COURSE CONTENT

DEVOPS

VII Semester: CE / CSD / CSE / CSM / ECE / EEE / ME

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
2470519	PC	2	0	0	2	40	60	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes: 45		

Prerequisites: **Software Engineering.**

Course Overview:

This course introduces DevOps concepts, practices, and tools used in modern software development. It focuses on automation, continuous integration, testing, and deployment. Students will learn tools like Git, Jenkins, Docker, and Kubernetes to build efficient delivery pipelines. The course helps in understanding DevOps workflows, architecture, and real-world implementation.

Course Objectives:

1. To understand the fundamentals and importance of DevOps in modern software development.
2. To learn various DevOps tools for version control, build, testing, and deployment automation.
3. To study DevOps lifecycle, architecture, and continuous integration and delivery pipelines.
4. To apply project management practices and automation in real-world software projects.
5. To gain knowledge of testing, deployment strategies, and infrastructure automation tools.

Course Outcomes: After Completion of the Course, Students should be able to

1. Identify components of Devops environment.
2. Describe Software development models and architectures of DevOps.
3. Apply different project management, integration, testing and code deployment tool.
4. Investigate different DevOps Software development models.
5. Assess various Devops practices.

UNIT - I: Introduction: DevOps, and ITIL. Agile development model DevOps process and Continuous Delivery, Tools overview: Git, Jenkins, Docker, Kubernetes, Terraform, Prometheus, Scrum, Kanban.

UNIT - II: Models and DevOps Architecture: DevOps Lifecycle, DevOps, and Continuous Testing. DevOps influence on Architecture: Introducing software architecture, Remote workflows: GitHub/GitLab/Bitbucket, The separation of concerns, Handling database migrations, DevOps, architecture, and resilience.

UNIT - III: project management: The history of source code management, Roles and code, DevOps adoption in projects: Technology aspects, Agiling capabilities, Tool stack implementation, People aspect, processes. Shared authentication, Hosted Git servers, Different Git server implementations, Docker intermission.

UNIT - IV: Integrating the Build system: Build systems, Jenkins build server, managing build dependencies, Jenkins plugins, and file system layout, the host server, Build slaves, Software on the host, Triggers, Job chaining and build pipelines, Build servers and infrastructure as code, Building by dependency order, Build phases, Alternative build servers.

UNIT - V: Testing Tools and Deployment Tools: Various types of testing, Automation of testing Pros and cons, Selenium - Introduction, Selenium features, JavaScript testing, testing backend integration points, Test-driven development, REPL-driven development Deployment of the system: Deployment systems, Virtualization stacks, code execution at the client, Puppet master and agents, Ansible, Deployment tools: Chef, Salt Stack and Docker.

TEXT BOOKS:

1. Joakim Verona. Practical Devops, Second Edition. Ingram short title; 2nd edition (2018). ISBN10: 1788392574

2. Deepak Gaikwad, Viral Thakkar. DevOps Tools from Practitioner's Viewpoint. Wiley publications. ISBN: 9788126579952

REFERENCE BOOKS:

1. Len Bass, Ingo Weber, Liming Zhu. DevOps: A Software Architect's Perspective. Addison Wesley; ISBN-10.

ELECTRONIC RESOURCES:

1. https://www.atlassian.com/devops – DevOps concepts, practices, and tools overview.
2. https://www.jenkins.io/doc – Official Jenkins documentation and tutorials.
3. https://docs.docker.com – Docker official documentation and guides.
4. https://kubernetes.io/docs – Kubernetes official documentation and learning resources

MATERIALS ONLINE:

1. Course template
2. Tutorial question bank
3. Tech talk and Concept Video topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper – I
8. Model question paper – II
9. Lecture notes
10. E-Learning Readiness Videos (ELRV)