



**B. Tech.  
Semester VII**

**CLOUD COMPUTING**

**CE6002**

**EFFECTIVE FROM  
Syllabus version: 1.00**

Subject Code	Subject Title	Teaching Scheme			
		Hours		Credits	
		Theory	Practical	Theory	Practical
CE6002	Cloud Computing	3	2	3	1

Subject Code	Subject Title	Theory Examination Marks		Practical Examination Marks		Total Marks
		Internal	External	Internal	External	
CE6002	Cloud Computing	40	60	20	30	150

### Objectives of the course:

- To explain the conceptual knowledge of cloud computing technologies and its associated services.
- To demonstrate the various services of the various cloud service providers.
- To analyze the virtualization technologies and platforms to understand the implementation of cloud environment.
- To learn the technologies used to architect the cloud.

### Course outcomes:

Upon completion of the course, the student shall be able to

C01: Identify the basic requirements of cloud computing along with its advantages and drawbacks compare to traditional computing.

C02: Understand the technologies used for data center as well as services for cloud computing.

C03: Demonstrate the working of virtualization and its usage in cloud environment.

C04: Understand various service models and deployment models and architecture of cloud.

C05: Identify the cloud architecture and dynamic service provisioning in cloud.

C06: Understand the basic service level agreements defined for different types of cloud.

Sr. No.	Topics	Hours
<b>Unit – I</b>		
<b>1</b>	<b>Introduction to Cloud Computing:</b> Origin and influences, Basic concepts and terminology, Goals and benefits, Risks and challenges, Fundamental concepts and models: Roles and boundaries, Cloud characteristics.	<b>7</b>
<b>Unit – II</b>		
<b>2</b>	<b>Cloud Enabling Technology:</b> Cloud reference model, Cloud delivery models, Cloud deployment models, Cloud service model, Data centre technologies.	<b>7</b>
<b>Unit – III</b>		

<b>3</b>	<b>Virtualization:</b> Introduction to virtualization, Virtualization opportunities, Approaches to virtualization, Hypervisors, From virtualization to cloud computing.	<b>8</b>
<b>Unit – IV</b>		
<b>4</b>	<b>Cloud Infrastructure Mechanism:</b> Logical network perimeter, Virtual server, Cloud storage device, Cloud usage monitor, Resource replication, Ready-made environment, Automated scaling listener, Load balancer, SLA monitor, Pay-per-use, Monitor, Audit monitor, Failover system, Resource cluster, Multi device broker, State management database.	<b>9</b>
<b>Unit – V</b>		
<b>5</b>	<b>Fundamental Cloud Architectures:</b> Workload distribution architecture, Resource pooling architecture Dynamic scalability architecture, Elastic resource capacity architecture and Elastic disk provisioning architecture, Service load balancing architecture, Cloud busting architecture and Redundant storage architecture, Case study example.	<b>7</b>
<b>Unit – VI</b>		
<b>6</b>	<b>Advanced Cloud Architectures:</b> Hypervisor clustering architecture, Load balanced virtual server instances architecture, non-disruptive service relocation, Zero downtime architecture, Resource reservation architecture, Dynamic failure detection and recovery architecture, Rapid provisioning architecture, Storage workload management architecture.	<b>7</b>

<b>Sr. No.</b>	<b>Cloud Computing (Practical)</b>	<b>Hours</b>
<b>1</b>	Perform a practical to study different hypervisors for windows and Linux machine. Perform a practical to create virtual machine using type-2 hypervisor in windows.	<b>4</b>
<b>2</b>	Perform a practical to create the snapshot of virtual machine. Also, demonstrate the VM cloning and access the virtual machine using SSH and VNC. (Use the virtual machine from practical-1)	<b>4</b>
<b>3</b>	Perform a practical to configure EC2 compute service using AWS and connect to the EC2 instance using RDP.	<b>2</b>
<b>4</b>	Perform a practical to configure S3 service using AWS and configure access policies for the S3 bucket.	<b>4</b>
<b>5</b>	Perform a practical to configure AWS cloud front and elastic beanstalk services in AWS.	<b>2</b>

6	Perform a practical to host sample static and dynamic web pages on Amazon cloud services.	4
7	Perform a practical to configure RDS and Dynamo DB using AWS and perform the query it.	2
8	Perform a practical to configure compute service in Microsoft azure and google cloud platform.	4
9	Perform a practical to create VPC in AWS and demonstrate Amazon elastic beanstalk using any server.	4

#### **Textbooks:**

1. Thomas Erl, Zaigham Mahmood and Ricardo Puttini – “Cloud Computing Concepts, Technology & Architecture”, Prentice Hall.
2. K. Chandrasekaran – “Essentials of Cloud Computing”, CRC Press.

#### **Reference books:**

1. Kailash Jayaswal, JagannathKallkurchi, Donald Houde, Dr.Deven Shah – “Cloud Computing Black Book”, Dreamtech Press.
2. Rajkumar Buyya, James Broberg, Andrzej Goscinski – “Cloud Computing Principles and Paradigms”, Wile Publication.
3. RajKumar Buyya, Christian Vecchiola, S.ThamaraiSelvi – “Mastering Cloud Computing”, McGraw-Hill.

#### **Course objectives and Course outcomes mapping:**

- To explain the conceptual knowledge of cloud computing technologies and its associated services: C01, C02, C05
- To demonstrate the various services of the various cloud service provides: C02, C03.
- To analyze the virtualization technologies and platforms to understand the implementation of cloud environment: C02, C04
- To learn the technologies used to architect the cloud: C01, C02, C03, C04, C05, C06

#### **Course units and Course outcomes mapping:**

Unit No.	Unit Name	Course Outcomes					
		C01	C02	C03	C04	C05	C06
1	Introduction to Cloud Computing	✓					
2	Cloud Enabling Technology		✓				
3	Virtualization			✓			
4	Cloud Infrastructure Mechanism				✓		
5	Fundamental Cloud Architectures					✓	
6	Advanced Cloud Architectures						✓

#### **Programme outcomes:**

- PO 1: Engineering knowledge: An ability to apply knowledge of mathematics, science, and engineering.

- PO 2: Problem analysis: An ability to identify, formulates, and solves engineering problems.
- PO 3: Design/development of solutions: An ability to design a system, component, or process to meet desired needs within realistic constraints.
- PO 4: Conduct investigations of complex problems: An ability to use the techniques, skills, and modern engineering tools necessary for solving engineering problems.
- PO 5: Modern tool usage: The broad education and understanding of new engineering techniques necessary to solve engineering problems.
- PO 6: The engineer and society: Achieve professional success with an understanding and appreciation of ethical behavior, social responsibility, and diversity, both as individuals and in team environments.
- PO 7: Environment and sustainability: Articulate a comprehensive world view that integrates diverse approaches to sustainability.
- PO 8: Ethics: Identify and demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work.
- PO 9: Individual and team work: An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give/receive clear instructions.
- PO 11: Project management and finance: An ability to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO 12: Life-long learning: A recognition of the need for, and an ability to engage in life-long learning.

**Programme outcomes and Course outcomes mapping:**

Programme Outcomes	Course Outcomes					
	C01	C02	C03	C04	C05	C06
P01	✓			✓	✓	✓
P02			✓	✓		✓
P03		✓	✓	✓	✓	✓
P04					✓	✓
P05	✓	✓	✓	✓	✓	✓
P06						
P07		✓			✓	
P08						
P09						
P010						

P011						
P012	✓	✓	✓	✓	✓	✓