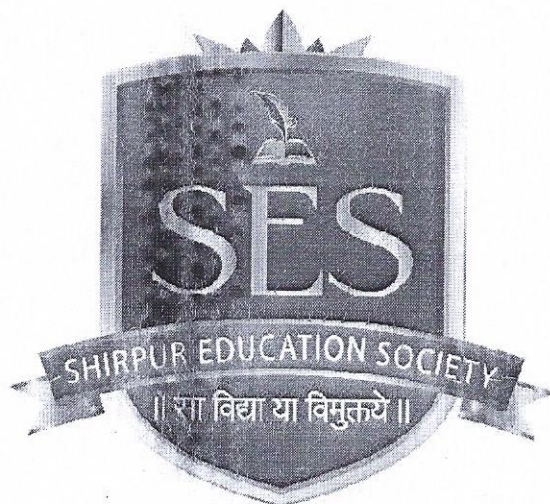




Shirpur Education Society's

R. C. Patel Institute of Technology, Shirpur
(An Autonomous Institute)

Course Structure and Syllabus

Honors Program
in
DevOps (Development and Operations)
Information Technology

With effect from Year 2026-27



Shahada Road, Near Nimzari Naka, Shirpur, Maharashtra 425405
Ph: 02563 259 802, Web: www.rcpit.ac.in

Honors Program in DevOps (Development and Operations) offered by Information Technology (w.e.f. 2026-27)														
Sr. No.	Course Category	Course Code	Course Title	Teaching Scheme			Evaluation Scheme					Total	Credit	
				L	T	P	Continuous Assessment (CA)				ESE			
							TA	Term Test 1 (TT1)	Term Test 2 (TT2)	Average of (TT1 & TT2)				
							[A]			[B]	[C]	[A+B+C]		
Sem-V														
1	H1	RCP23IH1301	DevOps	3			25	15	15	15	60	100	3	4
2	H1	RCP23IH1301L	DevOps Laboratory			2	25				25	50	1	
Total				3		2	50			15	85	150	4	

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Prof. S. P. Shukla

C.O.E.

Prof. Dr. P. J. Deore

Dean Academics & Dy. Director

Prof. Dr. J. B. Patil

Director

Semester - V



Program: Information Technology	T.Y. B.Tech.	Semester: V
DevOps (RCP23IH1301)		
DevOps Laboratory (RCP23IH1301L)		

Prerequisite:

1. Knowledge of Linux Operating system, installation and configuration of services and command line basics.
2. Basics of Computer Networks and Software
3. Software Development Life cycle.

Course Objective(s): The objective of this course is to understand the fundamentals of DevOps engineering and be fully proficient with DevOps terminologies, concepts, benefits, and deployment options to meet real world software development requirements.

Course Outcomes:

COs	Course Outcomes	Blooms Level	Blooms Description
CO1	Apply DevOps principles to meet software development requirements.	L3	Apply



DevOps (RCP23IH1301)

Course Contents



Unit-I Introduction to DevOps

06 Hrs.

Introduction, History of DevOps, DevOps Stakeholders, Goals, Important terminologies, DevOps Vs Agile, DevOps Tools, DevOps Lifecycle, Challenges with DevOps Implementation, Minimum Viable Product (MVP) Cross-functional Teams. Case studies: Traditional software development approaches and DevOps culture.

Unit-II Version Control

08 Hrs.

Introduction, Overview of Version Control Systems, Role of Version Control System, Types of Control Systems and their Supporting Tools **Database Version Control**: Introduction, Need of database version control, Methods of database version control, Challenges and benefits of Database version control, Database version control tools **Security and Access Control in VCS**: Role-based access. Audit trails and commit signing

Unit-III Continuous Integration

08 Hrs.

Introduction, Definition and Purpose of CI/CD, Key Benefits and Challenges of CI, Development without CI vs. Development with CI, Tools for CI process, Introduction to Jenkins, Key features of Jenkins, Architecture of Jenkins, Jenkins in Agile and DevOps environments, Continuous Integration with Jenkins, Use Cases for Distributed Builds in Jenkins, Coding Standards and Best Practices in CI: Importance of coding standards, Code quality tools, Coding Standards and Best Practices in CI

Unit-IV Continuous Deployment

08 Hrs.

Introduction, Need of CD, Features and Benefits of continuous deployment, , Process of Continuous Deployment, Deployment Patterns, Continuous deployment tools, Continuous deployment vs. continuous delivery, Overview of Docker, Docker vs Virtual Machines, Architecture, Docker Containers, Docker Workflow, Anatomy of Docker Image, Role of Docker in the CI/CD Pipeline, Advantages of Docker, CD in monoliths vs. microservices, CD in legacy applications. Case studies: Netflix, Amazon, Google

Unit-V Continuous Testing

06 Hrs.

Introduction, Continuous Testing vs. Traditional Testing, the role of continuous testing in DevOps, Types of Continuous Testing, Best Practices and Challenges in Continuous Testing, Steps to implement a continuous testing strategy into DevOps pipeline, Tools for Continuous Testing Introduction to Selenium, Selenium Tool Suite, Selenium IDE, Selenium RC, Selenium WebDriver, Architecture of Selenium Webdriver, Differences between Selenium 2 and Selenium 3, Page Object Model (POM)

Unit-VI Continuous Management

06 Hrs.

Introduction, Key Aspects of Continuous Management, Benefits of Continuous Management in DevOps, Overview of Infrastructure as a code, Benefits of Infrastructure as Code, The Four Key Metrics, Three Core Practices for Infrastructure as Code, The Parts of an Infrastructure System, Infrastructure Platforms, Infrastructure Resources, Compute Resources, Storage Resources, Network Resources Puppet Architecture, The Puppet Server, Performance Optimizations, Ansible: Ansible Architecture, Ansible and Infrastructure Management, Local Infrastructure Development: Ansible and Vagrant.

DevOps Laboratory (RCP23IH1301L)

List of Laboratory Experiments

Suggested Experiments:(Any 10)

1. To understand Version Control System / Source Code Management, install git and create a GitHub account.
2. To Perform various GIT operations on local and Remote repositories using GIT Cheat-Sheet.
3. To set up a CI pipeline using GitHub.
4. To integrate Git version control with project management tool (e.g. JIRA) to manage software development tasks.
5. To study deployment patterns on cloud, on premise and DevOps.
6. To implement team workflow using Git, GitHub, Jira where each team member has a specific role.
7. To understand Continuous Integration, install and configure Jenkins to setup a build Job.
8. To Setup and Run Selenium Tests in Jenkins.
9. To understand Docker Architecture and Container Life Cycle, install Docker and execute docker commands to manage images and interact with containers.
10. To learn Dockerfile instructions, build an image for a sample web application using Dockerfile.
ndenumerate Any other experiment based on syllabus may be included which would help the learner to understand topic/concept.



Practical examination will be based on the entire syllabus including, the practicals performed during laboratory sessions.

Text Books:

1. Iuliana Cosmina, Rob Harrop, Chris Schaefer and Clarence Ho, *An In-Depth Guide to the Spring Framework and Its Tools*, 5th Edition, Apress, 2017.
2. Roger S. Pressman, *Software Engineering: A Practitioner's Approach*, 8th Edition, McGraw-Hill, 2015.
3. Ian Sommerville, *Software Engineering*, 9th Edition, Pearson Education, 2011.
4. Clement Escoffier and Ken Finnigan, *Reactive Systems in Java: Resilient, Event-Driven Architecture with Quarkus*, 1st Edition, O'Reilly Media, 2021.
5. Craig Walls, *Spring Boot in Action*, 6th Edition, Manning, 2016.
6. Robert C. Martin, *Clean Code: A Handbook of Agile Software Craftsmanship*, 1st Edition, Pearson Education, 2008.

Reference Books:

1. Ashish Sarin and J. Sharma, *Getting Started with Spring Framework*, 2nd Edition, CreateSpace, 2012.
2. Rod Johnson et al., *Professional Java Development with the Spring Framework*, John Wiley & Sons, 2000.

