SKILL WORKBOOK

22SDC105R – CLOUD DEVOPS

Team DevOps
K L UNIVERSITY | CLOUD DEVOPS

SKILL WORKBOOK

STUDENT NAME	
REG. NO	
YEAR	
SEMESTER	
SECTION	
FACULTY	

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 SKILL 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										
2										
3										
4										
5										
6										
7										
8										

2024-25 EVEN SEMESTER SKILL CONTINUOUS EVALUATION

Sl No	Date	Experiment Name	Pre-Lab (10M)	Viva Voce (5M)	In Lab			Post-Lab (10M)	Total (50M)	Faculty Signature
					Writeup (10)	Execution (10)	Results (15)			
9										
10										
11										
12										

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LAB 01 : Use Git to deploy to GitHub with EC2 Ubuntu.

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

Prerequisite:

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

Pre-Lab Task:

1) Define EC2?

Ans:-

2) Write a command to check Git in Ubuntu?

Ans:-

3) What are the advantages of Git ?

Ans:-

4) What is AMI?

Ans:-

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In Lab Task:

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

- **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:

- **Write history of commands in Git bash to a file**

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(For Evaluator's use only)

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LAB 02 : Infrastructure as Code in EC2 Ubuntu Using Terraform

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

Prerequisite:

- **AWS Fundamentals**
- **AWS CLI**

Pre-Lab Task:

1) What is Terraform, and how does it differ from other infrastructure-as-code (IaC) tools like Ansible, Chef, and Puppet?

Ans:-

2) What are Terraform providers, and why are they important? Can you give an example of a provider in Terraform?

Ans:-

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In Lab Task:

1) Terraform Installation and working with terraform providers **.**

2) Deploy Your First Terraform Configuration on to AWS Cloud

3) Build and Test a Basic Terraform Module

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Post Lab Task:

a. Create a main.tf file where you will define your infrastructure resources:
b. Create an EC2 instance that will act as your web server.
c. Set up a security group allowing HTTP (port 80) traffic.

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LAB 03 :Working with Input, Output Variables -Terraform(Modular Approach)

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

Prerequisite:

- **AWS Fundamentals**
- **AWS CLI**

Pre-Lab Task:

1) Explain Terraform Modules and its components?

Ans:-

2) Explain the role of the main.tf, variables.tf, and outputs.tf files in a Terraform project

Ans:-

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In Lab Task:

1) Using Terraform Provisioners to Set Up an Apache Web Server on AWS

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Post Lab Task:

1) Use Input and Output Variables to Query Data in AWS Using Terraform.

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LAB 04 : Install git tool in worker node from master node using Ansible tool in a ubuntu machine. Attain this using password less authentication.

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

Prerequisite:

- **AWS Fundamentals.**
- **Web Development.**

Pre-Lab Task:

1) What are the benefits of using Ansible roles to organize your configuration tasks?

Ans:-

2) Define How would you modify the playbook to install a different web server, such as Nginx, instead of Apache?

Ans:-

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In Lab Task:

1) Install Ansible on a control node and configure two managed servers for use with Ansible

2) Build a basic inventory and execute an Ansible command to verify the configuration

3) Configure a playbook to install git in worker node

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Post Lab Task:

a. What other Ansible modules would you use to configure a web server (e.g., for SSL setup, firewalls, or database configuration)?

b. Explain how you would secure sensitive data, such as passwords, in your Ansible playbooks.

c. If a task fails during playbook execution, how would you troubleshoot the error, and what tools or Ansible features can assist in debugging?

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LAB 05 : Build a Docker image using a Dockerfile on an EC2 instance and push it to the Docker registry with a tag.

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

Prerequisite:

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

Pre-Lab Task:

1) What are the main steps to install Docker on Ubuntu? How do they differ from the steps to install Docker on Windows?

Ans:-

2) When installing Docker on Windows, why is it necessary to enable Hyper-V or WSL 2 (Windows Subsystem for Linux 2)?

Ans:-

In Lab Task:

1) Install Docker in EC2 ubuntu machine.
2) Builds an nginx image
3) Push the image to Docker Hub.
4) Explore Docker Hub for the pushed images.
5) website and get them into your development environment and practice.

Post Lab Task:

1) Describe the purpose of Docker Desktop on Windows. How does it differ from the Docker Engine installed directly on Ubuntu?
   Hint: Consider the role of Docker Desktop in managing containers and the virtual machine-based architecture on Windows.

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LAB 06 : Docker-based three-tier web application in EC2 Ubuntu

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

Prerequisite:

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

Pre-Lab Task:

1) Explain the three-tier architecture. What are the tiers in your web application?

   Ans:-

2) What are the benefits of using Docker in a web application deployment?

   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

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LAB 07 : EC2 Ubuntu three-tier web application with Kubernetes

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

Prerequisite:

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

Pre-Lab Task:

1) What is Kubernetes, and why is it used in deploying applications?

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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LAB 08 : Install a Web Application on EC2 Ubuntu using AWS Kubernetes tool

Date of the Session:____/____/____ Time of the Session:___to___

Prerequisite:

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

Pre-Lab Task:

1) What is the role of a Kubernetes Deployment in managing web applications?

Ans:-

2) What are the key components of Kubernetes, and what roles do they play in managing applications ?

Ans:-

In Lab Task:

1) Deploy a Web Application using AWS Kubernetes Services

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PostLab Task:

1) How does Amazon EKS work?

2) Does Amazon EKS work with my existing Kubernetes applications and tools?

3) Can I update my Kubernetes cluster to a new version?

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LAB 09 :Jenkins Installation and Configuring on EC2 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) Jenkins Installation and Configuring on ubuntu**.**

PostLab Task:

1) Building CI/CD pipeline to deploy new version of Application (Jenkins)

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LAB 10 :Continuous Integration with Jenkins in EC2 ubuntu:

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:

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Post Task:

1) Explain Kubernetes, and how can you integrate Jenkins with Kubernetes?

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LAB 11 :Continuous Deployment Using AWS Pipeline

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

Prerequisite:

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

Pre-Lab Task:

1) In DevOps, what role does pipeline?

Ans:-

2) What is CI and CD in AWS?

Ans:-

3) What type of applications does AWS deploy?

Ans:-

In Lab Task:

1) Set up a Continuous Deployment Pipeline using Jenkins

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Post Lab Task:

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

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LAB 12 :Working with Nagios Monitoring Tool in EC2 ubuntu

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:

Post Lab Task:

1. What is the necessity of Continuous monitoring?

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