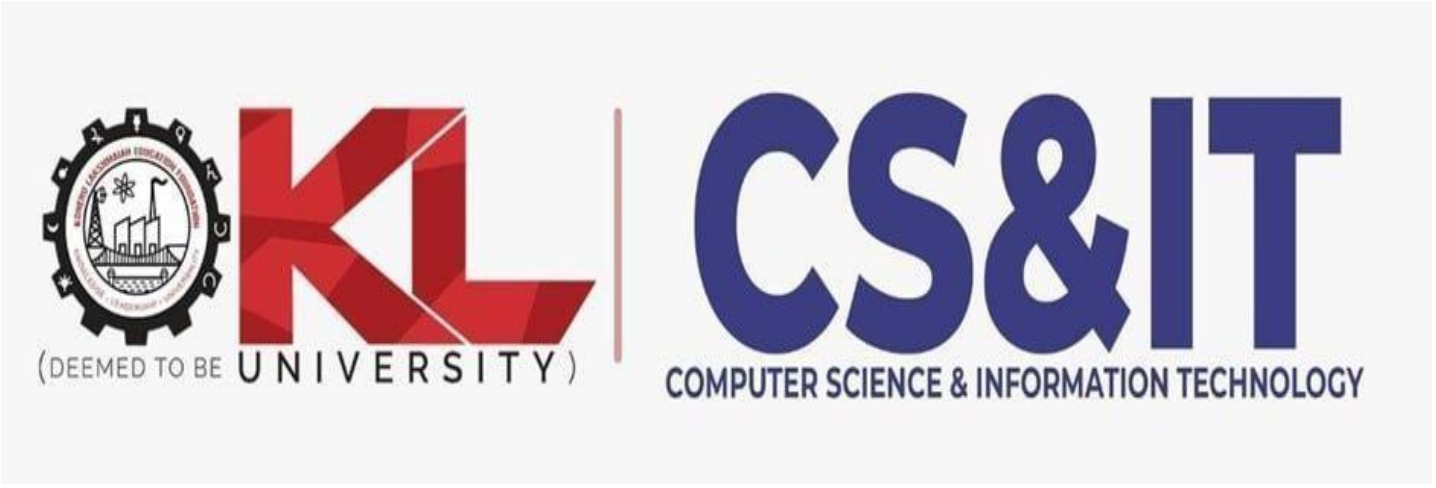
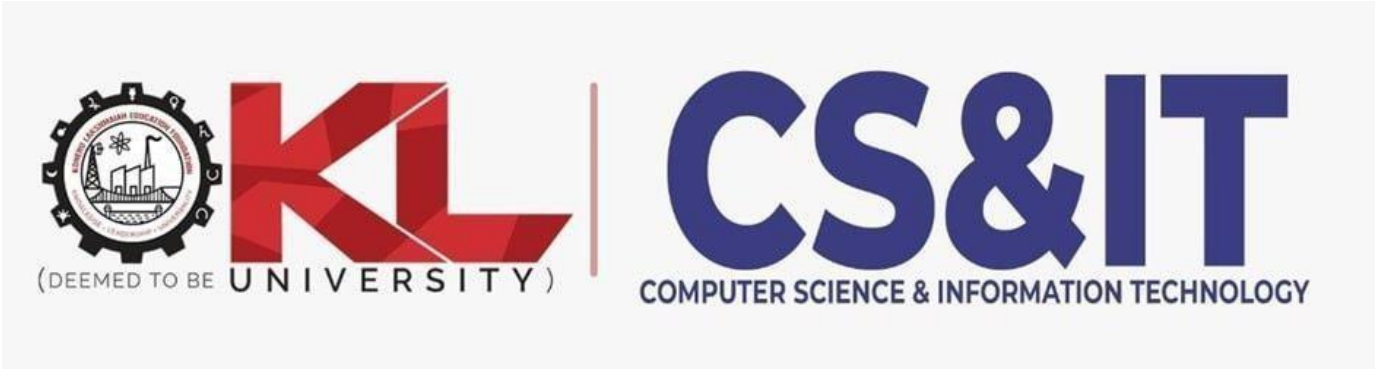



# LAB WORKBOOK

## 22SMD3303A– CONTINUOUS DELIVERY AND DEVOPS

Team DevOps
K L UNIVERSITY | CONTINUOUS DELIVERY AND DEVOPS




# LABORATORY WORKBOOK

| | |
|---|---|
| STUDENT NAME | |
| REG. NO | |
| YEAR | |
| SEMESTER | |
| SECTION | |
| FACULTY | |

# Table of Contents

## Organization of the Student Lab Workbook

The laboratory framework includes a creative element but shifts the time-intensive aspects outside of the Two-Hour closed laboratory period. Within this structure, each laboratory includes two parts: Prelab and In-lab.

### a. Pre-Lab

The Prelab exercise is a homework assignment that links the lecture with the laboratory period - typically takes 2 hours to complete. The goal is to synthesize the information they learn in lecture with material from their textbook to produce a working piece of software. Prelab Students attending a two-hour closed laboratory are expected to make a good-faith effort to complete the Prelab exercise before coming to the lab. Their work need not be perfect, but their effort must be real (roughly 80 percent correct).

### b. In-Lab

The In-lab section takes place during the actual laboratory period. The First hour of the laboratory period can be used to resolve any problems the students might have experienced in completing the Prelab exercises. The intent is to give constructive feedback so that students leave the lab with working Prelab software - a significant accomplishment on their part. During the second hour, students complete the In-lab exercise to reinforce the concepts learned in the Prelab. Students leave the lab having received feedback on their Prelab and In-lab work.

# 2024-25 EVEN SEMESTER LAB CONTINUOUS EVALUATION

| Sl No | Date | Experiment Name | Pre-Lab (10M) | In Lab | | | Post-Lab (10M) | Viva Voce (5M) | Total (50M) | Faculty Signature |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Writeup (10) | Execution (10) | Results (5) | | | | |
| 1 | | | | | | | | | | |
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|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Writeup (10) | Execution (10) | Results (5) | | | | |
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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**
**SUBJECT CODE: 22SMD3303A**
**CONTINUOUS DELIVERY AND DEVOPS WORKBOOK**

## LAB 01: Deploy a file from Github via Git bash.

Date of the Session:_____ Time of the Session:

### Prerequisite:

- **Software Engineering Methodologies.**
- **Python Programming.**
- **Basics of Web Development.**

### Pre-Lab Task:

**1)** What is DevOps.

**Ans:-**

**2)** Why do you think models are important while developing a software

**Ans:-**

**3)** What are the differences between waterfall model, The agile model.

**Ans:-**

**4)** Explain Git,Github and Gitbash?

**Ans:-**

## In Lab Task:

1) **Deploy to GitHub via Git : A Practical**

- **Install Git and set up your GitHub account**
- **Execute the most popular commands in Git**
- **Push all the files from local repository to GitHub.**

## Post Lab Task:

- **Pull changes from Remote repository to Local repository**

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*(For Evaluator's use only)*

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## LAB 02: Deploy to GitHub via Git in Ubuntu

**Date of the Session:____/___/____** **Time of the Session:_____to_____**

### Prerequisite:

- **Overview and Applications of DevOps in Development life cycle.**
- **Overview of Git.**
- **Web App Development.**
- **Python Programming.**

### Pre-Lab Task:

**1)** What are the stages in DevOps Lifecycle and briefly explain each stage.

**Ans:-**

**2)** What are the benefits of DevOps and In what way DevOps can achieve the goals of cloud computing.

**Ans:-**

## In Lab Task:

**1)** GIT Installation and Configuring on windows**.**

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## PostLab Task:

**1)** Ceate a file in git bash.

**Writing space for the Problem:(For Student's use only)**

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## LAB 03: Install and Configure Jenkins for continuous integration.

**Date of the Session:___/___/___** **Time of the Session:_____to_____**

**Prerequisite:**

- **DevOps life cycle.**
- **Web Development.**

**Pre-Lab Task:**

**1)** Categorise the DevOps tools and technologies that are used, according to the stages in the DevOps Lifecycle.

**Ans:-**

**2)** What Explain at least 2 tools and their limitations that are used in the DevOps Lifecycle at each stage.

**Ans:-**

**3)** Define CI/CD and List out the benefits of CI/CD.

**Ans:-**

## In Lab Task:

**1)** Continuous Integration with Jenkins: A Practical

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## LAB 04: Continuous Integration for Email using Jenkins plugins.

**Date of the Session:___/___/___** **Time of the Session:_____to_____**

### Prerequisite:

- **plugins Environment.**
- **Git and GitHub.**
- **Java Programming.**

### Pre-Lab Task:

**1)** What is pipeline.

**Ans:-**

**2)** What is Jenkin?

**Ans:-**

## In Lab Task:

**1)** Build a jenkin pipeline: A Practical.

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# LAB 05: Build Python Application From The Azure Platform

**Date of the Session:___/___/___** **Time of the Session:_____to_____**

## Prerequisite:

- **Web Development.**
- **Azure Environment.**
- **Basic Concepts of distributed computing.**
- **Java and Python Programming.**

## Pre-Lab Task:

1. What are the sequence of phases that are present in Maven's Build Lifecycle and clean lifecycle?

**Ans:-**

**2.** What is a Maven repository and what the types of maven repositories?

**Ans:-**

3. What is the maven basic project structure?

**Ans:-**

**In Lab Task:**

1) Use CI/CD to deploy a Java web app to Azure App Service: A Practical.

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## LAB 06: Creating and Configuring a build job for a Java Application for ci/cd pipeline.

**Date of the Session:___/___/___** **Time of the Session:_____to_____**

### Prerequisite:

- **Linux Environment.**
- **Idea of VM.**
- **Azure Environment and tools.**
- **Git and GitHub.**

### Pre-Lab Task:

**1)** In DevOps, what role does pipeline?

**Ans:-**

**2)** What is CI and CD in Azure?

**Ans:-**

**3)** What type of applications does Azure deploy?

**Ans:-**

## In Lab Task:

**1)** Create a static HTML web app in Azure for Devops Operations: A Practical.

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## LAB 07: Test Driven Development with JUnit 5.

**Date of the Session:___/___/___** **Time of the Session:_____to_____**

**Prerequisite:**

- **Junit**
- **Test driven development**
- **Git and GitHub.**

**Pre-Lab Task:**

**1)** Define testing.
**Ans:-**

**2)** Importance of Junit.
**Ans:-**

**3)** Describe types of testing and its importance.
**Ans:-**

**In Lab Task:**

Installation of junit testing tool.

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## LAB 08: Automated Testing Using Cucumber

**Date of the Session:___/___/___** **Time of the Session:_____to_____**

### Pre-Lab Task:

1) What is a web Server?

**Ans:-**

2) What is BTT.

**Ans:-**

3) How to create a job in java for testing.

**Ans:-**

**In Lab Task:**

1. **Creating a single web server application for testing.**

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# LAB 09: Configure Amazon Ec2 instances using aws console

**Date of the Session:___/___/____** **Time of the Session:___to____**

## Pre-Lab Task:

**1)** What is Amazon EC2
**Ans:-**

**2)** What is an instance in EC2
**Ans:-**

**3)** What are Amazon Machine Images
**Ans:-**

**In Lab Task:**

- Log in to the AWS Console and go to the EC2 Dashboard.
- Click "Launch Instance." : A Practical

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## LAB 10: Build a container and run a cointainer using docker desktop.

**Date of the Session:___/___/____** **Time of the Session:___to____**

**Pre-Lab Task:**

1) Define container

**Ans:-**

2) Define docker

**Ans:-**

3) List out Popular Testing Tools
**Ans:-**

4) List out the Primary and Secondary keywords of docker?
**Ans:-**

## In Lab Task:

1) Creating a container: A Practical.

**Writing space for the Problem:(For Student's use only)**

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# LAB 11: Working with prebuild Docker Images

**Date of the Session:____/__/____** **Time of the Session:_____to_____**

## Prerequisite:

- **Docker Daemon**
- **Docker CLI**
- **Desktop Docker**

## Pre-Lab Task:

**3)** What is a Containerization.

**Ans:-**

**4)** What is Docker Repository?

**Ans:-**

**5)** Difference between Conatiner and Image?

**Ans:-**

**In Lab Task:**

1) Install Docker, Docker Desktop and Creating an Account in Docker Hub: A Practical
2) Explore Docker Hub for images that will run a website and get them into your development evnvironment and practice.
    a. Run a copy of the website in 'httpd'

**Post Lab Task:**

1) Explore Docker Hub for images that will run a website and get them into your development environment and practice.
   a. Run a copy of the website in ‘Nginx’

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## LAB 12: Implement Mysql In Docker

**Date of the Session:___/___/___** **Time of the Session:_____to_____**

**Prerequisite:**

- **Docker Daemon**
- **Docker CLI**
- **Desktop Docker**

**Pre-Lab Task:**

4. What is Docker Compose?

**Ans:-**

5. Explain Docker Architecture?

**Ans:-**

## In Lab Task:

1) Push and Pull your own image with pre-installations to/from repository
2) Building Container Images Using Docker files
3) Create a Docker Container Network

**Post Lab Task:**

1) Storing Container data in docker volumes
2) Host three tier web application using Docker

**Writing space for the Problem:(For Student's use only)**

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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**
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## LAB 13: Create and deploy web application using Docker

**Date of the Session:___/___/___** **Time of the Session:_____to_____**

**Pre-Lab Task:**

**1)** What is WEB Application.
**Ans:-**

**2)** Explain Docker Components?

## In Lab Task:

**1)** Docker on Windows: A Practical.

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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

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**CONTINUOUS DELIVERY AND DEVOPS WORKBOOK**

## LAB 14: Implement Kubernetes on Windows Using Minikube

**Date of the Session:____/__/____** **Time of the Session:_____to_____**

**Prerequisite:**

- **Linux Environment.**
- **Idea of VM.**
- **Docker**

**Pre-Lab Task:**

**1)** What is Kubernetes?

**Ans:-**

**2)** Differentiate Load Balancer and Auto Scaling?

**Ans:-**

**In Lab Task:**

1) Install minikube
2) Build a simple Kubernetes cluster with one master node and two worker nodes

**Post Lab Task**

1) Build a simple Kubernetes cluster with one master node and two worker nodes using Kubeadm
2) Create a deployment that uses the NGINX image
3) Expose only one pod on port 8081
4) Verify the NGINX version on the pod
5) Create a service for the deployment on port 80

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**CONTINUOUS DELIVERY AND DEVOPS WORKBOOK**

# LAB 15: Working with Nagios Monitoring Tool

**Date of the Session:___/___/____** **Time of the Session:___to____**

## Pre-Lab Task:

1) What is Continuous Monitoring
   **Ans:-**

2) Role of Monitoring Systems
   **Ans:-**

3) Types of Monitoring
**Ans:-**

4) List out Popular Monitoring Tools
**Ans:-**

## In Lab Task:

1. Working with Nagios Monitoring Tool: A Practical

**Writing space for the Problem:(For Student's use only)**

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