CLOUD AND DEVOPS

III B.TECH - I SEMESTER

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
A6IT13	PCC	3	0	0	3	40	60	100

COURSE OBJECTIVES:

1. To understand the fundamentals of cloud computing, including its benefits and different service models.
2. To understand the different Version control tools like Git,
3. To understand the concepts of Continuous Integration/ Continuous Testing/ Continuous Deployment)
4. To understand Configuration management using Ansible
5. Illustrate the benefits and drive the adoption of cloud-based Devops tools to solve real world problems

COURSE OUTCOMES:

At the end of the course, student will be able to:

1. Implement and manage core cloud services like IAM, EC2, S3, VPC, and RDS effectively.
2. Understand different actions performed through Version control tools like Git.
3. Perform Continuous Integration and Continuous Testing and Continuous Deployment using Jenkins by building and automating test cases using Maven & Gradle.
4. Ability to Perform Automated Continuous Deployment and to do configuration management using Ansible.
5. Build, test, and deploy a simple sample application through the CI/CD pipeline, demonstrating automation and efficiency in software delivery.

UNIT - I	CLOUD COMPUTING INTRODUCTION	CLASSES: 10

Cloud Computing, Why Cloud Computing, Advantages of Cloud Computing, Virtualization, cloud service models, Cloud deployment models, Public clouds: Amazon Web Services, Microsoft Azure, and Google Cloud Services.

AWS Cloud services: IAM Roles, and Policies, EC2, S3, VPC, RDS

UNIT - II	DEVOPS INTRODUCTION	CLASSES: 10

DevOps definition, History of DevOps, DevOps Roles, DevOps Need, DevOps Problems & Solution, DevOps Main Objectives, DevOps: Continuous Delivery and Benefits, DevOps and Software Development Life Cycle: Waterfall Model, Agile Model, DevOps on Cloud.

Version control systems: Git and Github

GIT Features, 3-Tier Architecture, GIT – Clone /Commit / Push, GIT Hub Projects, GIT Hub Management, GIT Rebase & Merge, GIT Stash, Reset, Checkout, GIT Clone, Fetch, Pull.

UNIT - III	COMPILE, BUILD & CONTINUOUS INTEGRATION	CLASSES: 12

Introduction, Installation of Maven, POM files, Maven Build lifecycle, Build phases(compile build, test, package) Maven Profiles, Maven repositories(local, central, global),Maven plugins, Maven create and build Artifacts, Dependency management, Installation of Gradle, Understand build using Gradle

CONTINUOUS INTEGRATION/CONTINUOUS DELIVERY USING JENKINS

Definition of Jenkins, Install & Configure Jenkins, Jenkins Architecture Overview, Creating a Jenkins Job, Configuring a Jenkins job, Introduction to Plugins, Commonly used plugins (Git Plugin,). Jenkins Build Pipe Line.

UNIT - IV	CONFIGURATION MANAGEMENT AND CONTAINERIZATION	CLASSES: 10

Containerization: Docker, What is Docker Image, Docker Installation, Working with Docker Containers, Container, Docker Engine, Crating Containers with an Image, Working with Images, Docker Command Line Interface, Docker Compose, Docker Hub, Docker Trusted Registry, Docker swarm, Docker attach, Docker File & Commands.

Configuration: Ansible Introduction, Installation, Ansible master/slave configuration, YAML basics, Ansible modules, Ansible Inventory files, Ansible playbooks, Ansible Roles.

UNIT - V	BUILDING DEVOPS PIPELINES USING AWS	CLASSES: 08

Create Github Account, Repository, Create AWS Organization, Create a new pipeline, Build a sample code, Modify AWS-pipelines.

TEXT BOOKS

1. Stephen Baron, “AWS: The Complete Beginner's Guide”, 2020
2. "The DevOps Adoption Playbook: A Guide to Adopting DevOps in a Multi-Speed IT Enterprise" by Sanjeev Sharma
3. “DevOps. Building CI/CD Pipelines with Jenkins, Docker Container, AWS ECS, JDK 11, Git and Maven by John Edward Cooper Berg

REFERENCE BOOKS

1. Hands-On Azure Devops: Cicd Implementation For Mobile, Hybrid, And Web Applications Using Azure Devops And Microsoft Azure: CICD Implementation for ... DevOps and Microsoft Azure (English Edition) Paperback – 1 January 20202. by Mitesh Soni
2. Jeff Geerling, “Ansible for DevOps: Server and configuration management for humans”, First Edition, 2015.
3. David Johnson, “Ansible for DevOps: Everything You Need to Know to Use Ansible for DevOps”, Second Edition, 2016.
4. Mariot Tsitoara, “Ansible 6. Beginning Git and GitHub: A Comprehensive Guide to Version Control, Project Management, and Teamwork for the New Developer”, Second Edition, 2019.
5. https://www.jenkins.io/user-handbook.pdf
6. https://maven.apache.org/guides/getting-started/
7. "Cloud Computing: From Beginning to End" by Ray J. Rafaels
8. Douglas E. Comer , “The Cloud Computing Book”, Edition: 1st, 2023.