INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

CLOUD APPLICATION DEVELOPMENT								
V Semester: CSE | IT								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
ACSD20	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	0	0	3	40	60	100
Contact Classes: 48	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 48**		
Prerequisites: Computer Networks								

I. COURSE OVERVIEW:

The course provides Overall, the course appears to provide a comprehensive understanding of cloud computing concepts, architectures, major service providers, and practical skills for deploying applications on these platforms. It covers a range of topics from basic concepts to hands-on tutorials for using specific cloud services provided by AWS, Azure, and Google Cloud.

II. COURSES OBJECTIVES:

The students will try to learn:

I	The definition, characteristics, benefits, and challenges of cloud computing. The advanced concepts for developing well-structured and efficient programs that involve complex data structures, numerical computations, or domain-specific operations.
II	The programming model for compute and data-intensive applications in the cloud environment. Learn about key AWS services such as EC2, S3, databases, and Docker.
III	Get hands-on experience with Azure virtual machines, Azure App Service, and Azure storage
IV	Gain knowledge about GCP compute services and Kubernetes Engine (GKE).

III. COURSE OUTCOMES:

At the end of the course, students should be able to:

CO1	Understand the fundamentals of cloud computing and service models.
CO2	Apply and develop scalable applications using cloud-based platforms and tools.
CO3	Integrate cloud storage and databases into applications
CO4	Deploy and manage applications using cloud services (e.g., AWS, Azure, GCP).
CO5	Implement security, authentication, and performance best practices in cloud apps.
CO6	Evaluate and optimize cloud applications for cost and efficiency.

IV. COURSE CONTENT:

MODULE –I: INTRODUCTION AND CLOUD APPLICATION DEVELOPMENT (10)

Introduction: Definition, Characteristics, Benefits, challenges of cloud computing, cloud models: IaaS (infrastructure as service),PaaS(platform as a service),SaaS(software as a service), deployment models- public, private, hybrid, community; Types of cloud computing: Grid computing utility computing, cluster; open source private clouds, SLA; Applications of cloud computing: Healthcare, energy systems, transportation, manufacturing, education, government, mobile communication, application development.

Case Study: Microsoft Azure Fundamentals, Getting Started with Cloud and AZURE, Creating Microsoft Azure Account, AWS Cloud History, AWS Cloud Number Facts, AWS Cloud Use Cases, AWS Global Infrastructure

MODULE –II: CLOUD ARCHITECTURE, PROGRAMMING MODEL (09)

Cloud Architecture, programming model: NIST reference architecture, architectural styles of cloud applications, single, multi, hybrid cloud site, redundant, non-redundant, 3 tier, multi-tier architectures; Programming model: Compute and data intensive.

Case Study: Dockers

MODULE –III: CLOUD RESOURCE VIRTUALIZATION (10)

Cloud resource virtualization: Basics of virtualization, types of virtualization techniques, merits and demerits of virtualization.

Full vs Para - virtualization, virtual machine monitor/hypervisor - virtual machine basics, taxonomy of virtual machines, process vs system virtual machines.

Case Study: Cloud services: Amazon, Google, Azure, online services

MODULE –IV: CLOUD RESOURCE MANAGEMENT AND SCHEDULING (09)

Cloud Resource Management and Scheduling: Policies and mechanisms for resource management, resource

bundling, combinatorial, fair queuing, start time fair queuing, borrowed virtual time, cloud scheduling subject to deadlines, scheduling map reduce applications subject to deadlines, resource management and application scaling.

MODULE –V: CLOUD APPLICATION (10)

Creating GCP - Google Cloud Platform - Account V2, Getting started with Google Compute Engine – GCE, Creating your first Virtual Machine in GCP, Installing HTTP Webserver on Google Compute Engine Virtual Machine, Exploring Compute Engine VM IP Addresses in Google Cloud Platform, Simplifying VM creation in Google Cloud Platform - Instance Templates, Managed Services - IAAS, PAAS and SAAS in GCP, Exploring Google Cloud Platform GCP Compute Services Getting Started with Google Kubernetes Engine GKE.

Case Study: Google Cloud Platform

V. TEXTBOOKS:

1. Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, *Mastering Cloud Computing*, McGraw-Hill, 1st Edition, 2013.
2. Thomas Erl, *Cloud Computing: Concepts, Technology & Architecture*, Pearson, 1st Edition, 2013.
3. Gautam Shroff, *Enterprise Cloud Computing: Technology, Architecture, Applications*, Cambridge University Press, 1st Edition, 2010.

VI. REFERENCE BOOKS:

1. Toby Velte, Anthony Velte, Robert Elsenpeter, *Cloud Computing: A Practical Approach*, McGraw-Hill, 1st Edition, 2009.
2. George Reese, *Cloud Application Architectures: Building Applications and Infrastructure in the Cloud*, O'Reilly Media, 1st Edition, 2009.
3. Barrie Sosinsky, *Cloud Computing Bible*, Wiley, 1st Edition, 2011.

VII. ELECTRONICS RESOURCES:

1. https://www.udemy.com/course/google-cloud-digital-leader-certification/?couponCode=ST8MT40924
2. www.udemy.com/courses/search/?q=microsoft+azure&src=sac&kw=microsoft+Ahttps://www.edx.org/l

VIII. MATERIALS ONLINE:

1. Course template
2. Tutorial question bank
3. Tech talk topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper – I
8. Model question paper – II
9. Lecture notes
10. PowerPoint presentation
11. E-Learning Readiness Videos (ELRV)