

COURSE TITLE	CLOUD COMPUTING & SECURITY
COURSE CODE	01CC0505
COURSE CREDITS	3

Objective:

- 1 The objective of this course is to provide a comprehensive understanding of cloud computing concepts, architectures, and service models, along with the deployment and management of cloud-based applications. It aims to develop practical skills in using cloud platforms and tools while emphasizing security principles, including data protection, identity and access management, and risk mitigation in cloud environments. The course also focuses on analyzing cloud vulnerabilities, implementing security best practices, and ensuring compliance with industry standards to build secure and scalable cloud solutions.

Course Outcomes: After completion of this course, student will be able to:

- 1 Understand Cloud Basic & Concept with different Cloud Platforms
- 2 Explain the fundamentals and services of AWS Cloud
- 3 Develop & Gain Knowledge of Docker, Container & Kubernetes.
- 4 Analyse the Security Concept in Cloud as per the services
- 5 Apply the Concept of Cloud with Trending Technologies

Pre-requisite of course: Understanding of the Internet. Basic Programming Knowledge. Basic Network Security Concepts.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
2	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	INTRODUCTION OF CLOUD COMPUTING Definition of Cloud Computing, What is Cloud Computing & Need of Cloud Computing, Types of Cloud, Different Types of Cloud Services, Benefits of Cloud Computing, Challenges of Cloud Computing, Introduction to Cloud Platforms & it's use, Role of Cloud with the Virtualization	6
2	AWS CLOUD Introduction of AWS, What is it's Need and Benefits, Services of AWS, Introduction to EC2 & AMI, Introduction to s3, What is Network & it's Role in Cloud, Network Security Group with Ports, Description of Sub nets, Description of IAM, Use of Key Pair Login, Use of Auto Scaling, Use of Load balancer, Introduction to VPC, What is it's use in Web Development	7

Contents : Unit	Topics	Contact Hours
3	CLOUD COMPUTING THREATS, DOCKER, CONTAINER & KUBERNETES Serverless Computing, Advantages of Serverless Computing, Introduction to OWASP, What is Docker, Advantages & Disadvantages of Docker, Architecture of Docker, What is Container, ,Advantages & Disadvantages of Container, Architecture of Container, Difference between Docker vs Container,, What is Kubernetes - Advantages & Disadvantages of Kubernetes - Architecture of Kubernetes,, Difference between Kubernetes vs Docker, Difference between Kubernetes vs Docker vs Container	7
4	CLOUD SECURITY Introduction to NIST, NIST Framework, Security in Cloud, Necessary Steps in Cloud,, Security in AWS, Framework for Cloud Security, Required/Necessary S teps, Monitoring, RBAC, Data Governance, Identity & Access Management, Training	6
5	CLOUD WITH TRENDING TECHNOLOGIES Enabled Technologies in Cloud, Role of AI in Cloud, Benefits of AI in Cloud, Use of AI in Cloud - Web Development in Cloud, Development in Cloud, Data Storage in Cloud, Cyber Attack in Cloud	6
Total Hours		32

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	Practical 1 Create the account in Amazon Web Services Cloud with all the necessary fields & Payment methods	2
2	Practical 2 Deploy EC2 with all the necessary steps that are Required	2
3	Practical 3 Create S3 (Simple Storage Service) with Storage of 8GB and Upload One Image & Video and check it out.	2
4	Practical 4 Add & Use all the necessary steps for Auto Scaling	2
5	Practical 5 Create one Virtual Private Cloud with different types of Sub net that can be Connected	2
6	Practical 6 Deploy IAM and check out all the required credentials in it	2
7	Practical 7 Create one SNS (Simple Notification Service) and check it with your Registered Email Id	2
8	Practical 8 Deploy one RDS (Relational DataBase Service) and enter all the required Data in it	2

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
9	Practical 9 Connect one Load balancer and do Coding in Programming Languages of your Choice like Python, Java etc.	2
10	Practical 10 Create one DynamoDB for storing the Data & Compare with RDS including it's Use & Functionalities.	2
Total Hours		20

Textbook :

- 1 “Cloud Computing” - A Hands on Approach” , Arshdeep Bahga (Author), Vijay Madiseti (Author), CreateSpace Independent Publishing Platform, 2014

References:

- 1 “Cloud Computing with AWS” Everything You Need to Know to be an AWS Cloud Practitioner”, “Cloud Computing with AWS” Everything You Need to Know to be an AWS Cloud Practitioner”, Pravin Mishra (Author), Apress, 2023
- 2 “Architecting Cloud Computing Solutions” , “Architecting Cloud Computing Solutions” , Kevin L. Jackson (Author), Scott Goessling, Packt Publishing Ltd, 2018

Suggested Theory Distribution:

The suggested theory distribution as per Bloom’s taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
0.00	28.00	22.00	24.00	14.00	12.00

Instructional Method:

- 1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc
- 2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- 3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- 4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

Supplementary Resources:

- 1) “Coursera” – Cloud Computing Specialization (University of Illinois)

Supplementary Resources:

- 2 “edX” – Introduction to Cloud Computing (IBM)
- 3 “Pluralsight” – Cloud Security Fundamentals