



Lok Jagruti Kendra University
University with a Difference

Diploma in Artificial Intelligence & Machine Learning



Course Code: 025090505

Fundamentals of Cloud Computing

Programme / Branch Name			Diploma in Artificial Intelligence & Machine Learning			
Course Name	Fundamentals of Cloud Computing				Course Code	025090505
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses

ESC: Engineering Science Courses

OEC: Open Elective Courses

BSC: Basic Science Courses

PCC: Program Core Courses

PEC: Program Elective Courses

1. Teaching and Evaluation Scheme

Teaching Hours / Week / Credits				Evaluation Scheme			
L	T	P	Total Credit	CCE	SEE (Th)	SEE (Pr)	TOTAL
3	0	4	5	50	50	50	150

Legends:

L: Lectures T: Tutorial P: Practical

CCE: Continuous & Comprehensive Evaluation

SEE (Th): Semester End Evaluation (Theory)

SEE (Pr): Semester End Evaluation (Practical)

2. Prerequisites

- ✓ Basic concepts of distributed computing

3. Rationale

Companies are turning to cloud solutions instead of investing in infrastructure and maintaining it themselves. Due to the complex structure of the cloud, it is necessary to check from a security point of view. Businesses are looking for cloud service providers that are stable, secure, and offer multiple layers of security for their customers' data. This course will help implement cloud architectures, analyze security issues, write incident reports, and implement security architectures for cloud platforms.

4. Objectives

- ✓ The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.
- Fundamentals of computing paradigms and cloud computing.
- Understand the cloud architecture and types, service and deployment models of cloud.
- Private cloud establishment, work on public and private cloud.
- Identifying the main differences between administration and management of a network from various threats.

5. Contents

Unit No.	Topics	Sub-Topics	Learning Outcomes	% Weightage	Hours
1	Introduction to Cloud Computing	1.1. Introduction 1.2. Cloud Characteristics 1.3. Cloud Service Models 1.4. Cloud Deployment Models 1.5. Benefits and Disadvantages of Cloud Computing 1.6. Cloud Computing 1.7. Impact of Cloud Computing	- To understand cloud architecture - To understand characteristics, impact & models	20	8
2	Technology Platforms for Cloud Computing	2.1. Introduction to AWS 2.2. Introduction to Azure 2.3. Introduction to Google App Engine	To understand technology platforms for cloud	20	10
3	Challenges of Cloud Adoption	3.1. Performance 3.2. Reliability 3.3. Security and Privacy 3.4. Bandwidth costs 3.5. Load balancing 3.6. Hypervisors 3.7. Machine imaging 3.8. Cloud marketplace 3.9. Comparison of Cloud providers	To understand challenges of adoption of cloud	20	8

4	Fundamentals of Cloud Architectures	4.1. Workload Distribution Architecture 4.2. Resource Pooling Architecture 4.3. Dynamic Scalability Architecture 4.4. Elastic Resource Capacity Architecture 4.5. Service Load Balancing Architecture 4.6. Cloud Bursting Architecture 4.7. Elastic Disk Provisioning Architecture 4.8. Redundant Storage Architecture	• To understand load balancing in cloud • To understand various architectures of cloud	20	8
5	Cloud Security & Basics of Mobile Cloud	5.1. Cloud Security Challenges & Risks 5.2. General Issues Securing the Cloud 5.3. Securing Data & Data Security 5.4. Virtual Machine & Application Security 5.5. Security 5.6. Mobile Cloud Definition 5.7. Architecture of Mobile Cloud 5.8. Benefits & Challenges of Mobile Cloud	• To understand cloud security & Mobile Cloud	20	8
Total Hours					42

6. List of Practicals / Exercises

The practical/exercises should be properly designed and implemented in an attempt to develop different types of skills so that students can acquire the competencies/programme outcomes. Following is the list of practical exercises for guidance.

Sr. No.	Practical / Exercises	Key Competency	Hours
1	Summarize Cloud service models with real time examples.	To learn about Cloud service models with real time	4
2	Sketch out and analyze the architecture of Microsoft Azure.	To learn about architecture of Microsoft Azure	4
3	Sketch out and analyze the architecture of Amazon Web Service (AWS).	To learn about the architecture of AWS	4
4	Sketch out and analyze architecture of Google App Engine.	To learn about architecture of Google App Engine	4
5	Categorize Microsoft Azure Services and discuss each.	To learn about categorizing Microsoft Azure Services	4
6	To develop IT infrastructure in your organization conduct a survey on various options available. • Use Cloud Services. • Write cost benefit analysis of traditional infrastructure vs. Cloud infrastructure after the survey.	To prepare a test case for the various options available in the cloud	4
7	Provide a report on technical challenges of using the cloud for the following scenario: In a company, for insurance related product development, the data is processed which is personal and sensitive. To concern about the security of the data, data is moved over the cloud. Prepare a report for this.	To prepare a test case for the technical challenges of cloud	4
8	A university wants some advice about deployment of cloud for their online learning platform as they are not able to maintain their own data center. The university is evaluating the right choice of the cloud deployment model. Provide a report explaining pros and cons of each cloud deployment model for the universities online learning platform.	To prepare a test case for the deployment of cloud	4
9	Provide a report on adoption of private cloud in Indian government organizations.	To prepare a test case for the government organization	4
10	Create a Windows Base Server using AWS Cloud.	To know how to create server and configuration windows base	4
11	Create the S3 bucket using AWS Cloud.	To understand creating a bucket in Amazon S3	2
12	Upload an object on S3 bucket using AWS Cloud.	To understand uploading an object to the bucket	2

13	Download an object on S3 bucket using AWS Cloud.	To understand downloading an object from an S3 bucket	2
14	Create Elastic Load Balancers and Auto Scaling groups using AWS Cloud.	To understand Automatic server that creates load balancing	2
15	Create Relational Database Server using AWS Cloud	To understand Relational Database Server	4
16	Create Non-Relational Database Server using AWS Cloud.	To understand Non-Relational Database Server	4
Total Hours			56

7. Suggested Specification Table with Hours

Unit No.	Chapter Name	Teaching Hours	Distribution of Topics According to Bloom's Taxonomy					
			R %	U %	App %	C %	E %	An %
1	Introduction to Cloud Computing	8	40	30	20	-	5	5
2	Technology Platforms for Cloud Computing	10	30	30	20	10	5	5
3	Challenges of Cloud Adoption	8	20	30	30	10	5	5
4	Fundamentals of Cloud Architectures	8	20	20	20	10	15	15
5	Cloud Security & Basics of Mobile Cloud	8	20	20	30	10	10	10

Legends: R: Remembering U: Understanding
 App: Applying C: Creating
 E: Evaluating An: Analyzing

8. Textbooks

- 1) Cloud Computing: Principles and Paradigms, Rajkumar Buyya, Wiley India Edition
- 2) Amazon Web Services for Dummies. Bernard Golden. For Dummies.
- 3) Amazon Security overview whitepaper- <https://aws.amazon.com/whitepapers>

9. Reference Books

- 1) Cloud Computing Bible. Barrie Sosinsky. John Wiley & Sons.
- 2) Cloud Computing: Web Based Applications that Change the Way You Work and Collaborate Online, Miller Michael, Pearson Education India

10. Open Sources (Website, Video, Movie)

- 1) https://aws.amazon.com/getting-started/?nc1=f_cc
- 2) <http://docs.aws.amazon.com/IAM/latest/UserGuide/getting-started.html>
- 3) https://www.tutorialspoint.com/cloud_computing/cloud_computing_tutorial.pdf
- 4) <https://www.geeksforgeeks.org/cloud-computing/>