| Course Code | Course Title | L | T | P | C |
|---|---|---|---|---|---|
| BCSE408L | Cloud Computing | 3 | 0 | 0 | 3 |
| Pre-requisite | NIL | Syllabus version | | | |
| | | 1.0 | | | |

**Course Objectives**

1. To understand the fundamental of cloud computing and the virtual machine
2. To gain knowledge of the various cloud service and deployment models
3. To understand cloud management and cloud security concept

**Course Outcomes**

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

1. Design and develop cloud application and deploy it.
2. Evaluate the various cloud services and deployment models in the infrastructure
3. Apply the various cloud security concepts for application development
4. Design and manage cloud services with cloud simulation and various cloud platforms.
5. Design and develop AI and IoT applications in the cloud environment

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| **Module:1** | **Introduction** | **5 hours** |
| Cloud Computing definition - Evolution of Cloud Computing - Benefits and challenges of cloud computing – Cloud services – Cloud deployment – Cloud architecture –NIST architecture - Business models. | | |
| **Module:2** | **Virtualization** | **6 hours** |
| Introduction to Virtual Machine (VM) - basics of Virtualization - Types of Virtualizations - Desktop Virtualization – Application Virtualization - Server Virtualization - Storage Virtualization- OS level Virtualization –Virtualization for cloud computing – Software-defined data Center (SDDC). | | |
| **Module:3** | **Public Cloud** | **7 hours** |
| Public cloud benefits – Challenges – public cloud services – AWS – compute – storage –network services –Google cloud service (GCP) – compute – storage – network – Cloud AI services – Multitenant - case study. | | |
| **Module:4** | **Private Cloud** | **7 hours** |
| Private cloud benefits – challenges – private cloud services – VM migration – cloud provisioning – managing private cloud - OpenStack architecture – components – OpenStack installation –Google private cloud services - case study. | | |
| **Module:5** | **Cloud Management & Security** | **6 hours** |
| Data center –cloud management – resource management - automation –benefits of automation - Infrastructure security – network security – host level security. | | |
| **Module:6** | **Security Principles** | **6 hours** |
| Cloud security overview – CIA triads - Threats – risk management - computer security incident response team (CSIRT)–cloud security design principles - cloud security standards: privacy, confidentiality, and integrity –cloud security policy – service level agreement (SLA) | | |
| **Module:7** | **Cloud Application development** | **6hours** |
| Tools for cloud development – simulators – cloudsim - develop an application and deploy in public cloud services – deploy AI application in the cloud – IoT cloud services – cloud security services. | | |
| **Module:8** | **Recent Trends** | **2 hours** |

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| Guest lectures from Industry and, Research and Development Organizations | | |
| | **Total Lecture hours:** | **45 hours** |
| **Text Book(s)** | | |
| 1. | Hemanand D, Chembian W T, VallemRanadheer Reddy, Cloud Computing: Cloud Concepts; Methodology, Network Architecture, 2021. | |
| **Reference Books** | | |
| 1.<br>2.<br>3. | Stephen Baron, AWS: The Complete Beginner's Guide to Mastering Amazon Web Services, 2020.<br>Shaun Hummel, Cloud Computing: Architecture Fundamentals for Cloud Systems, 2017.<br>Chris Dotson, Practical Cloud Security: A Guide for Secure Design and Deployment, 2019 | |
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| Mode of Evaluation: CAT / written assignment / Quiz / FAT | | |
| Recommended by Board of Studies | 12-05-2023 | |
| Approved by Academic Council | No. 70 | Date 24-06-2023 |