DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE MODULE OF THE SUBJECT - CLOUD COMPUTING

(EVEN SEMESTER)

Course Syllabus with CO's

Academic Year: 2025 – 2026							
Department: Computer Science and Engineering							
Course Code	**Course Title**	**Core/Elective**	**Prerequisite**	**Contact Hours**			**Total Hrs/ Sessions**
				L	**T**	**P**	
BCS601	CLOUD COMPUTING	Core (IPCC)	-	3	0	2	40
Objectives	- Introduce the rationale behind the cloud computing revolution and the business drivers - Understand various models, types and challenges of cloud computing - Understand the design of cloud native applications, the necessary tools and the design tradeoffs. - Realize the importance of Cloud Virtualization, Abstraction`s, Enabling Technologies and cloud security						

Topics to be covered as per the syllabus

Module 1:

Distributed System Models and Enabling Technologies: 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.

Textbook 1: Chapter 1: 1.1 to 1.5

Module 2:

Virtual Machines and Virtualization of Clusters and Data Centers: Implementation Levels of Virtualization, Virtualization Structure/Tools and Mechanisms, Virtualization of CPU/Memory and I/O devices, Virtual Clusters and Resource Management, Virtualization for Data Center Automation.

Textbook 1: Chapter 3: 3.1 to 3.5

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Module 3:
Cloud Platform Architecture over Virtualized Datacenters: 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.
Textbook 1: Chapter 4: 4.1 to 4.5

Module 4:
Cloud Security: 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
Cloud Security and Trust Management: Cloud Security Defense Strategies, Distributed Intrusion/Anomaly Detection, Data and Software Protection Techniques, Reputation-Guided Protection of Data Centers.
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

Module 5:
Cloud Programming and Software Environments: 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.
Textbook 1: Chapter 6: 6.1 to 6.5

Laboratory Components:
1. Creating a Virtual Machine: Configure and deploy a virtual machine with specific CPU and memory requirements in Google Cloud. OR Exploring AWS CloudShell and the AWS Cloud9 IDE
2. Getting Started with Cloud Shell and gcloud: Discover the use of gcloud commands to manage Google Cloud resources from Cloud Shell. OR Working with Amazon S3Orchestrating Serverless Functions with AWS Step Functions
3. Cloud Functions: Create and deploy a Cloud Function to automate a specific task based on a Cloud Storage event. OR Working with Amazon DynamoDB

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4.	App Engine: Deploy a web application on App Engine with automatic scaling enabled. OR Developing REST APIs with Amazon API Gateway
5.	Cloud Storage: Qwikstart: Google Cloud Storage provides scalable and secure object storage for managing data, accessible via the Cloud Console or gsutil CLI. OR Creating Lambda Functions Using the AWS SDK for Python
6.	Cloud SQL for MySQL: Discover how Google Cloud SQL for MySQL provide automated management and high availability for MySQL databases? OR Migrating a Web Application to Docker Containers
7.	Cloud Pub/Sub: Experiment how Google Cloud Pub/Sub facilitate real-time messaging and communication between distributed applications. OR Caching Application Data with ElastiCache, Caching with Amazon CloudFronT, Caching Strategies
8.	Multiple VPC Networks: Explore benefits of using multiple VPC networks in Google Cloud for organizing and isolating resources. OR Implementing CloudFront for Caching and Application Security
9.	Cloud Monitoring: Discover how Cloud Monitoring help in tracking and analyzing the performance and health of cloud resources? OR Orchestrating Serverless Functions with AWS Step Functions
10.	Kubernetes Engine: Qwik Start: Deploy a containerized application to a Kubernetes Engine cluster. OR Automating Application Deployment Using a CI/CD Pipeline

List of Text Books

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

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Course Outcomes	The student will be able to:
	1. Describe various cloud computing platforms and service providers.
	2. Illustrate the significance of various types of virtualization.
	3. Identify the architecture, delivery models and industrial platforms for cloud computing based applications.
	4. Analyze the role of security aspects in cloud computing.
	5. Demonstrate cloud applications in various fields using suitable cloud platforms.

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Course Code: BCS601	Course Title: CLOUD COMPUTING												
List of Course Outcomes	**Program Outcomes**												**Total**
	PO-1	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO-10**	**PO-11**	**PO-12**	
CO-1	2	-	-	-	-	-	-	-	-	-	-	-	**2**
CO-2	2	2	-	-	-	-	-	-	-	-	-	-	**4**
CO-3	2	2	2	-	-	-	-	-	-	-	-	-	**6**
CO-4	2	2	2	-	-	-	-	-	-	-	-	-	**6**
CO-5	3	-	-	2	-	-	-	-	-	-	-	2	**7**
Total	**11**	**6**	**4**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**25**

Note: 3 = Strong Contribution   2 = Average Contribution   1= Weak Contribution   0 = No Contribution

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The Correlation of Course Outcomes (CO's) and Program Outcomes (PSO's)

SubjectCode: BCS601		Course Title: CLOUD COMPUTING	
List of Course Outcomes	**Program Specific Outcomes**		**Total**
	PSO-1	**PSO-2**	
CO-1	3	-	3
CO-2	2	2	4
CO-3	3	-	3
CO-4	3	2	5
CO-5	3	3	6
Total	14	7	21

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