DEVOPS

Course	B.Tech.-VI-Sem.	L	T	P	C
Course Code	22CSPC63	3	-	-	3

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO2	PO3	PO6	PO12	PSO1
CO1	explain DevOps fundamentals and version control concepts	3	3	3	3	3
CO2	summarize DevOps architecture	3	3	3	3	3
CO3	articulate source code control in system building	3	2	3	3	3
CO4	develop containerization and orchestration	3	3	3	3	3
CO5	plan monitoring, operations and testing for DevOps	3	2	3	3	3

Syllabus

Unit	Title/Topics	Hours
I	**Introduction to DevOps and Version Control**	8
Fundamentals of DevOps: What is DevOps?, DevOps principles, DevOps lifecycle, DevOps delivery pipeline, DevOps ecosystem and tools. The Agile wheel of wheels. **Version Control with Git:** Introduction to version control, Basics of Git, Installing and configuring Git, Common Git commands, Branching and merging strategies, Working with remote repositories.		
II	**DevOps influence on Architecture**	7
Introducing software architecture, The monolithic scenario, Architecture rules of thumb, The separation of concerns, Handling database migrations, Micro-services, and the data tier, DevOps, architecture, and resilience.		
III	**DevOps Integration with Jenkins and Ansible**	6+6=12
Part-A: Continuous Integration with Jenkins: Introduction to Continuous Integration (CI), using Maven for build, Jenkins architecture and setup, Managing Jenkins plugins and nodes, Building and deploying applications using Jenkins, Creating and managing Jenkins pipelines, Pipeline as code with Jenkins.		
Part-B: Configuration Management with Ansible: Introduction to Ansible, Ansible architecture and installation, Inventory management, Ad-hoc commands and playbooks, Roles and modules in Ansible, Writing and managing Ansible playbooks, Integrating Ansible with other tools.		
IV	**Containerization with Docker**	8
Containerization with Docker: Introduction to Docker, Docker installation and setup, Working with Docker images and containers Dockerfile and image creation, Docker compose and Docker Swarm. **Orchestration with Kubernetes:** Introduction to Kubernetes, Kubernetes architecture and components, Setting up a Kubernetes cluster, Managing pods, deployments, and services.		
V	**Monitoring, Operations and Testing Tools**	7
Prometheus: Introduction, Why learn Prometheus, Infrastructure Monitoring, Alerting and Alert Receivers. Grafana: Introduction, Creating Grafana Dashboards, Grafana API and Auto Healing Testing: Selenium features, Testing backend integration points, Test-driven Development, REPL-driven Development.		
Textbooks		
1. Joakim Verona. Practical DevOps, Ingram short title, 2nd Edition, 2018, ISBN-10: 1788392574.		
References		
1. Len Bass, Ingo Weber, Liming Zhu. DevOps: A Software Architect's Perspective. Addison Wesley; ISBN-10. 2. Deepak Gaikwad, Viral Thakkar. DevOps Tools from Practitioner's Viewpoint. Wiley publications. ISBN: 9788126579952.		