



# \*\*Master of Engineering - ME (Cloud Computing)\*\*

Course Name : Cloud Architecture and Management

--- --- ---

Course Code : CDC 5102

Academic Year : 2024 - 25

Semester : I

Name of the Course Coordinator : Dr. PRATHIVIRAJ N

Name of the Program Coordinator : Mr. Sreepathy HV

### \*\*Course File\*\*



Signature of Program Coordinator    Signature of Course Coordinator

--- ---

with Date    with Date

1. Course Plan 6

--- ---

1.1 Primary Information 6

1.2 Course Outcomes (COs) 7

1.3 Assessment Plan 8

1.4 Lesson Plan 9

1.5 References 12

1.6 Other Resources (Online, Text, Multimedia, etc.) 12

1.7 Course Outcomes (COs) Error! Bookmark not defined.

1.8 Course Timetable 13

1.9 Assessment Plan 13

1.10 Assessment Details 15

1.11 Course Articulation Matrix 16

2. Assessment Details Error! Bookmark not defined.

--- --- ---

2.1 Student Details: Error! Bookmark not defined.

2.2 Assessment outcomes Error! Bookmark not defined.

2.3 Analysis of Assessment outcomes Error! Bookmark not defined.

2.4 Attainment of Course Outcomes (Direct) Error! Bookmark not defined.

2.5 Attainment of Course Outcomes (Indirect): Course End Survey (CES) Questionnaire Error!  
Bookmark not defined.

2.6 Attainment of Course Outcomes (Indirect): Analysis Error! Bookmark not defined.

3. CO-PO Assessment Error! Bookmark not defined.

4. Observations and Comments Error! Bookmark not defined.

4.1 Observations from Course Coordinator based on the direct and indirect assessments Error!  
Bookmark not defined.

4.2 Comments/Suggestions by the Course Coordinator Error! Bookmark not defined.



## ## Program Education Objectives (PEOs)

The overall objectives of the Learning Outcomes-based Curriculum Framework (LOCF) for \*\*ME  
(Cloud Computing)\*\*\*, program are as follows.

PEO No. Education Objective

--- ---

PEO 1 Develop advance knowledge and understanding of the theories, concepts, and principles  
related to Cloud Computing,

including virtualization, distributed systems, cloud networks, security, micro services, and cloud  
infrastructure management  
services.

PEO 2 Apply critical thinking and problem-solving skills to address complex challenges in cloud  
computing such as scalability,

resource scheduling, performance optimization and data management.

PEO 3 Gain practical, hands-on experience with global cloud provider services, DevOps tools, automation and container

orchestration services through coursework and applied research experiences.



## ## Program Outcomes (POs)

By the end of the postgraduate program in **ME (Cloud Computing)**, graduates will be able to:

PO1 An ability to independently carry out research /investigation and development work to solve practical problems.

--- ---

PO2 An ability to write and present a substantial technical report/document.

PO3 Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The

mastery should be at a level higher than the requirements in the appropriate bachelor program.

PO4 An ability to design, develop scalable, highly available and fault-tolerant cloud solutions, services for business needs and

implement well architected cloud architectures based on theoretical principles, ethical considerations, and detailed

knowledge of the underlying infrastructure, applications and data.



PO5 An ability to demonstrate knowledge of securing cloud resources, data and infrastructure and apply DevOps best practices

--- ---

to automate software development life cycle.

## ## 1. Course Plan

### ### 1.1 Primary Information

Course Name : Cloud Computing and Management [CDC 5102]

---

L-T-P-C : 3-0-0-3

Contact Hours : 36 Hours

Pre-requisite : Basics of Operating System

Core/ PE/OE : Core



### 1.2 Course Outcomes (COs), Program outcomes (POs) and Bloom's Taxonomy Mapping

CO At the end of this course, the student should be able to: No. of Contact Program Outcomes

BL

---

Hours (PO's)

CO1 Interpret the cloud computing fundamentals to plan deployment of application on cloud. 8

PO4 3

CO2 Relate the role of virtualization in enabling the cloud. 8 PO1 4



CO3 Demonstrate the use of server and network virtualization. 8 PO3 3

---

CO4 Relate the management and economics in cloud usage 12 PO5 4

### 1.3 Assessment Plan

Components Mid-Term Flexible Assessments End semester/ Makeup

---

(2 - 3 in number) examination

Duration 90 minutes To be decided by the faculty. 180 minutes

Weightage 0.3 0.1 0.5

Typology of questions Applying; Applying; Analyzing. Applying; Analyzing;

Analyzing. Understanding. Understanding.

Answer all 5 Assignment: (Solving Use case Answer all 10 full questions of

Pattern questions of 10 using cloud services.) 10 marks each.

marks each.



Schedule As per academic Assignment submission: As per academic calendar.

--- --- --- ---

calendar. November 2023

Topics covered Cloud Computing Server and Network Comprehensive examination

Fundamentals, covering the full syllabus.

Virtualization, Management and

Overview of Cloud Services Students are expected to answer

Virtualization all questions.

### ### 1.4 Lesson Plan

L. No. TOPICS Course Outcome Addressed

--- --- ---

L0 Course delivery plan, Course assessment plan, Course outcomes, Program outcomes, CO-PO

---

mapping, reference books

L1 Overview of Computing Paradigm CO1

L2 Introduction to Cloud Computing CO1

L3 Cloud Computing definition, private, public and hybrid cloud. CO1

L4 Cloud types; IaaS, PaaS, SaaS CO1

L5 Benefits and challenges of cloud computing, public vs private clouds CO1

L6 role of virtualization in enabling the cloud CO1



L7 Business Agility: Benefits and challenges to Cloud architecture CO1

--- --- ---

L8 Application availability, performance, security and disaster recovery; next generation Cloud

Applications. CO1

L9 Basics of Virtualization - Types of Virtualization Techniques CO2

L10 Types of Virtualization Techniques - Merits and demerits of Virtualization CO2

L11 Full Vs Para-virtualization CO2

L12 Virtual Machine Monitor/Hypervisor CO2

L13 Virtual Machine Basics - Taxonomy of Virtual machines CO2

L14 Ring Levels - Process Vs System Virtual Machines CO2

MT Mid-Term CO1 & CO2

L15 Ring Levels - Process Vs System Virtual Machines CO2

L16 Emulation: Interpretation and Binary Translation - HLL Virtual Machines CO2

L17 Introduction to Server and Network Virtualization CO3

L18 Virtual Hardware Overview - Server Consolidation CO3

L19 Partitioning Techniques - Uses of Virtual server Consolidation CO3

L20 Server Virtualization Platforms CO3

L21 Design of Scalable Enterprise Networks - Layer2 Virtualization CO3

L22 VLAN - VFI -Layer 3 Virtualization CO3

L23 VRF - Virtual Firewall Contexts CO3

L24 Network Device Virtualization - Data- Path Virtualization - Routing Protocols CO3



L25 Introduction to Management and Cloud Services CO4

--- --- ---

L26 Reliability, availability and security of services deployed from the cloud CO4

L27 Reliability, availability and security of services deployed from the cloud CO4

L28 Performance and scalability of services, tools and technologies used to manage cloud services deployment CO4

L29 tools and technologies used to manage cloud services deployment; CO4

L30 Cloud Computing infrastructures available for implementing cloud based services CO4

L31 Service Management in Cloud Computing - Service Level Agreements(SLAs) CO4

L32 Billing & Accounting - Comparing Scaling Hardware: Traditional vs. Cloud CO4

L33 Economics of scaling: Benefitting enormously CO4

L34 Managing Data - Looking at Data, Scalability & Cloud Services CO4

L35 Database & Data Stores in Cloud - Large Scale Data Processing CO4

L36 Economics of choosing a Cloud platform for an organization, based on application requirements, CO4

economic constraints and business need



### ### 1.5 References

- 1. Barrie Sosinsky, "Cloud Computing Bible", Wiley-India, 2010
- 2. Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, ",Cloud Computing: Principles and Paradigms", Wiley, 201
- 3. Nikos Antonopoulos, Lee Gillam, "Cloud Computing: Principles, Systems and Applications", Springer, 2012. Ronald L. Krutz, Russell
- Dean Vines,"Cloud Security: A Comprehensive Guide to Secure Cloud Computing", Wiley-India, 2010
- 4. <https://in.coursera.org/learn/cloud-computing-basic>

### ### 1.6 Other Resources (Online, Text, Multimedia, etc.)

- 1. Web Resources: Blog, Online tools and cloud resources.
- 2. Journal Articles.



### ### 1.7 Course Timetable

1 st Semester CDC Room: Cloud Lab

--- --- --- --- --- --- --- --- ---

9-10 10-11 11-12 12-1 1-2 2-3 3-4 4-5

MON CAM

TUE

WED CAM

THU

FRI CAM

SAT

### ### 1.8 Assessment Plan

COs

--- --- --- --- --- ---

Mid End

CO CO Name Term Assignment Semester CO wise

No. (Max. (Max. 20) (Max. Weightage

50) 100)

Interpret the cloud

computing

CO1 fundamentals to plan 20 20 0.20

deployment of

application on cloud.

CO2 Relate the role of virtualization in 30 30 0.30

--- --- --- --- --- ---

enabling the cloud.

CO3 Demonstrate the use of server and network - 10 20 0.25

virtualization.

CO4 Relate the management and - 10 30 .25

economics in cloud

usage

Marks (weightage) 0.3 0.2 0.5 1.0

Note:



- In-semester Assessment is considered as the Mid-Term Assessment (MA) in this course for 50 marks, which includes the performances in class participation, assignment work, class tests, mid-term tests, quizzes etc.
- End-semester examination (ESE) for this course is conducted for a maximum of 100 and the same will be scaled down to 50.
- End-semester marks for a maximum of 50 and IA marks for a maximum of 50 are added for a maximum of 100 marks to decide upon the grade in this course.

Weightage for CO1 = (IT1 marks for CO1 / 2.5 + IT2 marks for CO1 / 2.5 + Assignment marks for CO1 + ESE marks for CO1 / 2)/100

$$(25/2.5 + 0 + 0 + 20/ 2)/100 = 0.2$$

### ### 1.9 Assessment Details

The assessment tools to be used for the Current Academic Year (CAY) are as follows:

Sl.	Tools	Weightage	Frequency	Details of Measurement
---	---	---	---	---
No.	(Weightage/Rubrics/Duration, etc.)			
	<ul style="list-style-type: none"> <li>- Performance is measured using Mid-Term attainment level.</li> <li>- Reference: question paper and answer scheme.</li> </ul>			
1	Mid-Term	0.3	1	Mid-Term is assessed for a maximum of 50 marks and scaled down to 30 marks.
	<ul style="list-style-type: none"> <li>- Performance is measured using</li> </ul>			
2	Assignments	0.2	2	assignments/quiz attainment level.
	<ul style="list-style-type: none"> <li>- Assignments/quiz are evaluated for a maximum of 20 marks.</li> <li>- Performance is measured using</li> </ul>			

- Performance is measured using

Mid-Term attainment level.

- Reference: question paper and

1 Mid-Term 0.3 1 answer scheme.

- Mid-Term is assessed for a maximum of 50 marks and scaled down to 30 marks.

- Performance is measured using

2 Assignments 0.2 2 assignments/quiz attainment level.

- Assignments/quiz are evaluated for a maximum of 20 marks.
- Performance is measured using

ESE attainment level.

- Reference: question paper and

3 ESE 0.5 1 answer scheme.

- ESE is assessed for a maximum of 100 marks and scaled down to 50 marks.

### ### 1.10 Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5
----	-----	-----	-----	-----	-----

---	---	---	---	---	---
-----	-----	-----	-----	-----	-----

CO1		Y			
-----	--	---	--	--	--

CO2	Y				
-----	---	--	--	--	--

CO3		Y			
-----	--	---	--	--	--

CO4			Y		
-----	--	--	---	--	--

Average Articulation Level	*	*	*	*	*
----------------------------	---	---	---	---	---