



DSEC/IT/U23CST71/CC/III/V
DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE
(AUTONOMOUS)

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)
Re-Accredited with 'A' Grade By NAAC, Accredited by TCS.
Accredited by NBA (AERO, CSE, IT & MECH)
Re-Accredited by NBA (BME, ECE, EEE)
PERAMBALUR - 621212.



COURSE PLAN (2025-2026)

Name of the Faculty Members				
Designation/Department	ASSISTANT PROFESSOR /IT			
Course Code/Name	U23CST71/CLOUD COMPUTING			
Year/Section/Department	III / IT / C			
Credits Details	L:3	T:0	P:0	C:3
Total Contact Hours Required	45			

Syllabus:

UNIT-I CLOUD ARCHITECTURE MODELS AND INFRASTRUCTURE	9
Cloud Architecture: System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture – Cloud deployment models – Cloud service models; Cloud Infrastructure: Architectural Design of Compute and Storage Clouds – Design Challenges	
UNIT-II VIRTUALIZATION BASICS	9
Virtual Machine Basics – Taxonomy of Virtual Machines – Hypervisor – Key Concepts – Virtualization structure – Implementation levels of virtualization – Virtualization Types: Full Virtualization – Para Virtualization – Hardware Virtualization – Virtualization of CPU, Memory and I/O devices	
UNIT-III VIRTUALIZATION INFRASTRUCTURE AND DOCKER	9
Desktop Virtualization – Network Virtualization – Storage Virtualization – System-level of Operating Virtualization – Application Virtualization – Virtual clusters and Resource Management – Containers vs. Virtual Machines – Introduction to Docker – Docker Components – Docker Container – Docker Images and Repositories	
UNIT-IV CLOUD DEPLOYMENT ENVIRONMENT	9
Google App Engine – Amazon AWS – Microsoft Azure; Cloud Software Environments – Eucalyptus – Open Stack.	
UNIT-V CLOUD SECURITY	9
Virtualization System-Specific Attacks: Guest hopping – VM migration attack – hyper jacking. Data Security and Storage; Identity and Access Management (IAM) - IAM Challenges - IAM Architecture and Practice.	
TOTAL: 45 PERIODS	

Objectives:

The main learning objective of this course is to prepare the students:

- To understand the principles of cloud architecture, models and infrastructure
- To understand the concepts of virtualization and virtual machines
- To gain knowledge about virtualization Infrastructure.
- To explore and experiment with various Cloud deployment environments.
- To learn about the security issues in the cloud environment.

Text Book(s):

- 1.Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2012
- 2.James Turnbull, “The Docker Book”, O’Reilly Publishers, 2014
- 3.Krutz, R. L., Vines, R. D, “Cloud security. A Comprehensive Guide to Secure Cloud Computing”, Wiley Publishing, 2010.

Reference Books:

- 1.James E. Smith, Ravi Nair, “Virtual Machines: Versatile Platforms for Systems and Processes”, Elsevier / Morgan Kaufmann, 2005.
- 2.Tim Mather, Subra Kumaraswamy, and Shahed Latif, “Cloud Security and Privacy: an enterprise perspective on risks and compliance”, O’Reilly Media, Inc., 2009.

NPTEL LINK:

https://onlinecourses.nptel.ac.in/noc24_cs17/preview

WEB SOURCES:

- W1:**<https://www.slideshare.net/slideshow/nist-cloud-computing-reference-architecture/29497993>
W2:<https://portal.selvamtech.edu.in/wp-content/uploads/2025/06/unit-3-notes-1.pdf>
W3:<https://www.studocu.com/cloud-computing/ccs335-unit-5-notes>

Course Plan:

Topic No	Topic Name	Reference Detail	Page No	Teaching Methodology	No of periods required	Cumulative periods
UNIT I CLOUD ARCHITECTURE MODELS AND INFRASTRUCTURE						(9)
1.	Cloud Architecture	T3	33-34	BB Black Board	1	1
2.	System Models for Distributed and Cloud Computing	T1	27-34	BB/ PPT	1	2
3.	NIST Cloud Computing	W1	-	BB/ PPT	2	4
4.	Reference Architecture	W1	-	BB/ PPT	1	5
5.	Cloud deployment models	T3	43-50	BB/ PPT	1	6
6.	Cloud service models	T1	192-203	BB/ PPT	1	7
7.	Cloud Infrastructure	T1	192-203	BB/ PPT	1	8
8.	Architectural Design of Compute and Storage Clouds	T1	215-225	BB/ PPT	1	9
9.	Design Challenges	T1	225-227	BB/ PPT	1	10

Outcome of Unit-I Understand the design challenges in the cloud.

UNIT II VIRTUALIZATION BASICS (9)

10.	Virtual Machine Basics	R1	9-12	BB/ PPT	1	11
11.	Taxonomy of Virtual Machines	R1	22-23	BB/ PPT	1	12
12.	Hypervisor, Key Concepts	T1	140-141	BB/ PPT	1	13
13.	Virtualization structure	T1	140-145	BB/ PPT	2	15
14.	Implementation levels of virtualization	T1	130-140	BB/ PPT	1	16
15.	Virtualization Types: Full Virtualization	T1	141-143	BB/ PPT	1	17
16.	Para Virtualization	T1	143	BB/ PPT	1	18
17.	Hardware Virtualization	T1	145	BB/ PPT	1	19
18.	Virtualization of CPU, Memory and I/O devices	T1	145-155	BB/ PPT	1	20

Outcome of Unit-II Understand the concept of virtualization and its types.

UNIT III VIRTUALIZATION INFRASTRUCTURE AND DOCKER (9)

19.	Desktop Virtualization, Network Virtualization	W2	-	BB/ PPT	1	21
20.	Storage Virtualization	W2	-	BB/ PPT	1	22
21.	level of Operating Virtualization	W2	-	BB/ PPT	1	23
22.	Application Virtualization	W2	-	BB/ PPT	1	24
23.	Virtual clusters and Resource Management	W2	-	BB/ PPT	2	26
24.	Containers vs. Virtual Machines	W2	-	BB/ PPT	1	27
25.	Introduction to Docker – Docker Components	T2	7-9	BB/ PPT	1	28
26.	Docker Container	T2	12-13	BB/ PPT	1	29
27.	Docker Images and Repositories	T2	9-12	BB	1	30

Outcome of Unit-III: Experiment with virtualization of hardware resources and Docker

UNIT –IV CLOUD DEPLOYMENT ENVIRONMENT (9)

28.	Google App Engine	T1	229-231	BB/ PPT	1	31
29.	Amazon AWS	T1	231-233	BB	2	32
30.	Microsoft Azure	T1	233-234	BB/ PPT	1	33
31.	Eucalyptus	T1	387-389	BB/ PPT	1	34
32.	OpenStack.	T1	389-393	BB/ PPT	1	35

Outcome of Unit-IV: Learn and deploy services on the cloud and set up a cloud environment

UNIT –V CLOUD SECURITY (9)

37.	Virtualization System	W3	-	BB	1	36
38.	Specific Attacks	W3	-	BB/ PPT	1	37

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39.	Guest hopping	W3	-	BB/ PPT	1	38
40.	VM migration attack	W3	-	BB/ PPT	1	39
41.	hyper jacking.	W3	-	BB/ PPT	1	40
42.	Data Security and Storage	W3	-	BB/ PPT	1	41
43.	Identity and Access Management (IAM)	W3	-	BB/ PPT	1	42
44.	IAM Challenges	W3	-	BB/ PPT	2	44
45.	IAM Architecture and Practice	W3	-	BB/ PPT	1	45

Outcome of Unit-V Explain security challenges in the cloud environment

Course Outcomes - Program Outcome Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	3	-	-	-	-	-	-	-	3	2
CO2	3	3	2	2	3	-	-	-	-	-	-	-	3	2
CO3	3	2	3	2	3	-	-	-	-	-	-	-	3	3
CO4	2	2	3	1	3	-	-	-	-	-	-	-	3	3
CO5	3	3	2	2	2	-	-	-	-	-	-	-	2	3
CO6	2	1	3	-	2	-	-	-	-	-	-	-	3	3
Avg	2.8	2.6	2.4	1.8	2.8	-	-	-	-	-	-	-	2.8	2.6

[Levels of correlation: 3(High), 2(Medium), 1(Low)]

Assignment: 1

Register Number	Total Number	Mode of Assignment MCQ/Seminar/PPT	Topics
Assignment:1			
	64	Written	<ul style="list-style-type: none"> • Cloud Architecture • NIST Reference Architecture
Assignment:2			
	64	PPT	<ul style="list-style-type: none"> • Virtualization structure • Virtualization Types
Assignment:3			
	64	Seminar	<ul style="list-style-type: none"> • level of Operating Virtualization • Amazon AWS
Assignment:4			
	64	Case study	<ul style="list-style-type: none"> • Google App Engine • Identity and Access Management (IAM)
Assignment:5			
	64	MCQ	<ul style="list-style-type: none"> • MCQ relevant to cloud computing domain

Submission Details:

Phase 1 (Before AT 1)		Phase 2 (Before AT 2)		Phase 3 (Model)
Assignment 1	Assignment 2	Assignment 3	Assignment 4	Assignment 5

PLAN OF ASSESSMENT TEST -DISTRIBUTION OF MARKS:

TEST	CO- MARK WISE DISTRIBUTION						BLOOM'S LEVEL MARK WISE DISTRIBUTION					
	C01	C02	C03	C04	C05	C06	BTL1	BTL2	BTL3	BTL4	BTL5	BTL6
AT-1	37	23	--	--	--	--	21	23	16	--	--	--
	--	--	37	23	--	--	--	--	--	--	--	--
AT-2	37	23	--	--	--	--	21	23	16	--	--	--
	--	--	37	23	--	--	--	--	--	--	--	--
MODEL	20	20	20	20	20	--	--	--	--	--	--	--
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Google Class Code Details:

Class Name: U23CST71-CLOUD COMPUTING

Class Code: yd3xlxfc

Prepared by

AP/IT

Verified By

HOD/IT

Approved By
Principal