

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING (AIML)

Syllabus

Semester: VI

Year: 2025-2026

Course Title	DevOps & Cloud Engineering Fundamentals	Course Code	ACS601
Total Teaching Hours	30	Teaching + Tutorial Hours/Week	3
Internal Assessment Marks	05		

Course Learning Objectives: This course will enable students to

1. To introduce the fundamental concepts, principles, and workflow of DevOps including DevOps pipeline and its components.
2. To understand and implement Continuous Integration and Continuous Delivery/Deployment (CI/CD) practices using modern tools.
3. To explain containerization concepts using Docker and orchestration using Kubernetes..
4. To provide foundational knowledge of Cloud Computing, AWS/Azure services, and cloud architecture with security essentials.

Course Content (Syllabus)

MODULE-1 Introduction to DevOps – DevOps, DevOps Workflow, DevOps Principles, Architecture, Orchestration, Applications, Tools, DevOps Pipeline, Components of a DevOps Pipeline, Phases of DevOps Pipeline.	10 Hrs
MODULE-2 CI/CD: Introduction to Continuous Integration, Continuous Delivery and Deployment, Benefits of CI/CD, Metrics to track CI/CD practices Containerization using Docker: Docker, Architecture, Components, Docker Compose, Docker Advantages	10Hrs
MODULE-3 Introduction to Kubernetes (K8s): Kubernetes, features of K8s, Monolithic Vs Microservices Architecture, Terminologies in K8s. Cloud Fundamentals: Cloud Computing ,AWS/Azure overview, Cloud Security Essentials, Core AWS Services, AWS Advanced Services, Cloud Architecture	10Hrs

Prerequisites:

Full-Stack Development Basics
Infrastructure & Networking Fundamentals

Course Outcomes:

CO1: Explain DevOps principles, workflow, architecture, and DevOps pipeline phases.

CO2: Apply CI/CD practices and containerization using Docker for application deployment.

CO3: Demonstrate the use of Kubernetes for container orchestration and differentiate monolithic and microservices architectures.

CO4: Illustrate cloud computing concepts and identify core and advanced AWS/Azure services with security considerations.

TEXT BOOKS:

1. Fundamentals of DevOps and Software Delivery – Yevgeniy Brikman (O'Reilly)
Covers DevOps principles, CI/CD, deployment strategies, and cloud integration with practical examples.

REFERENCE BOOKS:

1. Mastering Continuous Integration and Deployment with Jenkins and Docker on AWS (DevOpsstrategy) Focused practical guide on building CI/CD pipelines with popular tools (Jenkins, Docker, AWS).
2. Learning DevOps – Mikael Krief (Packt Publishing) Detailed exploration of DevOps culture, CI/CD practices, and Infrastructure-as-Code topics