

Government of Pakistan
National Vocational and Technical Training Commission

Prime Minister Youth Skills Development Program

"Skills for All"



Course Contents / Lesson Plan
Course Title: Networking & Cloud Computing - AWS
Duration: 3 Months

Trainer Name	
Author Name	Muhammad Qasim Mehmood & Muhammad Asif (Sr.Trainers CORVIT)
Course Title	Networking & Cloud Computing - AWS
Objectives and Expectations	<p>Objectives and Expectations:</p> <p>Employable skills and hands-on practice for Networking and Cloud Computing</p> <p>Networking has become one of the most attractive career profiles among candidates. From the basics of Routing and Switching to Cloud Networking, the advancements happening in the networking domain are beyond one's imagination.</p> <p>Cloud computing powers modern-day industry through seamless provision of servers, storage, networking, software and analytics. Study cloud computing to develop in-demand skills and expertise in virtualization, cloud infrastructure, app development and security.</p> <p>This is a special course designed to address unemployment in the youth. The course aims to achieve the above objective through hands on practical training delivery by a team of dedicated professionals having rich market/work experience. This course is therefore not just for developing a theoretical understanding/back ground of the trainees. Contrary to that it is primarily aimed at equipping the trainees to perform commercially in a market space in independent capacity or as a member of a team.</p> <p>The course therefore is designed to impart not only technical skills but also soft skills (i.e. interpersonal/communication skills; personal grooming of the trainees etc.) as well as entrepreneurial skills (i.e. marketing skills; free lancing etc.). The course also seeks to inculcate work ethics to foster better citizenship in general and improve the image of Pakistani work force in particular</p> <p>Main Expectations:</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>ii. To materialize the main expectations, a special module on Job Search & Entrepreneurial Skills has been included in the latter part of this course (3rd month) through which, the trainees will be made aware Of the Job search techniques in the local as well as international job markets (Gulf</p>

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 comprehensible 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.

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)

Field visits (At least one visit to a trade-specific major industry/ site must be arranged by the training institute)

Entry-level of
For an advanced course of Networking and cloud proposed entry level is minimum Beginner to

trainees	Intermediate
Learning Outcomes of the course	<p>Learning Outcomes of the course</p> <p>By the end of this course, the trainees should gain the following competencies:</p> <ul style="list-style-type: none"> • Understanding of Networking techniques Campus Design & Enterprise Network Configuration of IP Connectivity • Configuration of Advance Routing and Routing Protocols Management of Network • Security of Network Problems Solving Skills Troubleshooting Skills Network Monitoring Skills Network Designing • High Availability of Network Remote Site Management • Secure and Encrypted traffic b/w branches Implementation of Network Policies Programmability and Automation • Understanding of Cloud Computing Architecture • Distinguish between traditional and cloud computing models in terms of business value. • Learn fundamental concepts of cloud computing. • Identify technical challenges and mitigation measures involved in cloud computing. • Understand latest digitization trends associated with cloud computing. • Design and build enterprise-to-carrier grade private and public cloud. Learning focus would be on following: - • Understand various types of virtualizations (compute, storage and network) • Identify leading hypervisor manufacturers. • Learn the fundamentals concepts and deployment of vSphere virtual infrastructure. • Security threats and challenges in private and public cloud buildup. Understand design principles in securing your cloud. • Security management in cloud including identity and access management, next generation security protection and application programming interface (API) based security. • Learn about advanced load balancing architecture in cloud. • Identify common cloud attack vectors and remediating controls. Learn Off the Shelf Cloud Solutions like Microsoft Azure and Amazon Web Services (AWS) • Detailed understanding of Microsoft Azure Cloud. • Cover the fundamentals of AWS architectural principles and services. • Deep dive into individual elements like IAM, S3, Cloud front, Storage Gateway, Snowball, EC2, Cloud watch, CLI, Lambda, Route 53, RDS, Dynamo DB, Redshift, Elastic Cache, Aurora, VPC, SQS, SNS, Elastic Transcoder, Kinesis, API Gateway etc.
Course Execution Plan	<p>The total duration of the course: 3 months</p> <p>Theory: 20%</p> <p>Practical: 80%</p> <p>Total Hours of Study : 240 Hours</p>
Companies offering jobs in the respective trade	<p>There are a lots of Job opportunities in the field of networking. Few of them are mentioned below:</p> <ul style="list-style-type: none"> • PTCL (Pakistan Telecommunication Company Limited) • Jazz (Mobilink) • Telenor Pakistan • Zong (China Mobile Pakistan) • National Data Consultants (NDC Tech) • Systems Limited • Inbox Business Technologies

- World Call Telecom Limited
- Vision Telecom Pvt Ltd
- COMSATS Internet Services
- NSC Global
- Siemens
- Saif Telecom
- Descon Engineering
- Descon Mirani
- Presson Descon
- Olayan Descon
- JGC- Descon / DIP
- Etimaad
- IAEL
- SPEC Group Pakistan
- Callmate Telips
- Lahore Gymkhana
- Royal Palm
- Serena Hotel Islamabad
- Novatax Limited
- Hascom Business
- Excicom
- SB&B Advertising
- Polaris Values
- Raaziq International Pvt Ltd
- OOCL Pakistan
- Exel Pakistan
- DHL Pakistan
- Yaseen Shipping
- Karachi International Terminal Ltd
- Intertek Pakistan
- WWF Pakistan
- ESBI
- Merlin International Pakistan
- Arbor Tech
- Pak Oasis Industries Pvt. Ltd.
- OMV Exploration GmbH
- M3 Tech

Job Opportunities	<ul style="list-style-type: none"> • Cloud Administrator • Network Administrator • IT Support Officer • Manager / Assistant Manager IT • Network support engineer • Cloud Analyst
No of Students	25
Learning Place	Classroom / Lab
Instructional Resources	<p>https://www.youtube.com/@iptrainers</p> <p>https://www.youtube.com/@corvitsystemslahore</p> <p>https://www.cisco.com/c/en/us/training-events/training-certifications.html</p> <p>https://www.netacad.com/</p> <p>https://skillsforall.com/</p> <p>https://e.huawei.com/en/talent/portal/#/</p>

<https://learningcontent.cisco.com/games/binary/index.html>

<https://www.deakin.edu.au>

The daily lectures for the class will be recorded and made available on One Drive, and the link to access them will be shared with the students.

The whiteboard activities from each day will be converted to PDF format and shared with students via a One Drive link.

MODULES

Schedule d Weeks	Module Title	Days	Hours	Learning Units	Home Assignment
Week 1	Introduction to Networking and Cloud Computing	Day 1		Introduction to Computer Network Intermediate Devices Basic network terms LAN MAN WAN Evaluation Identify components of computer networks and describe their basic characteristics Introduction to network devices Router Switches HUB Server Client Operating System	
		Day 2		Network fundamentals Network protocols OSI layers Describe TCP/IP transport layer TCP/IP layers Evaluation	• Task 1
		Day 3		Cloud Computing Concept, History, and Definitions Advantages of Cloud Business Model Differentiating types of clouds: public, private and hybrid Categorizing service types What is cloud computing Advantages of cloud computing What is AWS	<u>Details may be seen at Annexure-I</u>
		Day 4		Define the files and components of virtual machines Hypervisor: Role and Purpose in Virtualization and Various Hypervisor Types Virtualization: Terminologies and the different Types of Virtualizations	
		Day 5		What is cloud computing Advantages of cloud computing What is AWS AWS pricing AWS infrastructure overview AWS services and categories AWS shared responsibility model AWS Databases overview	

Week 2	IPv4 Addressing & Subnetting	Day 1	<p>IPv4</p> <p>Concept of Network-id and Broadcast-id</p> <p>Subnet Mask and Wildcard Mask</p> <p>Concept of Default Gateway</p> <p>Routed & Non-Routed Ports</p> <p>Rules of IP addressing for Routed Ports</p> <p>Subnetting</p>	<ul style="list-style-type: none"> • Task 2 <p><u>Details may be seen at Annexure-I</u></p>
		Day 2	<p>IPv6 Addressing:</p> <p>History of IPv6 Addressing</p> <p>Format of IPv6 addressing</p> <p>Network Prefix and Interface ID Types of IPv6 Addresses:</p> <p>Global Unicast Addresses</p> <p>Unique Local Addresses</p> <p>Link Local Addresses</p> <p>Multicast Addresses</p>	
		Day 3	<p>Amazon elastic compute cloud (EC2)</p> <p>Amazon ec2 pricing models</p> <p>EC2 use cases</p> <p>AMI Building strategy</p> <p>Amazon EC2 launch template</p>	
		Day 4	<p>AWS Architecture overview</p> <p>AWS Cloud adoption framework</p> <p>AWS Well-Architected framework</p> <p>Reliability and high availability</p> <p>Transitioning a data center to a cloud</p>	
		Day 5	<p>Cloud storage overview</p> <p>Amazon S3</p> <p>Amazon S3 storage classes</p> <p>Amazon S3 pricing</p> <p>Amazon EBS</p> <p>Amazon EFS</p> <p>Instance store</p> <p>AWS storage gateway</p> <p>AWS Transfer family and other migration services</p>	
Week 3	Lab Setup with Cisco & Huawei Devices	Day 1	<p>MAC Addressing:</p> <p>Format of MAC addresses</p> <p>Types of MAC addresses</p> <p>Revision & Motivational Talk</p> <p>Basic Lab Setup with Cisco and Huawei Devices</p> <p>LAN and WAN cables Practice & Evaluation</p> <p>Physical Overview of Routers and Switches.</p> <p>How to access network devices locally.</p> <p>Difference between local and remote access.</p>	<ul style="list-style-type: none"> • Task 3 <p><u>Details may be seen at Annexure-I</u></p>

		Day 2	Introduction to terminal applications such as Putty, Hyper terminal and Secure CRT etc. LAN switching operations Link Aggregation application and configuration. VLAN principle, application and configuration	
		Day 3	Amazon VPC VPC features IP Subnetting IP addressing in VPC VPC components VPC Connectivity options Securing and troubleshooting your network Troubleshooting a VPC	
		Day 4	AWS network hardening AWS system hardening Data security in AWS AWS identity and access management (IAM) AWS cloud trail	
		Day 5	AWS config AWS trusted advisor Security best practices in AWS AWS compliance program AWS security resources Tooling and automation overview AWS System manager Administration and development tools access.	
Week 4	Advanced Configurations Of Cisco IOS and Huawei VRP Amazon Elastic Compute Cloud (EC2) AWS Architecture overview	Day 1	Introduction to Cisco IOS and CLI. Initial Configuration of Cisco IOS. Introduction of different modes of Cisco IOS. Configure and verify clock Configure and verify hostname. Configure and verify user access verification or login password Configure and verify enable password Configure and verify enable secret Learn how to modify, copy, write and erase configuration. Verify running-config and startup-config	<ul style="list-style-type: none"> • Task 4 <p><u>Details may be seen at Annexure-I</u></p>
		Day 2	Create username, password and their privileges Create username, password and their privileges in Huawei VRP How to configure and troubleshoot Ethernet and Serial interfaces. Configure description on interfaces. Configure ipv4 and ipv6 addresses on interfaces. Configure Keep alive, clock rate and encapsulation on interfaces.	

		Day 3	<p>Servers overview</p> <p>Hosting a website on AWS S3</p> <p>Computing on AWS</p> <p>Managing AWS instances</p> <p>AWS Elastic Beanstalk</p>	
		Day 4	<p>AWS Databases overview</p> <p>Amazon RDS</p> <p>Amazon Dynamo DB</p> <p>Amazon Redshift</p> <p>Amazon Aurora</p> <p>AWS Database Migration Service(AWS DMS)</p> <p>Migrating to Amazon RDS</p>	
		Day 5	<p>Scaling and name resolution overview</p> <p>Elastic Load Balancing (ELB)</p> <p>ELB and Listeners</p> <p>Amazon EC2 Auto-scaling</p> <p>Amazon Route-53</p> <p>Amazon cloud front</p>	
Week 5	<p>Basic Routing</p> <p>Cloud storage overview</p> <p>Amazon VPC</p> <p>AWS network hardening</p>	Day 1	<p>Remote-access with TELNET and SSH</p> <p>Introduction to DHCP.</p> <p>How to configure DHCP on Cisco IOS Understand Next hop.</p> <p>Practice & Evaluation</p> <p>How to configure next hop with:</p> <p>Outgoing interface</p> <p>Next Hop IP address Practice & Evaluation</p>	
		Day 2	<p>Revision & Motivational Talk</p> <p>Introduction to Routing for reachability.</p> <p>Understand static routing.</p> <p>Configure and verify static routing for IPv4</p> <p>Introduction to Dynamic Routing</p> <p>Types of routing protocols</p> <p>Evaluation</p> <p>Define IGP & EGP</p> <p>Evaluation</p>	<ul style="list-style-type: none"> • Task 5 <p><u>Details may be seen at Annexure-I</u></p>
		Day 3	<p>Introduction to server less and micro services</p> <p>Server less and containers overview</p> <p>AWS Lambda</p> <p>Working with AWS lambda</p> <p>Amazon APIs gateway</p> <p>AWS Step function</p> <p>Amazon SQS</p> <p>Containers on AWS</p>	

		Day 4	<p>AWS Cost management and best practices</p> <p>AWS support services</p> <p>Infrastructure as a Code</p> <p>Introduction to JSON and YAML</p> <p>AWS Cloud formation</p> <p>Troubleshooting AWS cloud formation</p> <p>Deployments</p>	
		Day 5	<p>AWS CLI setup on windows</p> <p>AWS CLI setup on Linux</p> <p>AWS CLI setup on Mac</p> <p>AWS cloud shell</p> <p>IAM security tools</p>	
Week 6	<p>Mid Term Exam</p> <p>Network Services and IOS Features</p> <p>AWS config</p> <p>Hosting a website on AWS S3</p>	Day 1	<p>Interior gateway protocols:</p> <p>RIP: Routing Information Protocol OSPF: Open Shortest Path First</p> <p>IS-IS: Intermediate System to Intermediate System Evaluation</p> <p>Exterior Gateway protocols:</p> <p>BGP: Border Gateway Protocol Evaluation</p> <p>Administrative Distance or preference of routing methods.</p> <p>Configure and verify Default Routing</p>	<ul style="list-style-type: none"> • Task 6 <p><i>Details may be seen at Annexure-I</i></p>
		Day 2	<p>Configure and verify CDP Evaluation</p> <p>Configure and verify NTP: Network Time Protocol Evaluation</p> <p>Password Recovery Evaluation</p>	
		Day 3	<p>Introduction</p> <p>Virtual Machines</p> <p>Scale Sets</p> <p>App Service</p>	
		Day 4	<p>SSH overview</p> <p>SSH to Linux servers</p> <p>SSH to window servers</p> <p>SSH troubleshooting</p> <p>EC2 instance connect</p> <p>EC2 instance roles</p>	
		Day 5	Mid Term Exam	
Week 7	<p>IP Traffic Management & Security</p> <p>On Cisco & Huawei</p> <p>AWS Databases overview</p> <p>Introduction to server less and</p>	Day 1	<p>Configure and verify CDP Evaluation</p> <p>Configure and verify NTP: Network Time Protocol Evaluation</p> <p>Password Recovery Evaluation</p>	<ul style="list-style-type: none"> • Task 7 <p><i>Details may be seen at Annexure-I</i></p>

	micro services	Day 2	Introduction to Access Control List Evaluation Configure and verify standard ACL Configure and verify extended ACL Evaluation Contiguous and dis-contiguous wildcard mask Implement named and numbered ACL	
		Day 3	EBS hands-on EBS snapshots EC2 instance store EBS volume types EBS multi attach	
		Day 4	Amazon EFS hands-on EFS vs EBS Amazon FSx Different storage classes Block level vs object level storages	
		Day 5	Hybrid Connectivity Options Routes and VNET Peering Routing and Peering Hybrid Scenarios	
Week 8	Job Search & Entrepreneurial Skills (Search Jobs in at least two labor marketplace countries) Deep Dive into Dynamic Routing AWS Cost management and best practices Introduction to JSON and YAML	Day 1	Introduction to public and private IP addresses Evaluation Introduction to NAT and PAT. Configure and verify network address translation Evaluation Configure and verify PAT/NAT overloading	<ul style="list-style-type: none"> • Task 8 <p><u>Details may be seen at Annexure-I</u></p>
		Day 2	OSPF: Open Shortest Path First Link State Algorithm Evaluation OSPF Process-id. OSPF Router-id. Configure Loopback Interfaces OSPF Area-id. OSPF contiguous wildcard mask OSPF Metric: cost OSPF Tables: Evaluation Configure and verify single area OSPF	

		Day 3	<p>High availability and scalability</p> <p>Application load balancer</p> <p>Network load balancer</p> <p>Classis load balancer</p> <p>Gateway load balancer</p> <p>Auto scaling group and policies</p> <p>Demo: Create Azure AD Tenant</p> <p>Demo: Create Users and Groups</p> <p>Demo: Self-Service Password Reset</p>	
		Day 4	<p>Choosing & creating a new AMI</p> <p>Public, Private & Elastic IP's</p> <p>Deploying a new instance from the created AMI</p>	
		Day 5	<p>AWS Dynamo DB for Radis</p> <p>RDS proxy</p> <p>Elastic Cache overview</p> <p>Elastic Cache hands-on</p> <p>Elastic Cache strategies</p>	
Week 9	<p>OSPF & Policy Based Routing</p> <p>EBS hands-on</p> <p>Amazon EFS hands-on</p>	Day 1	<p>Design and implement multiple area OSPF.</p> <p>Regular and transit area.</p> <p>Evaluation</p> <p>Define Internal Router, Backbone Router, Backbone Internal Router, Area Border Router and ASBR.</p> <p>Practice & Evaluation</p> <p>Introduce and configure redistribution. Define seed/external metric.</p> <p>Type 1 and Type 2 seed metric.</p> <p>Evaluation</p> <p>Static routes with null-0 for testing.</p> <p>Practice & Evaluation</p>	<p>• Task 9</p> <p><u>Details may be seen at Annexure-I</u></p>
		Day 2	<p>Revision & Motivational Talk</p> <p>Introduction to PBR tools: Route-map</p> <p>IP prefix-list Distribute-list ACL</p> <p>OSPF neighbor states</p>	
		Day 3	<p>Route53 Policies.</p> <p>Weighted simple and failover policies</p> <p>Geolocation policy</p> <p>Geoproximity Policy</p> <p>Multi value policy</p> <p>IP based traffic</p>	

		Day 4	What is DNS Route53: Register a domain Route53: Transfer a domain Create first record in Route53 Route53: TTL Route53: CNAME vs Alias Route53: Health Check Route53 and Third party domain	
		Day 5	S3 Buckets S3 Uploading Downloading S3 Permissions S3 Object Versioning S3 Lifecycle Policies S3 CRR S3 resource based policy	
Week 10	Introduction to AWS AWS Design constraints and Managing	Day 1	OSPF over multi-access networks DR, BDR and DRO roles in multi-access networks Evaluation Introducing OSPF LSA types 1 to 7. Practice & Evaluation	• Task 10 <u>Details may be seen at Annexure-I</u>
		Day 2	Regular area types: Stub Area Totally Stubby area Evaluation NSSA: Not So Stubby Area Totally NSSA Configure and verify OSPF Virtual Links. Practice and Evaluation	
		Day 3	S3 encryption S3 CORS S3 MFA S3 Access logs S3 pre-signed-URL S3 access points S3 Object lambda Configuring origins and behaviors	
		Day 4	AWS EC2 instance metadata AWS EC2 instance user data AWS CLI profiles AWS CLI with MFA AWS SDK overview AWS back off and service limits	
		Day 5	Describe, create, and manage Amazon Virtual Private Cloud Amazon VPC, Private Subnet, and Public Subnet AWS Networking, Security Groups, and Network ACLs Configuration and management of VPN connectivity	
Week 11	Storage – Azure AWS Operations	Day 1	Configure and verify OSPF Virtual Links. Practice and Evaluation Continuous and discontinuous OSPF backbones. Practice and Evaluation	• Task 11 <u>Details may be seen at Annexure-I</u>

		Day 2	OSPF filters: IP prefix-lists Evaluation Area filters Evaluation Passive interface Evaluation Route summarization Evaluation Authentication	
		Day 3	Cloud Front Use of cloud front Creating a cloud front distribution Hosting a website of cloud front distribution implementing restrictions	
		Day 4	AWS EKS Cluster Architecture Setting up Node Pools	
		Day 5	EKS Pods, Deployments, Services, Ingress. Deploying Workloads on EKS Namespaces and HPA	
Week 12	AWS Storage AWS Basic Security	Day 1	Revision & Motivational Talk Introduction to EGP Evaluation Historical Background Introduction to Multihoming Evaluation BGP fundamentals. Internal and External BGP. Evaluation BGP attributes: Weight Practice & Evaluation	<ul style="list-style-type: none"> • Task 12 <p><u>Details may be seen at Annexure-I</u></p> <p>Final Project</p>
		Day 2	Local preference Evaluation As-path Evaluation Router-id BGP route-summarization PBR with BGP attributes and PBR tools Evaluation Full Mesh i-BGP Route-reflector configuration BGP configuration best practices Evaluation BGP authentication	
		Day 3	Docker Architecture Hosting Docker Containers on AWS EC2, ECS FarGate, Lambda and Beanstalk	
		Day 4	AWS Code Commit AWS Code Build AWS Code Artifact	
		Day 5	AWS Code Deploy AWS Code Pipeline	
Week 13	Final Assessment		Final Exam	

Task No.	Task	Description	Week
1.	<p>Cisco Binary Game Link is given on Page4. Revise OSI and TCP/IP Models</p> <p>Cloud subscriptions</p>		Week 1
2.	<p>Solve IPv4 Addressing MCQs IPv6 Question will be given to identify their types Candidates are required to identify types of MAC addresses in the class</p> <p>Creation of public accounts</p> <p>Managing cloud users</p>	<p>PDF file will be given in the class containing 20 questions to practice IP addressing.</p> <p>Creation of public accounts Managing cloud users Installation & Virtualization and Various Hypervisor Types</p>	Week 2
3.	<p>Basic Configuration</p> <p>Installation of ESXi</p> <p>Configuring ESXi services</p>	<p>Configure and verify clock Configure and verify hostname.</p> <p>Configure and verify user access verification or login password</p> <p>Configure and verify enable password Configure and verify enable secret</p> <p>Learn how to modify, copy, write and erase configuration.</p> <p>Verify running-config and startup-config</p> <p>Create username, password and their privileges Configure banners:</p> <p>motd login exec</p> <p>Installation of ESXi Configuring ESXi services</p>	Week 3
4.	<p>Advanced Configurations Of Cisco IOS and Huawei VRP</p> <p>Create Centralized Storage vs. Distributed Storage</p>	<p>Configure and troubleshoot Ethernet and Serial interfaces.</p> <p>Configure description on interfaces.</p> <p>Configure ipv4 and ipv6 addresses on interfaces. Configure Keep alive, clock rate and encapsulation on interfaces.</p> <p>Verify connectivity with test traffic.</p> <p>Use of ping command and understand output. Impact of round-trip time.</p> <p>Remote-access with TELNET and SSH. Configure DNS.</p> <p>Configure DHCP on Cisco IOS and Huawei VRP</p> <p>Creat Centralized Storage vs. Distributed Storage</p>	Week 4
5.	<p>Basic Routing</p> <p>Create Backup and restore</p> <p>Backup</p>	<p>Configure next hop with: Outgoing interface</p> <p>Next Hop IP address</p> <p>Configure and verify static routing for IPv4</p> <p>Configure and verify Default Routing.</p> <p>Configure and verify DHCP Relay Agent.</p>	Week 5
6.	<p>Network Services and IOS Features</p> <p>Creating virtual machine, Clone & templates</p>	<p>IOS and Configuration Backup with TFTP</p> <p>Configure and verify CDP</p> <p>Configure and verify LLDP</p> <p>Configure and verify NTP: Network Time Protocol</p> <p>Password Recovery</p>	Week 6

		Configure and verify Embedded Event Manager: EEM Configure KRON Scheduler Configure and verify SYSLOG Creating virtual machine, Clone & templates	
7.	Network Services and IOS Features Creating virtual machine, Clone & templates IP Traffic Management & Security On Cisco & Huawei Describe vSphere architecture & vSphere cluster	Configure and verify standard ACL Configure and verify extended ACL Implement named and numbered ACL Configure and verify network address translation Configure and verify PAT/NAT-overloading Describe vSphere architecture & vSphere cluster	Week 7
8.	Deep Dive into Dynamic Routing Creating & Managing Virtual Machine in Azure Portal	Configure and verify single area OSPF. Design and implement multiple area OSPF. Introduce and configure redistribution. Configure seed/external metric. Configure Type 1 and Type 2 seed metric. Configure Static routes with null-0 for testing. Creating & Managing Virtual Machine in Azure Portal	Week 8
9.	OSPF & Policy Based Routing Create azure firewall	Industry Scenario-1 to implement PBR Industry Scenario-2 to implement PBR Create azure firewall	Week 9
10.	AWS login and feature explore AWS Operation on Portal Project	Create free login on AWS Web Portal Explore EC2 instance Explore EC2 Load Balancing on Amazon Web portal Dynamic scaling and policies of autoscaling Implement a Project as per instructor	Week10
11.	AWS Storage Management AWS Basic Security Features Create VPC and Database management	Explore how to create, delete, Mounting and unmounting EBS volume. Practices on AWS Storage management. Protect the cloud by implementing the different techniques,like Identity Access Management (IAM) Creating Users and Groups, Applying policies, Password Policy, Roles, AWS Security Management, Security Practices for Cloud Deployment and AWS Responsibilities and Securities. Create VPC Cloud on AWS and implement the all technique of database	Week11
12.	AWS Managerial tools Disaster Management Policies	Explore all management tools on by one in AWS Implement the different disaster management policies like How to manage Disaster Recovery and Backups, DR and Backups, AWS High Availability Design	Week12

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:	
<ul style="list-style-type: none"> • 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
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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: <ol style="list-style-type: none"> 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.

	<p>Ensure that the consequences are clear for using the platform outside of hours. (9am-8pm)</p> <p>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.</p>
Team Activity Planning: 30 minutes	<p>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.</p> <p>"IDENTIFY ENTREPRENEURS" TEAM ACTIVITY "BRAINSTORMING SOCIAL PROBLEMS" TEAM ACTIVITY"</p> <p><i>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.</i></p> <p>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.</p> <p>Type up notes for their strategy if this is helpful - it can be included underneath the Team Contract.</p>
Session Close: 5 minutes	<p>MENTOR: Close the session with the opportunity for anyone to ask any remaining questions.</p> <p>Instructor:</p> <p>Facilitate the wrap-up of the session. A quick reminder of what is coming up next and when the next session will be.</p>

MOTIVATIONAL LECTURES LINKS:

TOPIC	SPEAKER	LINK
Senior Network Engineer Salary Interview Job Description Career	Ben Lovegrove	https://www.youtube.com/watch?v=ibju0yMiaQ0
Network Engineers	NetworkChuck	https://www.youtube.com/watch?v=443TT26w1LE
Meet Network	LifeAtGoogle	https://www.youtube.com/watch?v=pNyaPRFJ8lQ

Engineers at Google		
How to Face Problems In Life	Qasim Ali Shah	https://www.youtube.com/watch?v=OrQte08MI90
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=s10dzfb0zd4
Wisdom of the Eagle	Learn Kurooji	https://www.youtube.com/watch?v=bEU7V5rJTw
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

SUCCESS STORY

Annexure III

S. No	Key Information	Detail/Description
1.	Self & Family background	<p>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.</p> <p>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.</p>

		<p>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.</p> <p>If at first, you don't succeed, try try again</p>
2.	How he came on board NAVTTC Training/ or got trained through any other source	<p>Certification in graphic designing from STEPS(NAVTTTC partner institute)</p>
3.	Post-training activities	<p>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.</p> <p>“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.</p> <p>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.</p> <p>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.</p> <p>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.”</p>

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.
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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**

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:

Attendance:

Be at work every day possible, plan your absences don't abuse leave time. Be punctual every day.

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.

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.

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

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.

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.

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.

Communication:

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

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.

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.