

Course Title : Cloud Computing

Course Code : 314261)

Credit Hours : 3

Prerequisites : Basic Networking, Operating Systems

Dr.Mohammed Tawfik**Course Description**

This course introduces the principles, architectures, and technologies of cloud computing. Topics include cloud service models (IaaS, PaaS, SaaS), deployment models (public, private, hybrid), virtualization, resource management, security, and real-world cloud platforms (AWS, Azure, OpenStack).

Course Objectives

1. Understand the fundamentals of cloud computing and its role in modern IT infrastructure.
2. Analyze cloud service models (IaaS, PaaS, SaaS) and deployment strategies.
3. Design and deploy applications on cloud platforms.
4. Evaluate security, scalability, and cost-efficiency challenges in cloud environments.

Learning Outcomes (CLOs)**Course Content****Week 1-2: Introduction to Cloud Computing**

- Definition, history, and evolution of cloud computing.
- Key concepts: On-demand self-service, resource pooling, elasticity.
- Case Study: Salesforce, AWS, Azure.

Week 3-4: Cloud Service Models

- IaaS (AWS EC2, S3), PaaS (Google App Engine), SaaS (Salesforce).
- Comparison of service models and use cases.

Week 5-6: Virtualization in Cloud

- Hypervisors (Type 1/Type 2), virtualization levels (hardware, OS, application).
- Tools: VMware, KVM, Docker.

Week 7-8: Cloud Deployment Models

- Public, private, hybrid, and community clouds.
- Case Study: OpenStack (private cloud), AWS (public cloud).

Week 9-10: Cloud Security

- Data privacy, encryption, vendor lock-in, and multi-tenancy isolation.
- Tools: AWS IAM, Azure Security Center.

Week 11-12: Cloud Resource Management

- Autoscaling, load balancing, and energy-efficient resource allocation.
- Tools: AWS Auto Scaling, Kubernetes.

Week 13-14: Real-World Cloud Platforms

- AWS, Azure, Google Cloud: Services, pricing, and best practices.
- Hands-on labs: Deploying a web app on AWS Elastic Beanstalk.

Week 15: Final Project

- Design a cloud-based solution for a real-world problem (e.g., e-commerce, IoT).

Assessment Methods

- Quizzes : 10%
- Assignments/Labs : 15%
- Midterm Exam : 30%
- Final Project : 5%
- Final Exam : 40%

Textbooks

1. "Cloud Computing: Concepts, Technology & Architecture" by Thomas Erl et al.
2. "Distributed and Cloud Computing" by Kai Hwang et al.

References

- NIST Cloud Computing Standards Roadmap.
- AWS/Azure/Google Cloud Documentation.