PVP 20

PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY

(Autonomous)

Kanuru, Vijayawada-520007

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (AI&ML)

IV B.Tech I Semester

DEV OPS

Course Code	**20M4703A**	**Year**	IV	**Semester**	I
Course Category	PEC	**Branch**	CSE (AI&ML)	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Software Engineering
Continuous Internal Evaluation	30	**Semester End Evaluation**	70	**Total Marks**	100

Course Outcomes		
Upon Successful completion of course, the student will be able to		
CO1	Describe DevOps concepts, lifecycle, and tools to understand modern software development and delivery.	**L2**
CO2	Apply Git, SonarQube, and Jenkins to implement version control, ensure code quality, and achieve continuous integration in real-world projects.	**L3**
CO3	Apply Docker, Selenium, Ansible, and Kubernetes/OpenShift to streamline software delivery and deployment workflows.	**L3**
CO4	Analyze CI/CD, testing, configuration, and container orchestration to improve efficiency, reliability, and automation in DevOps workflows using relevant tools.	**L4**

Contribution of course outcomes towards achievement of program outcomes & Strength of correlations (3: Substantial,2: Moderate,1: Slight)

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**P010**	**PO11**	**PSO1**	**PSO2**
CO1	**2**												
CO2	**3**												
CO3	**3**											**2**	
CO4		**3**									**2**		

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Syllabus		
Unit No	**Contents**	Mapped CO
I	**Introduction to DevOps**: Introduction to SDLC, Agile Model. Introduction to DevOps. DevOps Features, DevOps Architecture, DevOps Lifecycle, Understanding Workflow and principles, Introduction to DevOps tools, Build Automation, Delivery Automation, Understanding Code Quality, Automation of CI/ CD. Release management, Scrum, Kanban, delivery pipeline, bottlenecks, examples	CO1
II	**Source Code Management (GIT)**: The need for source code control, The history of source code management, Roles and code, source code management system and migrations. What is Version Control and GIT, GIT Installation, GIT features, GIT workflow, working with remote repository, GIT commands, GIT branching, GIT staging and collaboration. **Unit testing-code coverage:** Junit, n Unit& Code Coverage with Sonar Qube, SonarQube - Code Quality Analysis.	CO1, CO2
III	**Build Automation - Continuous Integration (CI)**: Build Automation, what is CI Why Cl is Required, CI tools, Introduction to Jenkins (With Architecture), Jenkins workflow, Jenkins master slave architecture, Jenkins Pipelines. pipeline basics - Jenkins Master, Node, Agent, and Executor Freestyle Projects& Pipelines, Jenkins for Continuous Integration, Create and Manage Builds, User Management in Jenkins Schedule Builds, Launch Builds on Slave Nodes.	CO1, CO2, CO4
IV	**Continuous Delivery:** Importance of Continuous Delivery, continuous deployment CD Flow, **Containerization with Docker:** Introduction to Docker, Docker installation, Docker commands, Images & Containers, Docker File, running containers, working with containers and publish to Docker Hub. **Testing Tools:** Introduction to Selenium and its features, Java Script testing.	CO1, CO3, CO4
V	**Configuration Management - ANSIBLE**: Introduction to Ansible, Ansible tasks Roles, Jinja2 templating, Vaults, Deployments using Ansible. **Containerization using Kubernetes (OpenShift):** Introduction to Kubernetes Namespace & Resources, CI/CD - On OCP, BC, DC & ConfigMaps, Deploying Apps on OpenShift Container Pods. Introduction to Puppet master and Chef.	CO1, CO3, CO4

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Learning Resources
Text Books
1. Devops for Beginners: Devops Software Development Method Guide for Software Developers and It Professionals, Joyner, Joseph. 1st Edition ,2015, Mihails Konoplows 2. Hands-on DevOps with Linux, Alisson Machado de Menezes.1st Edition, 2021, BPB Publications, India
References
1. DevOps: A Software Architect's Perspective, Len Bass, Ingo Weber, Liming Zhu, 1st Edition, 2015, Addison-Wesley. 2. The DevOps Handbook, Gene Kim, Jez Humble, Patrick Debois, John Willis, 1st Edition, 2016, IT Revolution Press. 3. Practical DevOps, Joakim Verona, 1st Edition, 2016, Packt Publishing. 4. Practical DevOps, Joakim Verona, 2nd Edition, 2018, Packt Publishing. 5. DevOps Tools from Practitioner's Viewpoint, Deepak Gaikwad, Viral Thakkar, 1st Edition, 2018, Wiley Publications.
E-Recourses and other Digital Material
1. https://elearn.nptel.ac.in/shop/completed-courses/short-term-programs-completed/cicd-devops-automation-and-devsecops-automation/?utm_source=chatgpt.com&v=c86ee0d9d7ed 2. https://elearn.nptel.ac.in/shop/completed-courses/short-term-programs-completed/azure-devops-and-micro-services-azure-kubernetes-deployment-models/ 3. https://www.coursera.org/specializations/packt-devops-complete-course