



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

DevOps Engineering								
IV Semester: AERO ME CE EEE CSE IT CSE (AI&ML) CSE (DS) CSE (CS)								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
ACSD18	Skill	L	T	P	C	CIA	SEE	Total
		2	0	0	0	40	60	100
Contact Classes: 32		Tutorial Classes: Nil		Practical Classes: Nil		Total Classes: 32		
Prerequisite: OBJECT ORIENTED PROGRAMMING								

I. COURSE OVERVIEW:

DevOps, a combination of "development" and "operations," is a software development methodology that emphasizes collaboration and communication between software developers and IT operations professionals. The goal of DevOps is to streamline the software delivery process, from code development to deployment and maintenance, by breaking down silos between development and operations teams.

II. COURSES OBJECTIVES:

The students will try to learn

- I. The DevOps Concepts for business cases, cloud provisioning and management services .
- II. The model canvas for DevOps use cases.
- III. The virtual machines and containers for designing of applications
- IV. The code with various aspects in continuous deployment / development.

III. COURSE OUTCOMES:

At the end of the course students should be able to:

- CO 1 Understands the DevOps concepts in continuous delivery / development of applications.
- CO 2 Create the DevOps applications using various tools and technologies.
- CO 3 Examine the virtual machines and containers for managing the files
- CO 4 Apply cloud services for deployment the applications in a real-time
- CO 5 Perform web security and testing the code with appropriate tools

IV. COURSE SYLLABUS:

MODULE 1: DevOps Concepts

Understanding DevOps movement, DevOps with changing time, The water fall model, Agile Model, Collaboration, Why DevOps, Benefits of DevOps, DevOps life cycle- all about continuous, Build Automation, Continuous Integration, Continuous Management, Continuous Delivery / Continuous Development, The agile wheel of wheels.

MODULE 2: DevOps Tools and Technologies

Code Repositories : Git, Differences between SVN and Git, Build tools – Maven, Continuous integration tools – Jenkins, Container Technology – Docker, Monitoring Tools, Continuous integration with Jenkins 2, Creating built-in delivery pipelines, Creating Scripts, Creating a pipeline for compiling and executing test units, Using the Build Pipeline plugin, Integrating the deployment operation

MODULE 3: Docker Containers

Overview of Docker containers, Understanding the difference between virtual machines and containers, Installation and configuration of Docker, Creating your first Docker container, Managing containers, Creating a

Docker image from Docker file, An overview of Docker's elements, Creating a Dockerfile, Writing a Dockerfile, Building and running a container on a local machine, Testing a container locally, Pushing an image to Docker Hub

MODULE 4: Cloud Provisioning and Configuration Management with Chef, Managing Containers Effectively with Kubernetes

Amazon EC2, Creating and configuring a virtual machine in Amazon Web Services, Prerequisite – deploying our application on a remote server, Deploying the application on AWS, Deploying the application in a Docker container.

Kubernetes architecture overview, Installing Kubernetes on a local machine, Installing the Kubernetes dashboard, Kubernetes application deployment, Using Azure Kubernetes Service (AKS), Creating an AKS service, Configuring kubectl for AKS, The build and push of the image in the Docker Hub

MODULE 5: Testing the Code

Manual testing, Unit testing, JUnit in general and JUnit in particular, A JUnit example, Automated integration testing, Docker in automated testing, Performance testing, Automated acceptance testing, Automated GUI testing, Integrating Selenium tests in Jenkins, JavaScript testing, Testing backend integration points, Test-driven development, A complete test automation scenario, Manually testing our web application.

V. TEXT BOOKS:

1. Mitesh Soni, “DevOps for Web Development”, Packt Publishing, 2016.
2. Mikael Krief, “Learning DevOps - The complete guide to accelerate collaboration with Jenkins, Kubernetes, Terraform and Azure DevOps”, Packt Publishing, 2019.

VI. REFERENCE BOOKS:

1. Joakim Verona, “Practical DevOps”, Packt Publishing, 2016.
2. Michael Huttermann, “DevOps for Developers”, A press publishers, 2012.
3. Sanjeev Sharma, “The DevOps Adoption Playbook”, Published by John Wiley & Sons, Inc.2017.
4. Sanjeev Sharma & Bernie Coyne, “DevOps for Dummies”, Published by John Wiley & Sons, Inc.

VII. REFERENCE BOOKS:

1. <https://www.geeksforgeeks.org/devops-tutorial/>
2. <https://www.javatpoint.com/devops>
3. <https://azure.microsoft.com/en-in/solutions/devops/tutorial>
4. <https://www.guru99.com/devops-tutorial.html>