INDIRA COLLEGE OF ENGINEERING AND MANAGEMENT

Parandwadi, Pune – 410506, Ph. 02114 661500, www.indiraicem.ac.in

Indira College of Engineering and Management (An autonomous Institute**)**					
Second Year of Artificial Intelligence and Data Science Engineering (2024 Course)					
Course	SEC-III Continuous Integration/ Deployment Framework		**Code**	24UAIP404 A	
Credits	2	**Pr/week**	4	**Evaluation Scheme**	Theory TAE/CAE/ESE	Practical **INT**/EXT
		Th/week				25/-

Prerequisite: Basic knowledge of software development and version control systems (Git)

Course Objective:

1	Understand CI/CD concepts and modern DevOps lifecycle.
2	Gain hands-on experience with popular CI/CD tools.
3	Build and manage deployment pipelines for real-world applications.
4	Integrate automated testing, code quality, and monitoring in CI/CD

Course Outcomes:

CO	CO Statement	Bloom's Level
CO1	Explain core concepts of CI/CD and its role in DevOps lifecycle	Remember(L1), Understand(L2)
CO2	Set up a CI/CD pipeline using open-source tools	Apply(L3)
CO3	Automate testing, building, and deployment using scripts and workflows	Apply(L3), Analyze(L4)
CO4	Evaluate the effectiveness of CI/CD integration with quality and monitoring	Analyze(L4), Evaluate(L3)

Lab No.	Lab Assignment Description	CO Mapping
1	Setup Git and GitHub repository; demonstrate cloning, branching, and pull requests	CO1
2	Create a basic build script using Maven/Gradle/npm for a sample project	CO2
3	Install Jenkins and configure a freestyle project to build a JavaScript/Java project	CO2
4	Create a GitHub Actions workflow for automated testing and build	CO2, CO3
5	Write a Dockerfile and build/run a Docker container locally	CO3

6	Integrate Docker with CI (build Docker image in Jenkins or GitHub Actions)	CO3
7	Deploy a sample web app to Heroku or Netlify using a CI/CD pipeline	CO3
8	Integrate SonarQube for code quality analysis in the pipeline	CO3, CO4
9	Use a basic monitoring tool (like Prometheus or StatusCake) for health checks	CO4
10	Schedule nightly builds with Jenkins or GitHub Actions cron trigger	CO2, CO3
11	Use GitHub Secrets to manage API tokens or passwords securely in work-flows	CO3
12	**Capstone:** Implement full CI/CD for a sample project (code → build → test → deploy)	CO2, CO3, CO4

Text Books
1. Humble, Jez, and David Farley. *Continuous Delivery: Reliable Software Releases through Build, Test, and Deployment Automation*. Addison-Wesley, 2010.
2. Kim, Gene, Jez Humble, Patrick Debois, and John Willis. *The DevOps Handbook: How to Create World-Class Agility, Reliability, & Security*. IT Revolution Press, 2016.
Reference Books
1. Pathania, Nikhil. *Learning Continuous Integration with Jenkins*. Packt Publishing, 2017.
2. Poulton, Nigel. *Docker Deep Dive*. Leanpub, 2020.
E Books
1. Google SRE Team. *Site Reliability Engineering*. O'Reilly Media, 2016. Available at sre.google/books
2. Jenkins Community. *Jenkins User Handbook*. Jenkins.io, n.d. https://www.jenkins.io/doc/book/
E-links
1. GitHub. *GitHub Actions Documentation*. GitHub Docs, n.d. https://docs.github.com/en/actions
2. FreeCodeCamp. *CI/CD Blog Tutorials & Guides*. FreeCodeCamp, n.d. https://www.freecodecamp.org/news/tag/cicd/