



COURSE PLAN – PART I

Name of the program and specialization	B.Tech / 3 rd year		
Course Title	Cloud Computing (Theory)		
Course Code	CSPE 56	No. of Credits	3
Course Code of Pre-requisite subject(s)			
Session	Jan 2021	Section (if, applicable)	A and B
Name of Faculty	Dr. Sayantan Nath	Department	CSE
Email	sayantan@nitt.edu	Telephone No.	9477033935
Name of Course Coordinator(s) (if, applicable)	NIL		
E-mail	sayantan@nitt.edu	Telephone No.	9477033935
Course Type	<input checked="" type="checkbox"/> Program Elective (Theory)		

Syllabus (approved in Senate)

Cloud Computing(Theory)

UNIT I Introduction

Evolution: Clustering - Grid computing – Virtualization – Basic concepts - Benefits and Risks - Roles and Boundaries - Characteristics - XaaS based service offerings - Basic Deployment models.

UNIT II Enabling Technologies

Networks: ISPs - Connectionless Packet Switching - Router-based Interconnectivity - Technical and Business Considerations - Data Center: Standardization and Modularity - Automation - Remote Operation – High Availability - Hardware Virtualization: Hardware Independence - Server Consolidation - Resource Replication -OS and hardware-based Virtualization - Web Technology - Multitenant Technology - Service Technology.

UNIT III Computing Mechanisms

Infrastructure: Logical Network Perimeter - Virtual Server - Storage Device - Usage Monitor – Resource Replication - Specialized: Automated Scaling Listener - Load Balancer - Monitors - Failover System – Hypervisor- Resource Cluster - Multi-Device Broker - State Management Database - Management: Resource - SLA – Billing- Remote Administration - Security.

UNIT IV Cloud Providers & Software Platforms

Globally available public clouds (Microsoft Azure - Amazon Web Services - Google Cloud Platform): Overview and Comparison - Instances - Images - Networking and Security - Storage - Monitoring and Automation -Introduction to Open-source software: Eucalyptus - Open Nebula - Open Stack - Apache Cloud Stack.

UNIT V Programming Models & Advances

Introduction to Map Reduce - Apache Spark – Tensor Flow – Inter-cloud: Architecture - Resource Provisioning -Billing - Security - Mobile Cloud Computing: Resource Allocation - Security - Business Aspects - Application -Future Scope - Introduction to Edge and Fog Computing.



Text Books

1. Kai Hwang, Geoffrey C. Fox, and Jack J. Dongarra, “Distributed and Cloud Computing from Parallel Processing to the Internet of Things”, Morgan Kaufmann, Elsevier, 2012.

Reference Book

1. Barrie Sosinsky, “Cloud Computing Bible”, John Wiley & Sons, 2010.
2. Tim Mather, Subra Kumara Swamy, Shahed Latif, “Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance”, O’Reilly, 2009.
3. James Turnbull, “The Docker Book: Containerization is the New Virtualization”, E-Book, 2015.

COURSE OBJECTIVES

- To provide an in-depth and comprehensive knowledge of the deployment models in Cloud Computing
- To understand the enabling technologies needed for establishing cloud environment
- To motivate students to do programming and experiment with the various cloud computing environments
- To shed light on the cloud providers and software platforms
- To introduce about different programming models in cloud computing

COURSE OUTCOMES (CO)

- Articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing
- Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud
- Adopt suitable computing mechanisms for establishing a cloud environment
- Provide the appropriate cloud computing solutions and recommendations according to the applications used

Course Outcome (CO)	Aligned programme Outcome
Articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing	PO 1, PO 4, PO 3
Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud	PO 2, PO 3, PO 5
Adopt suitable computing mechanisms for establishing a cloud environment	PO 1, PO 2, PO 4
Provide the appropriate cloud computing solutions and recommendations according to the applications used	PO 2, PO 4, PO 5

COURSE PLAN – PART II

COURSE OVERVIEW

The Cloud Computing course deals with the study of different sub component of computers and their software. The design and development of cloud architecture and application for solving scientific and real-life problems will also be dealt with. Moreover, an introduction to software with emphasis on the various syntactic and semantic constructs will be dealt with.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week	Topic	Mode of Delivery
1.	1	Evolution: Clustering - Grid computing – Virtualization – Basic concepts - Benefits and Risks - Roles and Boundaries - Characteristics	Talk and Online Presentation
2.	2	Basic Deployment models, Networks: ISPs - Connectionless Packet Switching - Router-based Interconnectivity - Technical and Business Considerations	Talk and Online Presentation



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3.	3	Data Center: Standardization and Modularity - Automation - Remote Operation – High Availability - Hardware Virtualization: Hardware Independence	Talk and Online Presentation
4.	4	Server Consolidation - Resource Replication -OS and hardware-based Virtualization - Web Technology - Multitenant Technology - Service Technology	Talk and Online Presentation
5.	5	Cycle test – 1	Online exam and submission
6.	6	Infrastructure: Logical Network Perimeter - Virtual Server - Storage Device - Usage Monitor – Resource Replication - Specialized: Automated Scaling Listener - Load Balancer	Talk and Online Presentation
7.	7	Monitors - Failover System – Hypervisor- Resource Cluster - Multi-Device Broker - State Management Database - Management: Resource - SLA	Talk and Online Presentation
8.	8	Billing- Remote Administration – Security, Globally available public clouds (Microsoft Azure - Amazon Web Services - Google Cloud Platform): Overview and Comparison	Talk and Online Presentation
9.	9	Cycle test – 2	Online exam and submission
10.	10	Instances - Images - Networking and Security - Storage - Monitoring and Automation -Introduction to Open-source software: Eucalyptus – Open Nebula – Open Stack - Apache Cloud Stack	Talk and Online Presentation
11.	11	Introduction to Map Reduce - Apache Spark – Tensor Flow – Inter-cloud: Architecture - Resource Provisioning -Billing - Security - Mobile Cloud Computing: Resource Allocation	Talk and Online Presentation
12.	12	Security - Business Aspects - Application -Future Scope - Introduction to Edge and Fog Computing.	Talk and Online Presentation

The assessment in this course has two components, viz., Theory and Practical. The assessment in Theory component has cycle test and final assessment whose details are given in the below table. The assessment in Theory will be done for a total of 70 marks. The assessment in Practical component has periodical record / observation evaluation and final assessment whose details are given in the below table. The assessment in Practical will be done for a total of 30 marks. The total marks for this course is 100.

COURSE ASSESSMENT METHODS-THEORY

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1.	Cycle Test-1	As per academic rules	1 hour	15%
2.	Cycle Test-2	As per academic rules	1 hour	15%
3.	Assignment – I	1 week	1 week	20%
4.	Assignment – II	1 week	1 week	20%
CPA	Compensation Assessment	---	1 hour	15%
5.	Final semester – Assessment Theory *	As per academic rules	2 hours	30%
THEORY MARKS				100%

*mandatory

COURSE EXIT SURVEY

1. Students' feedback through class committee meetings.
2. Feedback questionnaire from students – from MIS at the end of the semester.

COURSE POLICY

MODE OF CORRESPONDENCE

Mode of Correspondence through internet and online.



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COMPENSATION ASSESSMENT POLICY

- Retest will be conducted if there is any valid reason for the absentees of any one of cycle test and lab test.

ATTENDANCE POLICY

- **At least 75% attendance in each course is mandatory.**
- **A maximum of 10% shall be allowed under On Duty (OD) category.**
- Students with **less than 65% of attendance** shall be prevented from writing the final assessment and **shall be awarded 'V' grade.**

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.
The above policy against academic dishonesty shall be applicable for all the programmers.

ADDITIONAL INFORMATION

The students can get their doubts clarified at any time with their faculty member.

FOR APPROVAL

Course Faculty
(Dr. Sayantan Nath)

CC-Chairperson
(Dr. C. Mala)

HOD
(Dr. Rajeswari Sridhar)