environment, 1.6 Service requirements	Analyze the environment and requirements for services	Case study: Google Docs vs. MS Word.	Research specific service reqs.	CO1
5	I	1.7 Cloud & Dynamic Infra, 1.8 Adoption, 1.9 Apps	Discuss infrastructure dynamics and adoption barriers.	Debate: "Security vs. Adoption."	Write a short note on Cloud Adoption.	CO1
UNIT-2-CLOUD COMPUTING ARCHITECTURE (08 Periods)						
6	II	2.1 Introduction, 2.2 Cloud Reference Model	Deep dive into the specific Cloud Reference Model.	diagram analysis.	Review Reference Model layers.	CO2
7	II	2.3 Types of Clouds (Public & Private)	Differentiate between Public and Private clouds.	Venn Diagram: Public vs. Private.	Find examples of Private Clouds.	CO2
8	II	2.3 Types of Clouds (Hybrid & Community)	Differentiate between Hybrid and Community clouds.	Scenario matching game.	Research a Community Cloud example.	CO2

9	II	2.4 Cloud Interoperability and standards	Understand why systems need to talk to each other.	Discussion on Vendor Lock-in.	Read about OpenStack standards.	CO2
10	II	2.5 Cloud computing Interoperability use cases	Analyze real-world use cases of interoperability.	Case Analysis: Multi-cloud strategy.	Summarize one use case.	CO2
11	II	2.6 Role of standards in Cloud environment	Evaluate the importance of standardization.	Group listing of current standards.	List 3 major cloud standards bodies.	CO2
12	II	2.x Review of Cloud Architecture	Reinforce architectural concepts.	Quiz on Unit 2 topics.	Prepare for Unit 2 Assessment.	CO2
13	II	2.x Architecture Implementation Examples	See architecture in practice (AWS/Azure concepts).	Virtual walkthrough of a cloud console.	Explore AWS Free Tier (optional).	CO2
UNIT-3-SCALABILITY AND FAULT TOLERANCE(08 Periods)						
14	III	3.1 Intro, 3.2 Scalability & Fault Tolerance	Define scalability vs. fault tolerance.	analysis.	Define Horizontal vs Vertical Scaling.	CO2
15	III	3.3 Cloud solutions, 3.4 Cloud Ecosystem	Map the cloud ecosystem players.	Ecosystem mapping exercise	Sketch a simple cloud ecosystem.	CO2
16	III	3.5 Cloud Business process management	Understand BPM in the cloud context.	Process flow charting.	Read on Cloud BPM tools.	CO2
17	III	3.6 Portability and Interoperability	Revisit portability in the context of fault tolerance.	Discussion: Moving apps between clouds.	Essay: Why is portability hard?	CO2
18	III	3.7 Cloud Service management, 3.8 Offerings	Explore how services are managed and offered.	Reviewing Service Level Agreements (SLAs).	Find a sample SLA online.	CO2
19	III	3.9 Testing under Control, 3.10 Service Controls	Learn testing methodologies for cloud.	Designing a test case for a web app.	Write 3 test cases for cloud scale.	CO2
20	III	3.11 Virtual desktop Infrastructure (VDI)	Understand VDI concepts.	Video demo of VDI usage.	Benefits of VDI for remote work.	CO2
21	III	3.x Unit 3 Review & Assessment	Assess understanding of scalability.	Mini-test on Scalability.	Revise Unit 3.	CO2
UNIT 4-CLOUD MANAGEMENT AND VIRTUALISATION TECHNOLOGY(08 Periods)						
22	IV	4.1 Virtualised Architecture, 4.2 Data Centre	Visualize a modern data center.	tour.	Components of a Data Center.	CO3
23	IV	4.3 Resilience, 4.4 Agility	Define agility and resilience in IT.	Disaster scenario planning.	Define RTO and RPO.	CO3

24	IV	4.5 Cisco Data Centre Network architecture	Study a specific industry architecture (Cisco).	Architecture diagram breakdown.	Research Cisco Nexus switches.	CO3
25	IV	4.6 Storage, 4.7 Provisioning	Understand storage types (Block/Object) and provisioning.	Comparison table: SAN vs. NAS vs. Cloud.	List 3 cloud storage providers.	CO3
26	IV	4.8 Asset Management, 4.9 Concept of Map Reduce	Intro to asset tracking and MapReduce basics.	Simple MapReduce logic puzzle.	How does Google use MapReduce?	CO3
27	IV	4.10 Cloud Governance, 4.11 Load Balancing	Manage cloud resources and balance traffic.	Load balancing simulation game.	Types of Load Balancers.	CO3
28	IV	4.12 High Availability, 4.13 Disaster Recovery	Strategies for keeping systems up 24/7.	Designing a HA architecture.	Difference between HA and DR.	CO3
29	IV	INTERNAL ASSESSMENT PREPARATION	Review Units 1-4 for Internal Exams.	Q&A Session / Mock Test.	Study for Internal Exams.	CO1-CO3
UNIT-5 VIRTUALISATION (08 Periods)						
30	V	5.1 Virtualisation, 5.7 Server Virtualisation	Core concepts of Hypervisors (Type 1 vs 2).	Identity Audit: Students open a browser (Chrome/Edge), click the lock icon on a site like Google or their school portal, and list five pieces of information found in the certificate.	List popular Hypervisors.	CO4
31	V	5.2 Network Virtualisation	Explain SDN and network overlay.	Diagramming a virtual network.	What is SDN?	CO4
32	V	5.3 Desktop & App Virtualisation, 5.5 Local Desktop	Distinguish between app and desktop virtualization.	Comparison matrix creation.	Examples of App Virtualization.	CO4
33	V	5.4 Desktop as a service (DaaS)	Understand the DaaS business model.	Case Study: Amazon Workspaces.	Pros/Cons of DaaS.	CO4
34	V	5.6 Virtualisation benefits	Analyze cost/efficiency benefits.	ROI calculation exercise.	Write 5 benefits of Virtualization.	CO4
35	V	5.8 Block and File level Storage Virtualisation	Technical dive into storage abstraction.	Whiteboard session on Storage Virt.	Define LUN and Volume.	CO4
36	V	5.9 Virtual Machine Monitor (VMM), 5.10 Infra Req	Role of the VMM/Hypervisor.	VMM architecture breakdown	Functions of a VMM.	CO4

37	V	5.11 VLAN and VSAN	Network segmentation in virtual environments.	Configuring a conceptual VLAN.	Difference: VLAN vs VSAN.	CO4
UNIT 6- CLOUD SECURITY (08 Periods)						
38	VI	6.1 Fundamentals, 6.2 Cloud security services	CIA Triad in Cloud (Confidentiality, Integrity, Availability).	Security Triad mapping.	Define CIA Triad.	CO4
39	VI	6.3 Design Principles, 6.4 Secure Cloud software reqs	Secure by design concepts.	Code review checklist creation.	What is SDLC?	CO4
40	VI	6.5 Policy Implementation	Creating and enforcing security policies.	Drafting a simple cloud policy.	Draft a password policy.	CO4
41	VI	6.6 Cloud Computing Security Challenges (Part 1)	Data breaches and data loss.	Analyze a famous breach (e.g., Capital One).	Research top cloud threats.	CO4
42	VI	6.6 Cloud Computing Security Challenges (Part 2)	Insider threats and insecure interfaces.	Debate: Insider vs Outsider threats.	Summary of CSA Top Threats.	CO4
43	VI	6.x Unit 6 Review	Consolidate security knowledge.	Security Quiz.	Revise Unit 6.	CO4
44	VI	6.x Practical Security	Simple security tools overview.	Demo of a security scanner (concept).	Look up "Kali Linux".	CO4
45	VI	6.x Guest Lecture / Video	Industry perspective on Cloud Security.	Video session (TED Talk or similar).	Write a summary of the video.	CO4
UNIT-7-CLOUD COMPUTING SECURITY ARCHITECTURE (05 Periods)						
46	VII	7.1 Architectural Considerations, 7.2 Info Classification	Classifying data (Public, Private, Restricted).	Data classification exercise.	Classify personal data types.	CO4
47	VII	7.3 VPN, 7.4 Public Key and Encryption Key mgmt	Tunneling and Encryption basics.	Roleplay: Simulate a "Request-Response" cycle using S-HTTP headers vs. standard HTTPS.	How does HTTPS work?	CO4
48	VII	7.5 Digital certificates, 7.6 Key management	Trust models and managing keys.	Check SSL cert of a website.	What is a CA (Cert Authority)?	CO4

49	VII	7.7 Memory Cards, 7.8 Implementing Identity Mgmt	IAM (Identity Access Management) basics.	Designing an IAM flow.	Define SSO (Single Sign On).	CO4
50	VII	7.9 Controls and Autonomic System	Automated security controls	Flowchart of an autonomic system.	Read on Autonomic Computing.	CO4
UNIT-8- MARKET BASED MANAGEMT OF CLOUDS (05 Periods)						
51	VIII	8.1 Cloud Info security vendors	Survey of the security market landscape.	Vendor comparison (CrowdStrike vs Palo Alto).	List 3 top security vendors.	CO5
52	VIII	8.2 Cloud Federation, charactrization	Connecting multiple clouds.	Diagramming a federation.	Define Identity Federation.	CO5
53	VIII	8.3 Cloud Federation stack	Layers of the federation stack.	Stack analysis.	Read on SAML/OIDC.	CO5
54	VIII	8.4 Third Party Cloud service	Role of brokers and 3rd parties.	Role-play: Cloud Broker negotiation.	What is a Cloud Broker?	CO5
55	VIII	8.5 Case study	Comprehensive case study of market management.	Group presentation on Case Study.	Prepare Case Study slides.	CO5
UNIT-9-HADOOP (05 Periods)						
56	IX	9.1 Introduction to Hadoop	Basics of Big Data and Hadoop.	Brainstorming data sources (IoT, Social).	What is Big Data?	CO5
57	IX	9.2 Data Source	Where does big data come from?	Encapsulation Demo: Use a "Letter in an Envelope" analogy to show how ESP wraps data for transit.	List 5 Big Data sources.	CO5
58	IX	9.3 Data storage (HDFS)	Understanding Hadoop Distributed File System.	HDFS Read/Write flow diagram.	How does HDFS handle failure?	CO5
59	IX	9.3 Data Analysis (MapReduce)	Processing data on Hadoop.	WordCount example in MapReduce.	MapReduce logic for WordCount.	CO5
60	IX	9.4 Comparison with other system	RDBMS vs. Hadoop.	Table comparison: SQL vs NoSQL.	Final Course Review.	CO5

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