CVM UNIVERSITY
Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2020-21

Programme: **Bachelor of Engineering (Information Technology)**

Semester: **VII**

Course Code: **102047801**

Course Title: **Advanced Software Engineering**

Course Group : **Professional Elective Course - III**

Course Objectives: Objective of Advance Software Engineering course is to promote understanding of advance concepts of software development through DevOps and related technologies. Advance software Engineering concepts provides stable and scalable infrastructure for Software development and Operations, which brings in scaling techniques, support to flexible development, integration using DevOps technologies.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		Total
Lecture	Tutorial	Practical		Internal	External	Internal	External	
03	0	02	04	40/14	60/21	20/07	30/10	152/52

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	**DevOps Concepts and Assessment Framework:** Need for DevOps, Agile development, DevOps-Build automation, Continuous integration Cloud provisioning, Configuration management, Continuous delivery, Continuous testing and deployment, Continuous monitoring, Importance of PPT - people, process, and technology.	06
2	**Continuous Integration:** Installing Jenkins 2, Global Tool Configuration in Jenkins, Creating and configuring build automation tool like maven web applications, Unit test case results in Jenkins, Master agent architecture in Jenkins, Integrating Jenkins and SonarQube, E-mail notifications in Jenkins Continuous integration using Visual Studio Team Services, Eclipse and VSTS integration, VScode continuous integration in VSTS.	07
3	**Containers:** Overview of Docker containers, Understanding the difference between virtual machines and containers, Installing, and configuring Docker, Creating a Tomcat container.	04

4	**Cloud Computing and Configuration Management:** Installing and configuring a Chef workstation, converging a Chef node using a Chef workstation, Installing software packages using cookbooks, Creating a role, Installing knife plugins for Amazon Web Services and Microsoft Azure, Creating and configuring a virtual machine in Amazon EC2, Creating and configuring a virtual machine in Microsoft Azure.	**06**
5	**Continuous Delivery:** Continuous delivery in Docker container using Jenkins Plugin, Continuous Delivery in AWS EC2 and Microsoft Azure VM using Script, Continuous delivery in AWS Elastic Beanstalk using Jenkins Plugin, Continuous delivery in Microsoft Azure App Services Using FTP, Continuous delivery in Microsoft Azure App Services Using VSTS.	**06**
6	**Automated Testing: Functional and Load Testing:** Functional testing using Selenium, Functional test execution in Jenkin, Load test execution using Jenkins, Load testing using a URL-based test and Apache JMeter for Microsoft Azure, URL-based test, Apache JMeter.	**06**
7	**Security and Monitoring:** Security in Jenkins and VSTS, User management in Jenkins, User management in VSTS, Monitoring Jenkins and Microsoft Azure, Monitoring Jenkins, Azure Web Apps troubleshooting and monitoring, Azure web application monitoring.	**05**
	Total	**40**

List of Practicals / Tutorials:

1	Install and configure git project with remote.
2	Create Web application and perform git operations on the project
3	Installing and configuring Jenkins and configuring SSL on Jenkins Server.
4	Docker Installation with Running Hello World Container.
5	Demonstrate Node.js Application Execution in Docker.
6	CASE STUDY: Any Configuration Management System Implemented in Cloud Computing
7	Create a server and add to organization by Chef Configuration Concepts.
8	Demonstrate the use of selenium with at least two test cases in your preferred language.
9	Demonstrate the use of JMeter.
10	Deploy complete CI/CD Application on Cloudbase services.

Reference Books:

1	DevOps Bootcamp: “A fast-paced guide to implement DevOps” by Mitesh Soni.
2	Learning DevOps: “The complete guide to accelerate collaboration with Jenkins, Kubernetes, Terraform and Azure DevOps” by Mikael Krief.
3	The Devops Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations by Gene Kim, Patrick Debois, John Willis.

Supplementary learning Material:	
1	NPTEL - Swayam Courses.
2	Coursera – DevOps Essentials.

Pedagogy:

- Direct classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz
- Continuous assessment
- Interactive methods
- Seminar/Poster Presentation
- Industrial/ Field visits
- Course Projects

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						**R**: Remembering; **U**: Understanding; **A**: Applying; **N**: Analyzing; **E**: Evaluating; **C**: Creating
R	**U**	**A**	**N**	**E**	**C**	
10%	15%	25%	25%	10%	15%	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	To Understand the fundamentals of DevOps concepts like integration and DevOps framework configuration.	**20**
CO-2	To Understand the version control system to track changes in development.	**30**
CO-3	To Learn about the integration and container ecosystem using tools like Jenkins and Docker.	**30**
CO-4	To understand and apply DevOps testing, security, and monitoring aspect in application.	**20**

Curriculum Revision:	
Version:	1.0
Drafted on (Month-Year):	June -2020
Last Reviewed on (Month-Year):	-
Next Review on (Month-Year):	June-2025