Government of Pakistan

National Vocational and Technical Training Commission

Prime Minister's Hunarmand Pakistan Program

"Skills for All"

Course Contents / Lesson Plan

Course Title: DevOps

Duration: 3 Months

Revised Edition

Trainer Name	
Course Title	**DevOps**
Objectives and Expectations	**Employable skills and hands-on practice in DevOps Field** This course offers a broad, cross-disciplinary learning experience for students looking to pursue careers in DevOps, DevSecOps, NetDevOps etc. In this course, students are introduced to key aspects of the Automation, Cloud Computing, Continuous Integration and Continuous Deployment (CI/CD), Troubleshooting, Agile Methodologies, Security, Collaboration and Communication, Monitoring and Logging, so that they can enter the design market as strong candidates for beginner to intermediate level design jobs. **Main Expectations:** In short, the course under reference should be delivered by professional instructors in such a robust hands-on manner that the trainees are comfortably able to employ their skills for earning money (through wage/self-employment) at its conclusion. This course thus clearly goes beyond the domain of the traditional training practices in vogue and underscores an expectation that a market-centric approach will be adopted as the main driving force while delivering it. The instructors should therefore be experienced enough to be able to identify the training needs for the possible market roles available out there. Moreover, they should also know the strengths and weaknesses of each trainee to prepare them for such market roles during/after the training. **i.** Specially designed practical tasks to be performed by the trainees have been included in the Annexure-I to this document. The record of all tasks performed individually or in groups must be preserved by the management of the training Institute clearly labeling name, trade, session, etc so that these are ready to be physically inspected/verified through monitoring visits from time to time. The weekly distribution of tasks has also been indicated in the weekly lesson plan given in this document. **ii.** To materialize the main expectations, a special module on **Job Search & Entrepreneurial Skills** has been included in the latter part of this course (5th & 6th month) through which, the trainees will be made aware of the Job search techniques in the local as well as international job markets (Gulf countries). Awareness around the visa process and immigration laws of the most favored labor destination countries also form a part of this module. Moreover, the trainees would also be encouraged to venture into self-employment and exposed to the main requirements in this regard. It is also expected that a sense of civic duties/roles and responsibilities will also be inculcated in the trainees to make them responsible citizens of the country. **iii.** A module on **Work Place Ethics** has also been included to highlight the importance of good and positive behavior in the workplace in the line with the best practices elsewhere in the world. An outline of such

qualities has been given in the Appendix to this document. Its importance should be conveyed in a format that is attractive and interesting for the trainees such as through PPT slides +short video documentaries. Needless to say that if the training provider puts his heart and soul into these otherwise non-technical components, the image of the Pakistani workforce would undergo a positive transformation in the local as well as international job markets.

To maintain interest and motivation of the trainees throughout the course, modern techniques such as:

- Motivational Lectures
- Success Stories
- Case Studies

These techniques would be employed as an additional training tool wherever possible (these are explained in the subsequent section on Training Methodology).

Lastly, evaluation of the competencies acquired by the trainees will be done objectively at various stages of the training and a proper record of the same will be maintained. Suffice to say that for such evaluations, practical tasks would be designed by the training providers to gauge the problem-solving abilities of the trainees.

(i) Motivational Lectures

The proposed methodology for the training under reference employs motivation as a tool. Hence besides the purely technical content, a trainer is required to include elements of motivation in his/her lecture. To inspire the trainees to utilize the training opportunity to the full and strive towards professional excellence. Motivational lectures may also include general topics such as the importance of moral values and civic role & responsibilities as a Pakistani. A motivational lecture should be delivered with enough zeal to produce a deep impact on the trainees. It may comprise of the following:

- Clear Purpose to convey the message to trainees effectively.
- Personal Story to quote as an example to follow.
- Trainees Fit so that the situation is actionable by trainees and not represent a just idealism.
- Ending Points to persuade the trainees on changing themselves.

A good motivational lecture should help drive creativity, curiosity, and spark the desire needed for trainees to want to learn more.

The impact of a successful motivational strategy is amongst others commonly visible in increased class participation ratios. It increases the trainees' willingness to be engaged on the practical tasks for a longer time without boredom and loss of interest because they can see in their mind's eye where their hard work would take them in short (1-3 years); medium (3 -10 years) and long term (more than 10 years).

As this tool is expected that the training providers would make arrangements for regular well planned motivational lectures as part of a coordinated strategy interspersed throughout the training period as suggested in the weekly lesson plans in this document.

Course-related motivational lectures online link is available in **Annexure-II**.

(ii) Success Stories

Another effective way of motivating the trainees is using Success Stories. Its inclusion in the weekly lesson plan at regular intervals has been recommended till the end of the training.

A success story may be disseminated orally, through a presentation, or using a video/documentary of someone that has risen to fortune, acclaim, or brilliant achievement. A success story shows how a person achieved his goal through hard work, dedication, and devotion. An inspiring success story contains compelling and significant facts articulated clearly and easily comprehendible words. Moreover, it is helpful if it is assumed that the reader/listener knows nothing of what is being revealed. The optimum impact is created when the story is revealed in the form of:-

- Directly in person (At least 2-3 cases must be arranged by the training institute)
- Through an audio/ videotaped message (2-3 high-quality videos must be arranged by the training institute)

It is expected that the training provider would collect relevant high-quality success stories for inclusion in the training as suggested in the weekly lesson plan given in this document.

The suggestive structure and sequence of a sample success story and its various shapes can be seen in **Annexure III**.

(iii) Case Studies

Where a situation allows, case studies can also be presented to the trainees to widen their understanding of the real-life specific problem/situation and to explore the solutions.

In simple terms, the case study method of teaching uses a real-life case example/a typical case to demonstrate a phenomenon in action and explain theoretical as well as practical aspects of the knowledge related to the same. It is an effective way to help the trainees comprehend in depth both the theoretical and practical aspects of the complex phenomenon in depth with ease. Case teaching can also stimulate the trainees to participate in discussions and thereby boost their confidence. It also makes the classroom atmosphere interesting thus maintaining the trainee interest in training till the end of the course.

Depending on suitability to the trade, the weekly lesson plan in this document may suggest case studies be presented to the trainees. The trainer may adopt a PowerPoint presentation or video format for such case studies whichever is deemed suitable but only those cases must be selected that are relevant and of a learning value.

The Trainees should be required and supervised to carefully analyze the cases.

For this purpose, they must be encouraged to inquire and collect specific information/data, actively participate in the discussions, and intended solutions to the problem/situation.

Case studies can be implemented in the following ways: -

i. A good quality trade-specific documentary (At least 2-3 documentaries must be arranged by the training institute)
ii. Health &Safety case studies (2 cases regarding safety and industrial accidents must be arranged by the training institute)
iii. Field visits(At least one visit to a trade-specific major industry/ site must be arranged by the training institute)

Entry-level of trainees	Intermediate / Matric Science
Learning Outcomes of the course	By the end of this course, students will be able to: • Use DevOps tools and technologies • Create and manage infrastructure as code • Use testing and quality assurance • monitor applications and infrastructure using tools like Nagios, Prometheus, or ELK stack • employ soft skills such as teamwork, communication, problem-solving, and adaptability, which are essential for working in a DevOps environment. • adopt DevOps practices and drive organizational change towards a more agile and efficient development process.
Course Execution Plan	The total duration of the course: **3 months (13 Weeks)** Theory: **20%** Practical: **80%**
Companies offering jobs in the respective trade	1. Financial institutions 2. Healthcare industry 3. E-commerce companies 4. Software houses 5. Media and entertainment companies 6. Software development firms 7. IT consulting firms 8. Cloud Service Providers
Job Opportunities	DevOps engineers are responsible for bridging the gap between development and operations teams and ensuring that software can be developed, tested, and deployed in a fast, reliable, and scalable way. Following are some of the roles that are present and or may become available as trends shift and morph to DevOps: • DevOps Engineer • Automation Engineer • Release Manager • Security Engineer • Cloud Architect • Site Reliability Engineer (SRE) • Agile Coach
No of Students	25-50
Learning Place	Classroom / Lab
Instructional Resources	1. Online courses: Online courses are a great way to learn DevOps concepts and practices. Platforms like Coursera, edX, and Udemy offer a wide range of courses on DevOps, from beginner to advanced levels. Some popular courses include "Introduction to DevOps" by edX,

	"DevOps Fundamentals" by Pluralsight, and "DevOps MasterClass: CI/CD with Jenkins Pipeline" by Udemy. 2. Books: There are many books available on DevOps, covering topics such as automation, continuous integration and delivery, and site reliability engineering. Some popular books include "The DevOps Handbook" by Gene Kim, Jez Humble, and others, "Continuous Delivery" by Jez Humble and David Farley, and "Site Reliability Engineering" by Google. 3. Online tutorials and blogs: There are many DevOps tutorials and blogs available online that can help you learn DevOps concepts and practices. Sites like DevOps.com, DZone, and Cloud Academy offer a wide range of DevOps tutorials, guides, and blog posts that cover a variety of topics. 4. Conferences and Meetups: Attending DevOps conferences and meetups can help you learn from industry experts and network with other DevOps professionals. Some popular DevOps conferences include DevOpsDays, AWS re:Invent, and KubeCon. 5. Open-source projects: Contributing to open-source DevOps projects is a great way to gain practical experience and learn from other developers. GitHub and GitLab are great platforms to find and contribute to DevOps projects.

Scheduled Week	Module Title	Day	Hour	Learning Unit
Week 1	**Introduction to DevOps Roadmap** **Linux Fundamentals**	**Day 1**	**Hour 1**	**IT Infrastructure Lecture by Teacher**
			Hour 2	**Water Fall Model Lecture by Teacher**
			Hour 3	**Agile Methodologies Lecture by Teacher**
			Hour 4	**Oral Quiz for Students**
		Day 2	**Hour 1**	**DevOps Roadmap Lecture by Teacher**
			Hour 2	**Ubuntu History Lecture by Teacher**
			Hour 3	**Pros and Cons of Ubuntu Lecture by Teacher**
			Hour 4	**Oral Quiz and Task for Students**
		Day 3	**Hour 1**	**Ubuntu Virtualization Lecture by Teacher**
			Hour 2	**Shells, GUI, Terminal Lecture by Teacher**
			Hour 3	**File System Lecture by Teacher**

			Hour 4	Ubuntu Directories by Teacher
		Day 4	Hour 1	Ubuntu Commands Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Ubuntu Permissions, Groups, Users lecture by Teacher
			Hour 4	Crontab Lecture by Teacher
		Day 5	Hour 1	Text editors, Tools, Lecture by Teacher
			Hour 2	Backup Techniques Lecture by Teacher
			Hour 3	I/O Redirection Lecture by Teacher
			Hour 4	Partitions Lecture by Teacher
Week 2	- Network and Security - Version Control System	Day 1	Hour 1	OSI Model Lecture by Teacher
			Hour 2	TCP/IP Fundamentals Lecture by Teacher
			Hour 3	TCP Lecture Continuation by Teacher
			Hour 4	UDP Lecture by Teacher
		Day 2	Hour 1	DNS Lecture by Teacher
			Hour 2	Https Lecture by Teacher
			Hour 3	SSL Lecture by Teacher
			Hour 4	DHCP Lecture by Teacher
		Day 3	Hour 1	NAT Lecture by Teacher
			Hour 2	FTP Lecture by Teacher
			Hour 3	Networking Quiz for Students
			Hour 4	Continuation of Networking Quiz

		Day 4	Hour 1	What is a GIT Lecture by Teacher
			Hour 2	Different GIT vendors Lecture by Teacher
			Hour 3	Installing and Using GIT (Command line + GUI) (Windows + Linux)
			Hour 4	Lab to allow students to download and do all necessary tasks to use GIT
		Day 5	Hour 1	Cloning a Repository Lecture by Teacher
			Hour 2	Basic GIT flow commands Lecture by Teacher
			Hour 3	Essential commands Lecture by Teacher
			Hour 4	Lab for students regarding all previously learned Labs
Week 3	Cloud Computing	Day 1	Hour 1	Introduction to Cloud, Private, Public, and Hybrid Cloud Lecture by Teacher
			Hour 2	Quiz given to Students by Teacher
			Hour 3	IaaS, PaaS, SaaS, and Azure Fundamentals
			Hour 4	Oral Quiz given to Students by Teacher
		Day 2	Hour 1	RBAC and Active Directory Lecture Given by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Compute and storage Services Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 3	Hour 1	Networks and App Gateway Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Monitoring and Auto scaling Lecture by Teacher
			Hour 4	Automation account and Azure Analytics workspace Lecture by Teacher
		Day 4	Hour 1	Introduction to AWS and AWS Architecture Lecture by Teacher
			Hour 2	Domains of AWS and AWS Compute Services (EC2 and Lambda) Lecture by Teacher
			Hour 3	Storage service and Networking services Lecture by Teacher

			Hour 4	Lab practice by Student
		Day 5	Hour 1	Monitoring and AWS management, Auto Scaling & Load balancer Lecture by Teacher
			Hour 2	Lab Practice by Student
			Hour 3	Cloud Security, AWS IAM, Redshift Lecture by Teacher
			Hour 4	Lab Practice by Student and QUIZ
Week 4	- Scripting - Web Servers	Day 1	Hour 1	Introduction to python Scripting, Syntax, and Variables Lecture by Teacher
			Hour 2	Lab Practice by student
			Hour 3	Variables and Data Types Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 2	Hour 1	Conditionals, Loops and Arrays Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Functions, Classes, Objects, Command Substitution Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 3	Hour 1	Introduction to PowerShell and Syntax Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	What is a Webserver Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 4	Hour 1	Installation and Managing service Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	What is IIS and how it works Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 5	Hour 1	What are bindings and Application Pools Lecture by Teacher
			Hour 2	What is Nginx and its architecture Lecture by Teacher
			Hour 3	Hands-on: Deploying a web application on Nginx Lecture by Teacher
			Hour 4	Lab Practice and Quiz by students
Week 5	- Database and Servers	Day 1	Hour 1	Motivational Lecture
			Hour 2	Lab Practice by Students

	- Yaml		Hour 3	Introduction to SQL and what SQL is Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 2	Hour 1	The core SQL Syntax and Data normalization Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Planning Tables & Relationships Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 3	Hour 1	Creating a New Database and Exploring Key Value Types Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Introducing constraints, functions, and primary Keys & Unique IDs Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 4	Hour 1	Inserting Data, Querying Data, Updating & Deleting data Lecture by Teacher
			Hour 2	Introducing Inner Joins, Multiple Joins combined, Left join, Filtering Lecture by Teacher
			Hour 3	Intro to Mongo Shells, Operators and Indexes Lecture by Teacher
			Hour 4	Mongo Atlas and Mongo Compass Lecture by Teacher
		Day 5	Hour 1	What is Yaml Language and Basic Yaml Syntax Lecture by Teacher
			Hour 2	Yaml Data types, Multiline strings, Anchors, and extensions Lecture by Teacher
			Hour 3	Docker Compose & Kubernetes Lecture by Teacher
			Hour 4	Lab Practice and Quiz Lecture by Teacher
Week 6	Containerization	Day 1	Hour 1	What is Docker Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	What is a Container Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 2	Hour 1	Docker vs Virtual Machine Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Docker Installation Lecture by Teacher
			Hour 4	Lab Practice by Students

		Day 3	Hour 1	Main Docker Commands Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Debugging a container Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 4	Hour 1	Developing with Containers and Docker Compose Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Private Docker Repository Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 5	Hour 1	Deploy Containerized App Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Docker Volumes and Volumes Demo Lecture by Teacher
			Hour 4	Lab Practice by Students
Week 7	Orchestration	Day 1	Hour 1	What is K8s and Main K8s Components Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	K8s Architecture and Minikube Local Setup Lecture by Teacher
			Hour 4	Main Kubectl Commands Lecture by Teacher
		Day 2	Hour 1	K8s Yaml configuration File Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Demo Project: MongoDB and MongoExpress Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 3	Hour 1	Organizing your components with K8s Namespaces Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	K8s Ingress, K8s with volume, K8s Services Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 4	Hour 1	Helm introduction Lecture by Teacher
			Hour 2	Lab Practice by Students

			Hour 3	Helm 2 vs Helm 3 Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 5	Hour 1	Helm charts and Dependencies Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Helm Templates and Commands Lecture by Teacher
			Hour 4	Lab Practice by Students
Week 8	- CI/CD	Day 1	Hour 1	Introduction to Jenkins Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Continuous Integration Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 2	Hour 1	Jenkins installation, Setup and Demo Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Jenkins Master Slave Architecture Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 3	Hour 1	Jenkins Pipeline Concepts Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Introduction to Azure DevOps and Azure Boards Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 4	Hour 1	Azure Repos and Pipelines Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Introduction to AWS DevOps Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 5	Hour 1	AWS DevOps Components Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Building a CICD Pipeline on AWS Lecture by Teacher
			Hour 4	Lab Practice by Students
Week 9	Infrastructure	Day 1	Hour 1	Introduction to Terraform Lecture by Teacher

	as a code		Hour 2	Lab Practice by Students
			Hour 3	AWS and Windows Setup Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 2	Hour 1	Linux and VS Code Installation Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Terraform overview and Modifying Recourses Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 3	Hour 1	Deleting and Referencing Recourses Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Terraform state commands and output Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 4	Hour 1	Target Recourses and Terraform Variables Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	AWS Cloud Formation and Templates Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 5	Hour 1	Building and Testing ARM Templates Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Template parametrization Lecture by Teacher
			Hour 4	Lab Practice by Students
2Week 10	Configuration Management Redhat OpenShift	Day 1	Hour 1	Introduction to Ansible Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Ansible vs Terraform Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 2	Hour 1	RedHat Overview Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Types and Architecture Lecture by Teacher

			Hour 4	Lab Practice by Students
		Day 3	Hour 1	Environmental Setup and Basic Concept Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	CLI Operations and Clusters Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 4	Hour 1	Application Scaling and Clusters Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Administration and Security Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 5	Hour 1	Docker Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Kubernetes Lecture by Teacher
			Hour 4	Lab Practice by Students
Week 12	Monitoring and Logging	Day 1	Hour 1	What is Prometheus Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Prometheus Architecture Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 2	Hour 1	Introduction to Grafana Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Monitoring with Grafana Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 3	Hour 1	Introduction to Datadog Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Integrations and Infrastructure Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 4	Hour 1	What is ELK Stack Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Various ELK Tools Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 5	Hour 1	Components of ELK Lecture by Teacher
			Hour 2	Lab Practice by Students

			Hour 3	ELK Flow Lecture by Teacher
			Hour 4	Lab Practice by Students
Week 12	Vulnerability Testing Case Study	Day 1	Hour 1	Snyk, what is vulnerability Scanning Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	How Snyk makes your App Secure Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 2	Hour 1	Prisma Cloud vs Snyk Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	What is Rapid 7 Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 3	Hour 1	Integrating Rapid 7 with Kubernetes cluster Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	What is Twistlock and how does it work Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 4	Hour 1	Integrating Twistlock with Virtual Lecture by Teacher
			Hour 2	Lab Practice by Students
			Hour 3	Monolithic vs Micro Services Lecture by Teacher
			Hour 4	Lab Practice by Students
		Day 5	Hour 1	Deployment Models Lecture by Teacher
			Hour 2	FInal Quiz
			Hour 3	FInal Quiz
			Hour 4	Final Quiz
Week 13	Final Structuring	Day 1	Hour 1	Motivational Speech
			Hour 2	Motivational Speech
			Hour 3	Motivational Speech
			Hour 4	Self-Assessment
		Day 2	Hour 1	Profile/CV Building
			Hour 2	Profile/CV Building
			Hour 3	Profile/CV Building
			Hour 4	Profile/CV Building

		Day 3	**Hour 1**	**Fiverr/Up work**
			Hour 2	**Fiverr/Upwork**
			Hour 3	**Fiverr/Upwork**
			Hour 4	**Fiverr/Upwork**
		Day 4	**Hour 1**	**Job Search**
			Hour 2	**Job Search**
			Hour 3	**Job Search**
			Hour 4	**Job Search**
		Day 5	**Hour 1**	**Final Workshop**
			Hour 2	**Final Workshop**
			Hour 3	**Final Workshop**
			Hour 4	**Final Workshop**

MODULES

TOPIC	SPEAKER	LINK
How to Face Problems In Life	Qasim Ali Shah	https://www.youtube.com/watch?v=OrQte08Ml90
Just Control Your Emotions	Qasim Ali Shah	https://www.youtube.com/watch?v=JzFs__yJt-w
How to Communicate Effectively	Qasim Ali Shah	https://www.youtube.com/watch?v=PhHAQEGehKc
Your ATTITUDE is Everything	Tony Robbins Les Brown David Goggins Jocko Willink Wayne Dyer Eckart Tolle	https://www.youtube.com/watch?v=5fS3rj6elFg
Control Your EMOTIONS	Jim Rohn Les Brown TD Jakes Tony Robbins	https://www.youtube.com/watch?v=chn86sH0O5U
Defeat Fear, Build Confidence	Shaykh Atif Ahmed	https://www.youtube.com/watch?v=s10dzfbozd4
Wisdom of the Eagle	Learn Kurooji	https://www.youtube.com/watch?v=bEU7V5rJTtw
The Power of ATTITUDE	Titan Man	https://www.youtube.com/watch?v=r8LJ5X2ejqU
STOP WASTING TIME	Arnold Schwarzenegger	https://www.youtube.com/watch?v=kzSBrJmXqdg
Risk of Success	Denzel Washington	https://www.youtube.com/watch?v=tbnzAVRZ9Xc

Tasks For Certificate in DevOps

Task No.	Task	Description	Week
1.	**Resonating with the Roadmap**	Write down all sections of the Roadmap that you feel proficient in and also list down sections you rank the hardest and why you rank them in that manner.	**Week 1**
2.	**Find the career path**	Prepare a career path related to your course and also highlight the emerging trends in the local as well as international market	
3.	**Linux Rapid Test**	A fast paced rapid test will be conducted orally checking the grip of various Linux commands and there uses.	
4.	**Protocol uses**	List down all protocols learnt and there uses in networking Related functions	**Week 2**
5.	**Pushing code to GIT**	Make a sample file and push it to Git	
6.	**Repository Cloning**	Clone several repositories and utilize their codes	
7.	**Cloud Comparison**	List down key differences in market trends and services of AWS, GCP and Azure	**Week 3**
8.	**Azure VM creation**	Objective: Deploy a virtual machine in Azure Tasks: 1. Create a new virtual machine in the Azure portal 2. Choose the appropriate operating system and size for the virtual machine 3. Configure networking for the virtual machine, including virtual network, subnet, and IP address 4. Create a new resource group for the virtual machine 5. Choose the appropriate storage account for the virtual machine's disks 6. Configure security settings for the virtual machine, including network security group and inbound rules 7. Deploy the virtual machine and verify that it is running correctly 8. Connect to the virtual machine using Remote Desktop Protocol (RDP)	

9.	**VPC Peering Lab**	**LAB VPC PEERING** **Singapore** Make a VPC with CIDR 10.10.0.0/16 Make a public subnet Make a separate routing table for VPC PUBLIC RT Select it and edit subnet association Attach subnet Make a gateway (Internet gateway for VPC A) Attach Add route 0.0.0.0 - IGW Make an EC2 Launch instance Name it A Attach a key pair (they are region specific) Key-Singapore Edit network settings Attach VPC-A Attach public subnet Enable auto assign Security group rule 1 SSH from everywhere Security group rule 2 ICMP from anywhere LAUNCH **North-Virginia** Create VPC VPC-B Add ipv4 CIDR 10.20.0.0/16 Create Make a private subnet VPC-B Private-subnet-VPC-B 10.2.0.0/24 Create Routing table Private-subnet-VPC-B-RT Add route Subnet association Attach No need for internet gateway! Launch instance Make an EC2 Launch instance Name it B Attach a key pair (they are region specific) Key-Virginia	

10.		Edit network settings Attach VPC-B Attach private subnet Enable auto assign Security group rule 1 SSH from everywhere (10.10.0.0/16) Security group rule 2 ICMP from anywhere (10.10.0.0/16) Now go in VPC-PEERING Create it from Singapore VPC-A-B LOCAL A Same account Another region (N.virginia) Paste VPC ID Requested Now accept it from N-virginia Adjust Routing Singapore RT Public-RT-VPC-A Add routes 10.20.0.0/16 Peering connection select VPC-A-B Virginia RT PRIVATE-RT Add route 10.10.0.0/16 Peering connection select VPC-A-B	**Week 4**
11.	**Python program**	• Python: Create a program that asks the user to enter their name and age, and then prints out a message that says "Hello [name], you are [age] years old!"	
12.	**Bash Script**	• *Bash: Create a script that prints out the current date and time, and saves it to a file.*	
13.	**Powershell script**	• Powershell: Create a script that prompts the user for their name, and then greets them with a personalized message	**Week 5**

14.	**Apache Task**	• reate a file called "index.html" in the document root directory of your Apache server. The document root directory is typically "/var/www/html" on Linux-based systems. • Open the "index.html" file in a text editor and add some basic HTML code, such as: • php • Save the file and restart Apache by running the command "sudo systemctl restart apache2" on Linux-based systems. • Open a web browser and navigate to your server's IP address or domain name. You should see the contents of your "index.html" file displayed in the browser.	**Week 5**

15.	**IIS Task**	Open the Internet Information Services (IIS) Manager console. You can do this by typing "inetmgr" in the Start menu on Windows-based systems. Click on the "Sites" node in the left-hand navigation pane, then select "Add Website" from the "Actions" pane on the right-hand side. In the "Add Website" dialog box, enter a name for your website, select a physical path for the website's content, and specify a binding information such as IP address, port, and host name. Click "OK" to create the website. IIS will create a new directory in the specified physical path with the same name as your website. Create a file called "index.html" in the website's root directory. You can use a text editor such as Notepad to create the file and add some basic HTML code to it. Save the "index.html" file and refresh the IIS Manager console to ensure that the new file is displayed under the website's directory tree. Restart the website by selecting it in the IIS Manager console and clicking on "Restart" in the "Actions" pane. Open a web browser and navigate to your server's IP address or domain name, along with the port number you specified in the binding information (e.g. http://localhost:80). You should see the contents of your "index.html" file displayed in the browser. That's it! You've successfully created a basic webpage and served it using the IIS web server.	**Week 5**

16.	**Nginix Task**	nstall Nginx web server if it's not already installed. You can do this on a Linux-based system by running the command "sudo apt-get install nginx" (for Ubuntu or Debian) or "sudo yum install nginx" (for CentOS or Red Hat). Create a file called "index.html" in the default document root directory of Nginx. The default document root directory is typically "/var/www/html" on Linux-based systems. Open the "index.html" file in a text editor and add some basic HTML code, such as: php Copy code <!DOCTYPE html> <html> <head> <title>Welcome to my website</title> </head> <body> Hello, world! This is my first website powered by Nginx. </body> </html> Save the file and restart Nginx by running the command "sudo systemctl restart nginx" on Linux-based systems. Open a web browser and navigate to your server's IP address or domain name. You should see the contents of your "index.html" file displayed in the browser. That's it! You've successfully created a basic webpage and served it using the Nginx web server	**Week 6**

17.	**Creating a Database and Table** **Inserting, Retrieving, Updating Data in a Table**	1. Create a new database: Use the CREATE DATABASE statement to create a new database. For example, CREATE DATABASE mydatabase; 2. Create a new table: Use the CREATE TABLE statement to create a new table. For example, CREATE TABLE customers (id INT PRIMARY KEY, name VARCHAR(50), email VARCHAR(50)); 1. Insert data into a table: Use the INSERT INTO statement to insert data into a table. For example, INSERT INTO customers (id, name, email) VALUES (1, 'John Doe', 'john.doe@example.com'); 2. Retrieve data from a table: Use the SELECT statement to retrieve data from a table. For example, SELECT * FROM customers; 3. Update data in a table: Use the UPDATE statement to update data in a table. For example, UPDATE customers SET email='new.email@example.com' WHERE id=1;	
18.	**Deleting Data, Creating indexes and views**	1. Delete data from a table: Use the DELETE statement to delete data from a table. For example, DELETE FROM customers WHERE id=1; 2. Create indexes: Use the CREATE INDEX statement to create indexes on one or more columns in a table. For example, CREATE INDEX idx_name ON customers (name); 3. Create views: Use the CREATE VIEW statement to create views that provide a customized view of data in one or more tables. For example, CREATE VIEW customer_names AS SELECT name FROM customers;	**Week 6**

19.	**YAML scripts**	1. Create a new YAML file named "config.yaml"
		2. Define the application name, version, and description using key-value pairs.
		For example:
		`app_name: "My Web App"`
		`version: "1.0"`
		`description: "A simple web application"`
		3. Define the database configuration settings using a nested object.
		For example:
		`database:`
		`name: "mydb"`
		`host: "localhost"`
		`port: "3306"`
		`username: "myuser"`
		`password: "mypassword"`
		4. Define the server configuration settings using another nested object.
		For example:
		`server:`
		`port: 8080`
		`host: "localhost"`
		5. Save the file and use it in your application to load the configuration settings.	

20.	**Run a pre-built container image**	Find a pre-built Docker image on Docker Hub, such as the official Nginx web server image. Pull the image to your local machine with the "docker pull" command. Start a container using the image with the "docker run" command, and access the web server through a browser.	**Week 7**
21.	**Build a custom Docker image**	Create a simple web application, such as a "Hello, World!" Python Flask app. Create a Dockerfile that defines the container image with the necessary dependencies and configurations. Build the Docker image with the "docker build" command, specifying the Dockerfile location. Start a container using the custom image with the "docker run" command, and access the web app through a browser.	

22.	**Use Docker Compose to define a multi-container app**	Create a simple web application and a database, such as a Python Flask app and a PostgreSQL database. Create a Docker Compose file that defines the two services, their dependencies, and configuration details. Start the app with the "docker-compose up" command, which will create and start both containers. Access the web app through a browser and verify that it can connect to the database.	**Week 8**
23.	**Build automation**	Create a build script that can compile and package the code into a deployable artifact, such as a JAR file or Docker image.	
24.	**Continuous Integration**	Configure a CI server, such as Jenkins, to run the build script and tests automatically whenever changes are pushed to the Git repository.	
25.	**Continuous Delivery**	Automate the deployment of the code to a staging or production environment after passing all the tests.	
26.	**Terraform Creation**	1. Create a Terraform module that provisions an EC2 instance in AWS with a specified AMI, instance type, and security group. 2. Write an Ansible playbook to deploy a web application on a set of servers with Apache and PHP installed.	
27.	**AWS CF**	3. Use CloudFormation to create an AWS VPC with public and private subnets, a NAT Gateway, and security groups. 4. Convert an existing manual deployment process to an automated one using Chef or Puppet.	**Week 9**
28.	**Jenkins Pipeline**	Implement a Jenkins pipeline that automatically deploys code changes to a production environment based on successful test results.	

29.	**Create an Ansible inventory**	Create a file named inventory in the following format: csharp Copy code [webservers] server1 ansible_host=192.168.1.100 server2 ansible_host=192.168.1.101 This inventory specifies two servers, server1 and server2, with their respective IP addresses.	
30.	**Create an Ansible playbook**	Create a file named playbook.yml in the following format: yaml Copy code --- - hosts: webservers become: yes tasks: - name: Ensure Apache is installed apt: name: apache2 state: present - name: Ensure Apache is running service: name: apache2 state: started • This playbook specifies two tasks: the first task installs Apache on the specified hosts, and the second task ensures that Apache is running.	**Week 10**
31.	**Run the Ansible playbook**	Use the following command to run the Ansible playbook: css Copy code ansible-playbook -i inventory playbook.yml This command executes the playbook on the hosts specified in the inventory file.	

32.	**Install a monitoring and logging tool**	There are several monitoring and logging tools available for free and commercial use. One popular open-source tool is Prometheus for monitoring and Grafana for visualization. You can install both tools by following the instructions for your specific operating system.	
33.	**Configure Prometheus and Grafana**	Once you have installed Prometheus, you need to configure it to scrape metrics from your target application. You can do this by adding a scrape_config block to the prometheus.yml Once you have installed Grafana, you need to configure it to connect to Prometheus as a data source. You can do this by adding a new data source in Grafana and specifying the URL of your Prometheus server.	**Week11**
34.	**Create a dashboard**	Once you have configured your monitoring and logging tools, you can create a dashboard to visualize the metrics collected by Prometheus. You can use the Grafana dashboard editor to create a new dashboard and add panels that display the metrics of interest.	
35.	**Install a vulnerability scanning tool**	There are several vulnerability scanning tools available for free and commercial use. One popular open-source tool is Nmap which is a command-line utility used to scan networks for open ports and services. You can install Nmap by following the instructions for your specific operating system.	**Week12**

Annexure-II:

Motivational Lectures

What is freelancing and how you can make money online - BBCURDU

https://www.youtube.com/watch?v=9jCJN3Ff0kA

What Is the Role of Good Manners in the Workplace? By Qasim Ali Shah | In Urdu

https://www.youtube.com/watch?v=Qi6Xn7yKIlQ

Hisham Sarwar Motivational Story | Pakistani Freelancer

https://www.youtube.com/watch?v=CHm_BH7xAXk

21 Yr Old Pakistani Fiverr Millionaire | 25-35 Lakhs a Month Income | Interview

https://www.youtube.com/watch?v=9WrmYYhr7S0

Success Story of a 23 Year - Old SEO Expert | How This Business Works | Urdu Hindi Punjabi

https://www.youtube.com/watch?v=tIQ0CWgszI0

Failure to Millionaire - How to Make Money Online | Fiverr Superhero Aaliyaan Success Story

https://www.youtube.com/watch?v=d1hocXWSpus

Annexure-II

SUGGESTIVE FORMAT AND SEQUENCE ORDER OF MOTIVATIONAL LECTURE.

Mentor

Mentors are provided an observation checklist form to evaluate and share their observational feedback on how students within each team engage and collaborate in a learning environment. The checklist is provided at two different points: Once towards the end of the course. The checklists are an opportunity for mentors to share their unique perspective on group dynamics based on various team activities, gameplay sessions, pitch preparation, and other sessions, giving insights on the nature of communication and teamwork taking place and how both learning outcomes and the student experience can be improved in the future.

Session- 1 (Communication):

Please find below an overview of the activities taking place Session plan that will support your delivery and an overview of this session's activity.

Session- 1 OVERVIEW
Aims and Objectives:
• To introduce the communication skills and how it will work • Get to know mentor and team - build rapport and develop a strong sense of a team • Provide an introduction to communication skills • Team to collaborate on an activity sheet developing their communication, teamwork, and problem-solving • Gain an understanding of participants' own communication skills rating at the start of the program

Activity:	**Participant Time**	**Teacher Time**	**Mentor Time**
Intro Attend and contribute to the scheduled.			
Understand good communication skills and how it works.			
Understand what good communication skills mean			
Understand what skills are important for good communication skills			
Key learning outcomes:	**Resources:**		**Enterprise skills developed:**

• Understand the communication skills and how it works. • Understand what communication skills mean • Understand what skills are important for communication skills	• Podium • Projector • Computer • Flip Chart • Marker	• Communication • Self Confidence • Teamwork

Schedule	**Mentor Should do**
Welcome: **5 min**	Short welcome and ask the **Mentor** to introduce him/herself. Provide a brief welcome to the qualification for the class. Note for Instructor: Throughout this session, please monitor the session to ensure nothing inappropriate is being happened.
Icebreaker: **10 min**	Start your session by delivering an icebreaker, this will enable you and your team to start to build rapport and create a team presentation for the tasks ahead. The icebreaker below should work well at introductions and encouraging communication, but feel free to use others if you think they are more appropriate. It is important to encourage young people to get to know each other and build strong team links during the first hour; this will help to increase their motivation and communication throughout the sessions.
Introduction & Onboarding: **20mins**	Provide a brief introduction of the qualification to the class and play the "Onboarding Video or Presentation". In your introduction cover the following: 1. Explanation of the program and structure. (Kamyab jawan Program) 2. How you will use your communication skills in your professional life. 3. Key contacts and key information – e.g. role of teacher, mentor, and SEED. Policies and procedures (user agreements and "contact us" section). Everyone to go to the Group Rules tab at the top of their screen, read out the rules, and ask everyone to verbally agree. Ensure that the consequences are clear for using the platform outside of hours. (9am-8pm) 4. What is up next for the next 2 weeks ahead so young people know what to expect (see pages 5-7 for an overview of the challenge). Allow young people to ask any questions about the session topic.
Team Activity Planning: **30 minutes**	MENTOR: Explain to the whole team that you will now be planning how to collaborate for the first and second

	collaborative Team Activities that will take place outside of the session. There will not be another session until the next session so this step is required because communicating and making decisions outside of a session requires a different strategy that must be agreed upon so that everyone knows what they are doing for this activity and how. • "IDENTIFY ENTREPRENEURS" TEAM ACTIVITY • "BRAINSTORMING SOCIAL PROBLEMS" TEAM ACTIVITY" *As a team, collaborate on a creative brainstorm on social problems in your community. Vote on the areas you feel most passionate about as a team, then write down what change you would like to see happen.* Make sure the teams have the opportunity to talk about how they want to work as a team through the activities e.g. when they want to complete the activities, how to communicate, the role of the project manager, etc. Make sure you allocate each young person a specific week that they are the project manager for the weekly activities and make a note of this. Type up notes for their strategy if this is helpful - it can be included underneath the Team Contract.
Session Close: **5 minutes**	**MENTOR:** Close the session with the opportunity for anyone to ask any remaining questions. **Instructor:** Facilitate the wrap-up of the session. A quick reminder of what is coming up next and when the next session will be.

Annexure-III

SUCCESS STORY

S. No	Key Information	Detail/Description
1.	**Self & Family background**	**Danyal Saleem,** who lives in Mirpur (AJK), is an example of how hard work and perseverance can reap rich rewards when bidding for projects online. The graphic designer works exclusively on an online freelancing platform and has earned, on average, **US$20,000** per month for the past several months. But this isn't a story of overnight success – Danyal has had

		to work hard to differentiate himself and stay true to his goal. It was a full year later, in May 2017, when Danyal finally decided to jump in. He signed up for one of the numerous sites that connect designers or coders with people or companies that have small projects, like designing a logo or building a website. He had already started a small business to help pay for his college education, so he was nervous and apprehensive about the decision. “I gave myself two or three months at most. If I didn’t succeed, then I would go back to running the business as it was showing potential,” he says. **If at first, you don’t succeed, try try again**
2.	**How he came on board NAVTTC Training/ or got trained through any other source**	Certification in DevOps from Microsoft (NAVTTC partner institute)
3.	**Post-training activities**	**Danyal’s** area of expertise is in **graphic design**. In his first month using Fiverr, he pitched mostly for projects centered around logo designing. But it wasn’t so simple. In the first few weeks, he didn’t hear back from even a single client, despite pitching for dozens of projects. “I needed to understand what worked, so I read blogs, participated in forums, and analyzed profiles of successful freelancers. It was an uphill struggle, but I didn’t want to give up,” he explains. Danyal says he understands why clients would be apprehensive giving projects to untested freelancers. They have hundreds of options to choose from, he explains, and to give a project to someone with no experience requires a strong leap of faith. A slow stream of projects started to come Danyal’s way. Within a few months, he was landing an average of a hundred projects every month, with a large number of repeat clients. He also expanded the range of his professional services, branching out from logo design to business cards, banners, Facebook cover pages, letterheads, and stationery. But he’s had to face his fair share of challenges too. The shoddy state of internet infrastructure in his city, Mirpur, threatened to derail his freelancing career.

		"Sometimes I haven't had connectivity for two days straight," he explains. "That's unthinkable for someone who makes his livelihood on the internet."
4.	**Message to others** **(under training)**	Take the training opportunity seriously Impose self-discipline and ensure regularity Make Hard work pays in the end so be always ready for the same.

Note: Success story is a source of motivation for the trainees and can be presented in several ways/forms in a NAVTTC skill development course as under: -

1. To call a passed out successful trainee of the institute. He will narrate his success story to the trainees in his own words and meet trainees as well.
2. To see and listen to a recorded video/clip (5 to 7 minutes) showing a successful trainee Audio-video recording that has to cover the above-mentioned points.*****
3. The teacher displays the picture of a successful trainee (name, trade, institute, organization, job, earning, etc) and narrates his/her story in the teacher's own motivational words.

***** *The online success stories of renowned professional can also be obtained from* ***Annex-II***

Annexure-IV:

Workplace/Institute Ethics Guide

Work ethic is a standard of conduct and values for job performance. The modern definition of what constitutes good work ethics often varies. Different businesses have different expectations. Work ethic is a belief that hard work and diligence have a moral benefit and an inherent ability, virtue, or value to strengthen character and individual abilities. It is a set of values-centered on the importance of work and manifested by determination or desire to work hard.

The following ten work ethics are defined as essential for student success:

1. **Attendance:**
   Be at work every day possible, plan your absences don't abuse leave time. Be punctual every day.
2. **Character:**
   Honesty is the single most important factor having a direct bearing on the final success of an individual, corporation, or product. Complete assigned tasks correctly and promptly. Look to improve your skills.
3. **Team Work:**
   The ability to get along with others including those you don't necessarily like. The ability to carry your weight and help others who are struggling. Recognize when to speak up with an idea and when to compromise by blend ideas together.
4. **Appearance:**
   Dress for success set your best foot forward, personal hygiene, good manner, remember that the first impression of who you are can last a lifetime
5. **Attitude:**
   Listen to suggestions and be positive, accept responsibility. If you make a mistake, admit it. Values workplace safety rules and precautions for personal and co-worker safety. Avoids unnecessary risks. Willing to learn new processes, systems, and procedures in light of changing responsibilities.
6. **Productivity:**
   Do the work correctly, quality and timelines are prized. Get along with fellows, cooperation is the key to productivity. Help out whenever asked, do extra without being asked. Take pride in your work, do things the best you know-how. Eagerly focuses energy on accomplishing tasks, also referred to as demonstrating ownership. Takes pride in work.
7. **Organizational Skills:**

Make an effort to improve, learn ways to better yourself. Time management; utilize time and resources to get the most out of both. Take an appropriate approach to social interactions at work. Maintains focus on work responsibilities.

8. **Communication:**

   Written communication, being able to correctly write reports and memos. Verbal communications, being able to communicate one on one or to a group.

9. **Cooperation:**

   Follow institute rules and regulations, learn and follow expectations. Get along with fellows, cooperation is the key to productivity. Able to welcome and adapt to changing work situations and the application of new or different skills.

10. **Respect:**

    Work hard, work to the best of your ability. Carry out orders, do what's asked the first time. Show respect, accept, and acknowledge an individual's talents and knowledge. Respects diversity in the workplace, including showing due respect for different perspectives, opinions, and suggestions.