


<b>CMR Institute of Technology, Bangalore</b>			
Department(s): Information Science & Engineering			
Semester: 6	Section(s): A,B,C	Lectures/week: 04	
Subject: Cloud Computing and Security		Code: BIS613D	
Course Instructor(s): Dr.Senthil Velan S, Dr.Srividya. R, Prof. Sneha P			
Course duration: January 2026 – May 2026			
Course Site: <a href="https://drive.google.com/drive/folders/1ZXqygCCVBWKWsb1SZXpCysp3vrEHxRC3?usp=sharing">https://drive.google.com/drive/folders/1ZXqygCCVBWKWsb1SZXpCysp3vrEHxRC3?usp=sharing</a>			
Google Classroom Link: <a href="https://classroom.google.com/c/NzQ4NjE0OTQ3MjUy">https://classroom.google.com/c/NzQ4NjE0OTQ3MjUy</a>			

<b>Link to detailed syllabus:</b>	
<b>Course Learning Objectives/ Expectations</b>	<p>CLO 1. Introduce the rationale behind the cloud computing revolution and the business drivers</p> <p>CLO 2. Understand various models, types and challenges of cloud computing</p> <p>CLO 3. Understand the design of cloud native applications, the necessary tools and the design tradeoffs.</p> <p>CLO 4. Realize the importance of Cloud Virtualization, Abstraction`s and Enabling Technologies and cloud security</p>
<b>Prerequisites</b>	<ol style="list-style-type: none"> <li>1. General Knowledge of Computer Operating Systems</li> <li>2. Fundamentals of Computer Networks</li> <li>3. General Awareness of Data Centers</li> </ol>

**NOTE: First one to two sessions should be marked for expectations setting about the course.**

<b>Lesson Plan</b>				
Lecture #	Book & Sections	Topics	Portions coverage	
			Teaching Aids/Course Delivery Methods	% of Syllabus Covered
1-10	Textbook 1: Chapter 1: 1.1 to 1.5	<b>Module – 1 Distributed System Models and Enabling Technologies:</b> Scalable Computing Over the Internet, Technologies for Network Based Systems, System Models for Distributed and Cloud Computing, Software Environments for Distributed Systems and Clouds, Performance, Security and Energy Efficiency.	Chalk & Talk/PPTs  Video Lectures for some topics	20%
<b>Links to some useful online lectures: Videos, assignments, quizzes, answers to old external question papers, notes and other e-material can be included</b> <ul style="list-style-type: none"> <li>➤ <a href="https://www.youtube.com/watch?v=MhdGrZHKJ3o">https://www.youtube.com/watch?v=MhdGrZHKJ3o</a></li> <li>➤ <a href="https://www.youtube.com/watch?v=p1Nr03gtkyU">https://www.youtube.com/watch?v=p1Nr03gtkyU</a></li> </ul>				
11-20	Textbook 1: Chapter 3: 3.1 to 3.5	<b>Module-2 Virtual Machines and Virtualization of Clusters and Data Centers:</b> Implementation Levels of Virtualization, Virtualization Structure/Tools and Mechanisms, Virtualization of CPU/Memory and I/O devices, Virtual Clusters and Resource Management,	Chalk & Talk/PPTs  Video Lectures for some topics	20%

		Virtualization for Data Center Automation.		
<b>Links to some useful online lectures: Videos, assignments, quizzes, answers to old external question papers, notes and other e-material can be included</b>				
<ul style="list-style-type: none"> <li>➤ <a href="https://www.youtube.com/watch?v=n7B4icXvs74">https://www.youtube.com/watch?v=n7B4icXvs74</a></li> <li>➤ <a href="https://www.youtube.com/watch?v=imhH7S6ovzk">https://www.youtube.com/watch?v=imhH7S6ovzk</a></li> </ul>				
21-30	Textbook 1: Chapter 4: 4.1 to 4.5	<b>Module 3</b> <b>Cloud Platform Architecture over Virtualized Datacenters:</b> Cloud Computing and Service Models, Data Center Design and Interconnection Networks, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms: GAE, AWS and Azure, Inter-Cloud Resource Management.	Chalk & Talk/PPTs Video Lectures for some topics	20%
<b>Links to some useful online lectures: Videos, assignments, quizzes, answers to old external question papers, notes and other e-material can be included</b>				
<ul style="list-style-type: none"> <li>➤ <a href="https://www.youtube.com/watch?v=R0WygLgY2nM">https://www.youtube.com/watch?v=R0WygLgY2nM</a></li> <li>➤ <a href="https://www.youtube.com/watch?v=SqvAaB3vK8U">https://www.youtube.com/watch?v=SqvAaB3vK8U</a></li> </ul>				
31-40	Textbook 2: Chapter 11: 11.1 to 11.3, 11.5 to 11.8, 11.10 to 11.14 Textbook 1: Chapter 4: 4.6	<b>Module 4</b> <b>Cloud Security:</b> Top concern for cloud users, Risks, Privacy Impact Assessment, Cloud Data Encryption, Security of Database Services, OS security, VM Security, Security Risks Posed by Shared Images and Management OS, XOAR, A Trusted Hypervisor, Mobile Devices and Cloud Security. <b>Cloud Security and Trust Management:</b> Cloud Security Defense Strategies, Distributed Intrusion/Anomaly Detection, Data and Software Protection Techniques, Reputation-Guided Protection of Data Centers.	Chalk & Talk/PPTs Video Lectures for some topics	
<b>Links to some useful online lectures: Videos, assignments, quizzes, answers to old external question papers, notes and other e-material can be included</b>				
<ul style="list-style-type: none"> <li>➤ <a href="https://www.youtube.com/watch?v=iAe-Wi5K7S4">https://www.youtube.com/watch?v=iAe-Wi5K7S4</a></li> <li>➤ <a href="https://www.youtube.com/watch?v=osz-MT3AxqA">https://www.youtube.com/watch?v=osz-MT3AxqA</a></li> <li>➤ <a href="https://www.youtube.com/watch?v=PW-V-72MJNY&amp;t=2s">https://www.youtube.com/watch?v=PW-V-72MJNY&amp;t=2s</a></li> </ul>				
41-50	Textbook 1: Chapter 6: 6.1 to 6.5	<b>Module 5</b> <b>Cloud Programming and Software Environments:</b> Features of Cloud and Grid Platforms, Parallel and Distributed Computing Paradigms, Programming Support for Google App Engine, Programming on Amazon AWS and Microsoft, Emerging Cloud Software Environments.	Chalk & Talk/PPTs Video Lectures for some topics	20%
<b>Links to some useful online lectures: Videos, assignments, quizzes, answers to old external question papers, notes and other e-material can be included</b>				
<ul style="list-style-type: none"> <li>➤ <a href="https://www.youtube.com/watch?v=y85G7GLYhYA">https://www.youtube.com/watch?v=y85G7GLYhYA</a></li> <li>➤ <a href="https://www.youtube.com/watch?v=LOfGJcVnvAk">https://www.youtube.com/watch?v=LOfGJcVnvAk</a></li> </ul>				

<b>Books</b>	
1.	1. Kai Hwang, Geoffrey C Fox, and Jack J Dongarra, Distributed and Cloud Computing, Morgan Kaufmann, Elsevier 2012 2. Dan C. Marinescu, Cloud Computing Theory and Practice, Morgan Kaufmann, 2nd Edition, Elsevier 2018
<b>Reference Books</b>	
1.	1. Rajkumar Buyya, Christian Vecchiola, and Thamrai Selvi, Mastering Cloud Computing McGrawHill Education, 1st Edition, 2017 2. Toby Velte, Anthony Velte, Cloud Computing: A Practical Approach, McGraw-Hill Education, 2017. 3. George Reese, Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, O'Reilly Publication, 1st Edition, 2009 4. John Rhoton, Cloud Computing Explained: Implementation Handbook for Enterprises, Recursive Press, 2nd Edition, 2009.

### Syllabus for Internal Assessment Tests (IAT\*)

IAT #	Syllabus
IAT-1	Class # 01-25
IAT-2	Class # 26-50

\*See calendar of events for IAT schedule.

### Evaluation: Quiz/Assignment/Seminar/Mini Project/Viva

- *Evaluation of course delivery is based on any one of the above*
- *Evaluation guidelines to be provided to help students understand how the evaluation would be done for assignments, quiz, and so on.*
- *Evaluation tools/methods to be mentioned e.g.: Easy polls, Survey Monkey, Typeform or inbuilt poll option in video conferencing tool.*
- *'Workbook' section includes additional activities to support self-learning e.g. exercises, game-based learning, case-study, and so on.*

Evaluation Method	Remarks
No of Assignments/Quiz or any of the mentioned above given	
Assignment1/Quiz/Others: Assignment 1: sub date:20/03/26 due date 27/03/26 Assignment2/Quiz/Others: Assignment 2: sub date:17/04/26 due date 24/04/26 Quiz 20 M ((duration 01 hours)	
<ul style="list-style-type: none"> <li>➤ Should take up the quiz before the deadline</li> <li>➤ Quiz score will be considered for the assessment</li> </ul>	
<b>Mention the issue date and submission date of all the above</b>	

<i>Evaluation guidelines (please provide the link)</i>	Provided through Google Classroom
<i>Evaluation tools/method</i>	Google forms
<i>Flipped Classroom process for students to understand</i>	Conducted at the end of the semester

<b>Workbook</b> ( <i>Additional activities to support self-learning e.g. exercises, game-based learning, case-study etc.</i> )	
<i>please provide the link to access the work book information</i>	Provided through Google Classroom

<b>Peer Learning</b> ( <i>teacher should list out the opportunities provided to interact with peers,(through discussions &amp; group work).</i> )	
Peer Learning is planned through Google meet	

<b>Discussion Board</b> ( <i>teacher should set up problem-solving forums or discussion boards, and assign students or student teams to monitor and support or direct questions).</i> )	
Discussion forum will be provided through Google Classroom	

<b>Virtual Lab</b> ( <i>for lab subject only</i> ). <i>Provide the details of various tools for learning, including additional web-resources, video-lectures, animated demonstrations and self-evaluation.</i>	
NA	
<i>please provide the link to access the virtual lab information</i>	

<b>Mention the best practices identified as part of teaching this subject</b>
<ol style="list-style-type: none"> <li>1. Demonstrating the real cloud for better understanding the concept.</li> <li>2. Explain the theory concepts practically wherever possible.</li> <li>3. Presentations by the students on selected topics.</li> </ol>

<b>Course Outcomes (COs)</b>
<p>➤ <b>By the end of this course, students will be able to :</b></p> <ol style="list-style-type: none"> <li>1. Describe various cloud computing platforms and service providers.</li> <li>2. Illustrate the significance of various types of virtualization.</li> <li>3. Identify the architecture, delivery models and industrial platforms for cloud computing-based applications.</li> <li>4. Analyze the role of security aspects in cloud computing.</li> <li>5. Demonstrate cloud applications in various fields using suitable cloud platforms.</li> </ol>

### CO-PO and CO-PSO Mapping

Course Outcomes		Blooms Level	Modules covered	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4
CO1	Describe various cloud computing platforms and service providers.	L1, L2, L3	1	2	1	2	1	2	-	-	-	-	-	2	2	2	-	-	2
CO2	Illustrate the significance of various types of virtualization.	L1, L2, L3	2	2	2	2	2	2	-	-	-	-	-	2	2	3	-	-	3
CO3	Identify the architecture, delivery models and industrial platforms for cloud computing based applications.	L1, L2, L3	3	2	1	1	1	1	-	-	-	-	-	2	2	1	-	-	1
CO4	Analyze the role of security aspects in cloud computing.	L1, L2, L3	4	2	1	1	1	1	-	-	-	-	-	2	2	1	-	-	1
CO5	Demonstrate cloud applications in various fields using suitable cloud platforms.	L1, L2, L3	5	2	1	1	1	1	-	-	-	-	-	2	2	1	-	-	1

#### **Identified curriculum gap if any and Justification:**

Identified Gap	Justification
This subject doesn't have the lab to demonstrate the real cloud.	For better understanding of concepts like virtualization, various cloud services, Map Reduce models, cloud deployments, various file systems etc. it's important to demonstrate the things on the cloud.

#### **Proposed Actions to fill the identified gaps:**

The Gap will be addressed by MOOC course and hands on session in the class. The static website will be hosted by the students as a part assessment to understand cloud and cloud services. The real cloud will be shown in the class with real time application. Wherever possible we will implement the code. Student presentations will be planned for the study of various cloud platforms on selected topics.

Installation of virtualization software (Virtual box, Xen etc..) and run applications with different OS and Implement cloud applications using GAE, AWS, Azure/simulate cloud applications using Cloudsim/ Greencloud/ Cloud Analyst.

Course Instructor Signature/s

CCI Signature

HOD