Course Code	:	**CSPE56**
Course Title	:	**Cloud Computing**
Number of Credits	:	**3-0-0-3**
Pre-requisites (Course Code)	:	**CSPC43**
Course Type	:	**PE**

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 Contents

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 softwares: Eucalyptus - OpenNebula - OpenStack - Apache CloudStack.

UNIT V Programming Models & Advances
Introduction to MapReduce - Apache Spark - TensorFlow - Intercloud: Architecture - Resource Provisioning - Billing - Security - Mobile Cloud Computing: Resource Allocation - Security - Business Aspects - Application - Future Scope - Introduction to Edge and Fog Computing.

Course Outcomes

Upon completion of this course, the students will be able to:

- 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

Text Book

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.