

Government of Pakistan

National Vocational and Technical Training Commission

Prime Minister's Hunarmand Pakistan Program

"Skills for All"



Course Contents / Lesson Plan

Course Title: Networking and Cloud Computing

Duration: 6 Months

Course Title	<p style="text-align: center;">Networking and Cloud Computing</p>
Objectives and Expectations	<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 virtualisation, 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><u>Main Expectations:</u></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> <ol style="list-style-type: none"> 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 <u>Job Search & Entrepreneurial Skills</u> 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 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

	<p>deemed suitable but only those cases must be selected that are relevant and of a learning value.</p> <p>The Trainees should be required and supervised to carefully analyze the cases.</p> <p>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.</p> <p>Case studies can be implemented in the following ways: -</p> <ol style="list-style-type: none"> 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
Learning Outcomes of the course	Skills to Learn how the individual components of the Bitcoin protocol make the whole system works: transactions, script, blocks, and the peer-to-peer network
Course Execution Plan	<p>The total duration of the course: 6 months (26 Weeks)</p> <p>Class hours: 4 hours per day</p> <p>Theory: 20%</p> <p>Practical: 80%</p> <p>Weekly hours: 20 hours per week (5 days a week)</p> <p>Total contact hours: 520hours</p>
Companies offering jobs in the respective trade	<ul style="list-style-type: none"> • PTCL • Huawei • Wateen • NetSole • Storm Fiber • Multinet • Nescom • Transworld • Netcom • Worldcall • Alpha Enterprises • Amigo Technology
Job Opportunities	<ul style="list-style-type: none"> • Network Engineer • Network Administrator • IT Support Officer • Manager / Assistant Manager Networks • Network support technician <p>Troubleshooters</p>
No of Students	25
Learning Place	Classroom / Lab

Instructional Resources

- <https://www.w3schools.com/>
- <https://www.coursera.com/>
- <https://www.towardsdatascience.com/>
- <https://www.codingbat.com/>
- <https://www.pythonforeverybody.com/>
- <https://www.imedita.com/blog/top-networking-courses/>
- <https://www.deakin.edu.au/courses/find-a-course/information-technology/cloud-computing-and-networking>
- <https://www.udemy.com/course/complete-networking-fundamentals-course-ccna-start/>
- <https://www.edx.org/learn/computer-networking>
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MODULES

Scheduled Week	Module Title	Learning Units	Remarks
Week 1	Fundamentals of IT	<ul style="list-style-type: none"> ● Motivational Lecture (For further detail please see Annexure: II) ● Motivational Lecture ● Course Introduction ● Success stories ● Job market ● Course Applications ● Institute Ethics ● Introduction to Information Technology ● Introduction to Computer Hardware ● Introduction to Computer Software 	<p>TASK1</p> <p>TASK2</p> <p>TASK3</p> <p><i><u>Details may be seen at Annexure-I</u></i></p>
Week 2	IP Network Principles/ Introduction to Cloud Computing Delivering services from the cloud/	<ul style="list-style-type: none"> ● Success stories (For further detail please see Annexure: III) ● Network Fundamentals, OSI & TCP/IP network protocols and data encapsulation. ● Ipv4 addressing principles, address design and subnetting. ● TCP/IP supporting applications such as Ping, Tracert, FTP, and Telnet. ● Review Traditional Computing 	<p>TASK 4</p> <p>TASK 4a</p> <p>TASK 4A</p> <p><i><u>Details may be seen at Annexure-I</u></i></p>

		<p>Challenges and Concerns</p> <ul style="list-style-type: none"> • Cloud Computing Concept, History, and Definitions • Cloud Reference Architecture • Advantages of Cloud Business Model • Differentiating types of clouds: public, private and hybrid • Categorizing service types • Comparing vendor cloud products: Amazon, Google, Microsoft and others 	
Week 3	<p>LAN Technologies/ : Introduction to Virtualization - the Backbone Technology of Cloud Computing/ vSphere Virtual Infrastructure</p>	<ul style="list-style-type: none"> • Motivational Lecture (<i>For further detail please see Annexure: II</i>) • LAN switching operations. • Link Aggregation application and configuration. • VLAN principle, application and configuration. • Virtualization: Definition, Concepts, History, and Relationship to Cloud Computing • Virtualization: Benefits, Challenges, Risks, and Suitability to Organizations • Hypervisor: Role and Purpose in Virtualization and Various Hypervisor Types • Virtualization: Terminologies and the different Types of Virtualization 	<p>TASK 5</p> <p>TASK 6</p> <p>TASK7</p> <p>TASK8</p> <p>TASK9</p> <p>TASK 8A</p> <p>TASK 9A</p> <p><i><u>Details may be seen at Annexure-I</u></i></p>

			Test at end of month (Week-4)
Week 5	Network Security/ Configuring and Managing Virtual Networks/ Storage Virtualization Basics	<ul style="list-style-type: none"> ● Motivational Lecture (For further detail please see Annexure: II) ● Traffic Filtering technologies and their application in the enterprise network ● User management through authentication and authorization schemes. ● Describe, create, and manage standard switches ● Configure virtual switch security and load-balancing policies ● Contrast and compare vSphere distributed switches and standard switches ● Describe the virtual switch connection types ● Describe the new TCP/IP stack architecture ● Use VLANs with standard switches ● Storage Architecture for Virtualization ● Physical Disk Types and Related Techniques ● Centralized Storage vs. Distributed 	TASK14 TASK 14 A <u>Details may be seen at Annexure-I</u>

		<p>Storage</p> <ul style="list-style-type: none"> Virtualized Storage vs. Non-Virtualized Storage Introduction to VM Disks 	
Week 6	<p>OSPF Routing Protocols / Configuring and Managing Virtual Storage/ Cloud Computing Emerging Trends/Technologies</p>	<ul style="list-style-type: none"> Success stories (For further detail please see Annexure: III) Basic principles of link state routing protocols OSPF principles, configuration, and implementation: neighbor and adjacency, protocol packet and LSA, database synchronization, intra-area route calculation, inter-area route calculation, and external route calculation Introduce storage protocols and storage device types Discuss ESXi hosts using iSCSI, NFS, and Fibre Channel storage Create and manage VMFS and NFS datastores Software Defined Networking (SDN) Network Functions Virtualization (NFV) Bring Your Own Device (BYOD) and MDM 	<p>TASK15 TASK 15A <i>Details may be seen at Annexure-I</i></p>
Week 7	<p>OSPF Special Areas / Role of Cloud in</p>	<ul style="list-style-type: none"> Motivational Lecture (For further detail please see Annexure: II) 	

	Digital transformation	<ul style="list-style-type: none"> Principles and configuration of OSPF special areas: stub area, totally stub area, and not-so-stubby area (NSSA) Big Data and Big Data Analytics, Hadoop, NoSQL databases, their characteristics and types. Internet of Things (IoT) and its types. Integration of cloud computing and DevOps 	<p>TASK 16</p> <p>TASK 17</p> <p>TASK 18</p> <p>TASK 17A</p> <p>TASK 18A</p> <p><i><u>Details may be seen at Annexure-I</u></i></p>
Week 8	Exterior Gateway Protocol / vCenter Server Architecture / OpenStack Architecture/ OpenStack Deployment	<ul style="list-style-type: none"> Success stories (For further detail please see Annexure: III) Introduction to EGP Historical Background Introduction to Multihoming BGP fundamentals. Internal and External BGP. Overview Deploy and configure vCenter Server Appliance Use vSphere Web Client Backup and restore vCenter Server vCenter Server permissions and roles vSphere HA architectures and features 	<p>TASK 19</p> <p>TASK 20</p> <p>TASK 21</p> <p>TASK 22</p> <p>TASK 23</p> <p>TASK 22A</p> <p>TASK 23A</p> <p><i><u>Details may be seen at Annexure-I</u></i></p> <p>2nd</p> <p>Monthly</p>

		<ul style="list-style-type: none"> • vSphere authentication proxy • Manage vCenter Server inventory objects and licenses • Access and navigate the new vSphere clients • OpenStack Overview & Components • OpenStack Dashboard Management • Authentication Management • Compute, Storage and Network Management • OpenStack Orchestration Management • Image Management 	Test at end of month (Week-8)
Week 9	Exterior Gateway Protocol / Virtual Machine Management/ Security Threats and Challenges in Cloud Computing	<ul style="list-style-type: none"> • Motivational Lecture (For further detail please see Annexure: II) • BGP Attributes • Weight • Local preference As-path • Multi exit discriminator Origin • Router-id • BGP route-summarization • PBR with BGP attributes and PBR tools Full Mesh i-BGP • Route-reflector configuration BGP configuration best practices BGP Packet types and states BGP 	TASK 24 TASK 25 TASK 26 TASK 27 TASK 26A TASK 27A <u>Details may be seen at Annexure-I</u>

		<p>authentication</p> <ul style="list-style-type: none"> ● Route filtering by using filtering tools such as ACL, IP-prefix ● Use templates and cloning to deploy new virtual machines ● Modify and manage virtual machines ● Clone a virtual machine ● Upgrade virtual machine hardware to version 12 ● Remove virtual machines from the vCenter Server inventory and datastore ● Customize a new virtual machine using customization specification files ● Perform vSphere vMotion and vSphere Storage vMotion migrations ● Create and manage virtual machine snapshots ● Create, clone, and export vApps ● Introduce the types of content libraries and how to deploy and use them ● Security and Compliance in Cloud ● Physical Security and Cloud Computing 	
Week 10	MPLS L3 VPN / Architectural Concepts of Cloud	<ul style="list-style-type: none"> ● Success stories (For further detail please see Annexure: III) 	

	<p>Security and Design Requirements/ vSphere HA, vSphere Fault Tolerance, and Protecting Data</p>	<ul style="list-style-type: none"> ● Control Plane ● Data Plane ● Understanding Routing Information Base ● Understanding Forwarding Information Base ● Understanding MPLS ● MPLS header ● MPLS Labels ● Label Information Base ● Label Forwarding Information Base ● Label Allocation ● Label Distribution ● Label Retention ● Configure and verify basic MPLS ● Understanding MPLS VPN ● VRF ● Route Distinguisher ● Route Targets ● MP-BGP ● Describe cloud security reference architecture ● Understand design principles of secure cloud computing 	<p>TASK 28</p> <p>TASK 29</p> <p>TASK 28A</p> <p>TASK 29A</p> <p><u>Details may be seen at Annexure-I</u></p>
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		<ul style="list-style-type: none"> • Explain the vSphere HA architecture • Configure and manage a vSphere HA cluster • Use vSphere HA advanced parameters • Define cluster-wide restart ordering capabilities • Enforce infrastructural or intra-app dependencies during failover • Describe vSphere HA heartbeat networks and datastore heartbeats • Introduce vSphere Fault Tolerance • Enable vSphere Fault Tolerance on virtual machines • Examine enhanced consolidation of vSphere Fault Tolerance virtual machines • Introduce vSphere Replication • Use vSphere Data Protection to back up and restore data 	
Week 11	Advanced Features of Switches/ Introduction to Microsoft Azure Cloud	<ul style="list-style-type: none"> • Motivational Lecture (<i>For further detail please see Annexure: II</i>) • Configure Basic Switch Settings • Configure SSH Access to the Switches • Configure Secure Trunks and Access Ports 	TASK 30 TASK 31 TASK 32 TASK 33 TASK 32A TASK 33A

		<ul style="list-style-type: none"> • Configure IP DHCP Snooping • Azure Foundations • Azure Marketplace • Azure Portal • Azure CLI • Cloud Shell • Lab: Creating a Free Azure Account • Footprint and Structure • Azure Services • Compute • Networking • Storage • Web and Mobile • Databases • Data and Analytics • Enterprise Integration • Security and Identity • Monitoring and Management 	<p><u>Details may be seen at Annexure-I</u></p>
<p>Week 12</p>	<p>Basic Statistics Operations/ Network Security Management in Cloud/ Azure</p>	<ul style="list-style-type: none"> • Success stories (For further detail please see Annexure: III) • VLANs and Private VLANs. • L2/L3 Etherchannels 	<p><u>Details may be seen at Annexure-I</u></p>

	Architecture	<ul style="list-style-type: none"> • inter Network Security Groups • Demo: Network Security Groups • VLAN routing with L3 switches. • Network Security Management in the Cloud • Vulnerability, Patch Management, and Pen-Testing • Introduction • Regions and Availability Zones • Resource Groups and Azure Resource Manager • Lab: Creating Azure Resources 	
	Build your CV	<p>Download professional CV template from any good site (https://www.coolfreecv.com or relevant)</p> <ul style="list-style-type: none"> • Add Personal Information • Add Educational details • Add Experience/Portfolio • Add contact details/profile links 	
Week 13	Mid-Term Assignment/Exam		
Week 14	RSTP/MSTP/ Compute - Azure	<ul style="list-style-type: none"> • Limitations of STP, improvements in RSTP, RSTP configuration • Limitations of a single spanning Tree, MSTP principles and configuration • Introduction • Virtual Machines • Scale Sets 	<p>TASK 34</p> <p>TASK 34 A</p> <p><i><u>Details may be seen at</u></i></p>

		<ul style="list-style-type: none"> • App Service • Azure Container Instances • Azure Kubernetes Service • Functions • Lab: Azure App Services 	<u>Annexure-I</u>
Week 15	<p>Link Aggregation Link Bundling EtherChannel</p> <p>L3 Redundancy / Networking – Azure</p>	<ul style="list-style-type: none"> • Motivational Lecture (For further detail please see Annexure: II) • Introduction to link aggregation Configure and verify EtherChannel Port Channel • Channel Group • Static Implementation Dynamic EtherChannel with -PagP -LACP • Different Load-balancing techniques. Introduce First Hop Redundancy • Hot Standby Routing Protocol • Introduction • Virtual Network • Load Balancer • VPN Gateway • Application Gateway • Content Delivery Network • Lab: Creating a Virtual Network 	<u>Details may be seen at Annexure-I</u>

		<p>Connection</p> <ul style="list-style-type: none"> • Demo: Create Network in Azure Portal • IP Addressing • Demo: Private DNS • Demo: Public DNS • Demo: Static Private and Public IP 	
Week 16	<p>Firewall Technology Basis/ Security – Azure</p>	<ul style="list-style-type: none"> • Success stories (For further detail please see Annexure: III) • firewall products • Security zone and security policy • NAT: Private network users accessing the Internet, Internet users accessing Intranet servers • Attack defense • Introduction • Securing Network Connectivity • Azure Security Center • Key Vault • Azure Information Protection • Advanced Threat Protection • Lab: Azure Key Vault 	<p>TASK 35</p> <p>TASK 36</p> <p><u>Details may be seen at Annexure-I</u></p> <p>3rd Monthly Test at end of month (Week-16)</p>
	<p>Create an account profile on Fiverr (at least two gigs) and Upwork</p>	<p>Create an account by following these steps:</p> <p>Step 1: Personal Info</p> <p>Step 2: Professional Info</p>	

		Step 3: Linked Accounts Step 4: Account Security	
Week 17	IPv6 Networks / Azure Solutions / Authentication and Authorization – Azure	<ul style="list-style-type: none"> ● Motivational Lecture (For further detail please see Annexure: II) ● Ipv6 Principles & Technologies ● IPv6 routing technologies ● Introduction ● Internet of Things ● Big Data ● Artificial Intelligence ● Serverless ● DevOps ● Lab: Using Azure AI ● Introduction ● Identity Services ● Azure Active Directory ● Multi-Factor Authentication ● Lab: Azure Active Directory ● Demo: Create Azure AD Tenant ● Demo: Create Users and Groups ● Demo: Self-Service Password Reset 	TASK 37 TASK 37A <u>Details may be seen at Annexure-I</u>
Week 18	Automation & Device Programmability / Database - Azure	<ul style="list-style-type: none"> ● Success stories (For further detail please see Annexure: III) ● Introduction to REST API ● Automation Protocols (Restconf, Netconf) ● Data Formats (JSON, XML) ● Postman ● Configure a router through scripting ● Introduction ● Cosmos DB 	TASK 38 TASK 38A <u>Details may be seen at Annexure-I</u>

		<ul style="list-style-type: none"> • Azure SQL • Azure Database for MySQL • Azure Database for PostgreSQL • Database Migration Services • Lab: Creating Cosmos DB 	
Week 19	AWS Cloud / Connectivity between Virtual Networks – Azure/	<ul style="list-style-type: none"> • Motivational Lecture (For further detail please see Annexure: II) • AWS Platform • Introduction to AWS Elastic computing • Introduction to the AWS products • Regions and Availability Zones • Signing up for AWS • AWS Free usage tier • Introduction AWS management console • EC2 Instance • Understanding AMI • Launching your first AWS instance • On-demand Instance pricing • Reserved Instance pricing • Spot instance pricing • Setting up security • Security groups 	<p>TASK 39</p> <p>TASK 39 A</p> <p><u>Details may be seen at Annexure-I</u></p>

		<ul style="list-style-type: none"> • Choosing & Creating a new AMI • Public, Private & Elastic IP's • Deploying a new instance from the created AMI • Key Pairs • Hybrid Connectivity Options • Routes and VNET Peering • Routing and Peering • Hybrid Scenarios 	
Week 20	<p>AWS Operations/ Create and Configure Network Security Group (NSG) – Azure / Storage – Azure</p>	<ul style="list-style-type: none"> • Success stories (For further detail please see Annexure: III) • Load Balancing • Introduction to Scaling • ELB(Elastic Load Balancer) • Components and types of load balancing • Auto-scaling • Get Started with Auto Scaling Using the Console • Maintain a Fixed Number of Running EC2 Instances • Dynamic Scaling • The lifecycle of autoscaling • Policies of autoscaling 	<p>TASK 40 TASK 40 A <u>Details may be seen at Annexure-I</u> 4th Monthly Test at end of month (Week-20)</p>

		<ul style="list-style-type: none"> • Network Security Groups • Demo: Network Security Groups • Introduction • Blob • Disk • File • Archive • Lab: Creating a Storage Account • Manage Azure VM Storage • VM Storage Overview • Demo: Add Disk • Disk Caching • Demo: Disk Caching 	
Week 21	Employable Project/Assignment (6 weeks (i.e 21-26) in addition to regular classes.	<ul style="list-style-type: none"> • Motivational Lecture (For further detail please see Annexure: II) • Guidelines to the Trainees for selection of students employable project like final year project (FYP) • Assign Independent project to each Trainee • A project based on trainee's aptitude and acquired skills. • Designed by keeping in view the emerging trends in the local market as 	<p>TASK41</p> <p><u>Details may be seen at Annexure-I</u></p>

		<p>well as across the globe.</p> <ul style="list-style-type: none"> • The project idea may be based on Entrepreneur. • Leading to the successful employment. • The duration of the project will be 6 weeks • Ideas may be generated via different sites such as: <ul style="list-style-type: none"> https://1000projects.org/ https://nevonprojects.com/ https://www.freestudentprojects.com/ https://technofizi.net/best-computer-science-and-engineering-cse-project-topics-ideas-for-students/ <ul style="list-style-type: none"> • Final viva/assessment will be conducted on project assignments. • At the end of session the project will be presented in skills competition • The skill competition will be conducted on zonal, regional and National level. • The project will be presented in front of Industrialists for commercialization 	
Week 22	AWS Storage/ Manage Azure	<ul style="list-style-type: none"> • Success stories (For further detail please see Annexure: III) 	TASK 42 TASK 42 A

	Subscriptions	<ul style="list-style-type: none"> ● EBS (Elastic Block Storage) ● Create EBS volumes ● Delete EBS Volumes ● Attach and detach EBS volumes ● Mounting and unmounting EBS volume ● Creating and deleting snapshots ● Creating volumes from snapshots ● S3(Simple Storage Service) ● Storage in Cloud ● S3 durability and redundancy ● S3 Buckets ● S3 Uploading Downloading ● S3 Permissions ● S3 Object Versioning ● S3 Lifecycle Policies ● Storage Gateway ● Import Export ● S3 Transfer Acceleration ● Intro to Accounts and Subscriptions ● Azure Trial Account Creation ● Demo: Quotas, Cost, Tagging ● Demo: Billing Alerts ● Demo: Subscription Policies 	<p><u>Details may be seen at Annexure-I</u></p>
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		storage	
	How to search and apply for jobs in at least two labor marketplace countries (KSA, UAE, etc.)	<ul style="list-style-type: none"> • Browse the following website and create an account on each website <ul style="list-style-type: none"> ▪ Bayt.com – The Middle East Leading Job Site ▪ Monster Gulf – The International Job Portal ▪ Gulf Talent – Jobs in Dubai and the Middle East • Find the handy ‘search’ option at the top of your homepage to search for the jobs that best suit your skills. • Select the job type from the first ‘Job Type’ drop-down menu, next, select the location from the second drop-down menu. • Enter any keywords you want to use to find suitable job vacancies. • On the results page you can search for part-time jobs only, full-time jobs only, employers only, or agencies only. Tick the boxes as appropriate to your search. • Search for jobs by: <ul style="list-style-type: none"> ▪ Company ▪ Category ▪ Location ▪ All jobs ▪ Agency • Industry 	
Week 23	AWS Basic Security)	<ul style="list-style-type: none"> • Cloud Front • Use of cloud front • Creating a cloud front distribution • Hosting a website of cloud front distribution • Implementing restrictions • Configuring origins and behaviors 	<p>TASK 43</p> <p>TASK 43 A</p> <p><i><u>Details may be seen at Annexure-I</u></i></p>

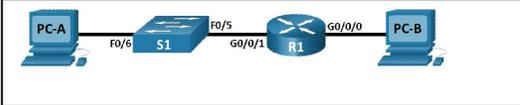
		<ul style="list-style-type: none"> • Route53 • Creating Zones • Hosting a website • Understanding routing policies • Weighted simple and failover policies • Identity Access Management (IAM) • Creating Users and Groups • Applying policies • Password Policy • Roles • AWS Security Management • Security Practices for Cloud Deployment • AWS Responsibilities and Securities • Cloud Trail • Trust advisor • 	
Week 24	AWS VPC and Database	<ul style="list-style-type: none"> • Success stories (For further detail please see Annexure: III) • Amazon Virtual Private Cloud (VPC) • Introduction to Amazon Virtual Private Cloud (VPC) • VPC Advantages • Default and Non-default VPC 	TASK 44 TASK 44 A <u>Details may be seen at Annexure-I</u>

		<ul style="list-style-type: none">• Components of VPC• Direct Connect• 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• Subnet and Subnet Mask• Relational Database Service (RDS)• Introduction to RDS• Different database services of AWS: Amazon RDS, Dynamo DB, Redshift etc.• Configuring the database• Configuring backups• Configuring the maintenance windows• Connecting to the database• Dynamo DB• Creating a dynamo dB• Configuring alarms• Adding data manually•	
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		<ul style="list-style-type: none"> ● Connecting to the database ● Dynamo DB ● Creating a dynamo dB ● Configuring alarms ● Adding data manually ● Backup and Disaster Recovery ● How to manage Disaster Recovery and Backups ● Best Practice for DR and Backups ● AWS High Availability Design ● Troubleshooting and Price Calculator ● AWS Best Practices (Cost +Security) ● AWS Calculator & Consolidated Billing 	
Week 26	Entrepreneurship and Final Assessment in project	<ul style="list-style-type: none"> ● Success stories (For further detail please see Annexure: III) ● Job Market Searching ● Self-employment ● Freelancing sites ● Introduction ● Fundamentals of Business Development ● Entrepreneurship ● Startup Funding 	

		<ul style="list-style-type: none">● Business Incubation and Acceleration● Business Value Statement● Business Model Canvas● Sales and Marketing Strategies● How to Reach Customers and Engage CxOs● Stakeholders Power Grid● RACI Model, SWOT Analysis, PEST Analysis● SMART Objectives● OKRs● Cost Management (OPEX, CAPEX, ROCE etc.)● Final Assessment	
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Tasks For Certificate in Networking and Cloud Computing

Task No.	Task	Description	Week
Big Data Analytics			
1	Search Top Pakistani Freelancers	Search any three freelancing sites(Fiverr, Upwork, Guru, etc.) and list down the top 5 profiles related to course	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	Week -1
3	Work Ethics	Generate a report on Institute work ethics and professionalism related to course	Week -1
4	Installation of simulators and connectivity of devices	attach a Router & Switch with PC via console cable Installation of Packet Tracer & GNS3 Import Router Images in GNS3 Router Modes Ping & Extended Ping How to Telnet a Router	Week -2
4A	Configure Basic Router Settings	 <p>Part 1: Set Up the Topology and Initialize Devices</p> <ul style="list-style-type: none"> • Cable equipment to match the network topology. • Initialize and restart the router and switch. <p>Part 2: Configure Devices and Verify Connectivity</p> <ul style="list-style-type: none"> • Assign static IPv4 and IPv6 information to the PC interfaces. • Configure basic router settings. • Configure the router for SSH. • Verify network connectivity. <p>Part 3: Display Router Information</p> <ul style="list-style-type: none"> • Retrieve hardware and software information from the router. • Interpret the output from the startup configuration. • Interpret the output from the routing table. 	Week -2

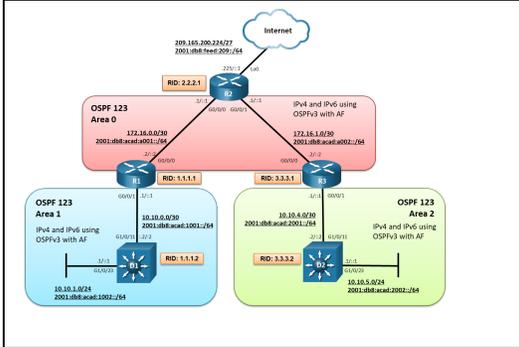
Task No.	Task	Description	Week																									
		<ul style="list-style-type: none"> Verify the status of the interfaces. 																										
5 6 7 8 9	Configure VLANs and Trunking	<div data-bbox="651 468 1170 573" style="text-align: center;"> </div> <table border="1" data-bbox="467 636 1122 758"> <thead> <tr> <th>Device</th> <th>Interface</th> <th>IP Address</th> <th>Subnet Mask</th> <th>Default Gateway</th> </tr> </thead> <tbody> <tr> <td>S1</td> <td>VLAN 1</td> <td>192.168.1.11</td> <td>255.255.255.0</td> <td>N/A</td> </tr> <tr> <td>S2</td> <td>VLAN 1</td> <td>192.168.1.12</td> <td>255.255.255.0</td> <td>N/A</td> </tr> <tr> <td>PC-A</td> <td>NIC</td> <td>192.168.10.3</td> <td>255.255.255.0</td> <td>192.168.10.1</td> </tr> <tr> <td>PC-B</td> <td>NIC</td> <td>192.168.10.4</td> <td>255.255.255.0</td> <td>192.168.10.1</td> </tr> </tbody> </table> <p data-bbox="467 821 643 856">Objectives</p> <ul style="list-style-type: none"> <li data-bbox="516 873 1256 905">Part 1: Build the Network and Configure Basic Device Settings <li data-bbox="516 917 1068 949">Part 2: Create VLANs and Assign Switch Ports <li data-bbox="516 961 1287 993">Part 3: Maintain VLAN Port Assignments and the VLAN Database <li data-bbox="516 1005 1187 1037">Part 4: Configure an 802.1Q Trunk between the Switches <li data-bbox="516 1050 915 1081">Part 5: Delete the VLAN Database 	Device	Interface	IP Address	Subnet Mask	Default Gateway	S1	VLAN 1	192.168.1.11	255.255.255.0	N/A	S2	VLAN 1	192.168.1.12	255.255.255.0	N/A	PC-A	NIC	192.168.10.3	255.255.255.0	192.168.10.1	PC-B	NIC	192.168.10.4	255.255.255.0	192.168.10.1	Week -3
Device	Interface	IP Address	Subnet Mask	Default Gateway																								
S1	VLAN 1	192.168.1.11	255.255.255.0	N/A																								
S2	VLAN 1	192.168.1.12	255.255.255.0	N/A																								
PC-A	NIC	192.168.10.3	255.255.255.0	192.168.10.1																								
PC-B	NIC	192.168.10.4	255.255.255.0	192.168.10.1																								
10 11 12 13	Configure IPv4 and IPv6 Static and Default Routes	<div data-bbox="651 1293 1170 1629" style="text-align: center;"> </div> <table border="1" data-bbox="626 1698 1198 1871"> <thead> <tr> <th>Device</th> <th>Interface</th> <th>IP Address / Prefix</th> </tr> </thead> <tbody> <tr> <td rowspan="2">R1</td> <td rowspan="2">G0/0/0</td> <td>172.16.1.1 /24</td> </tr> <tr> <td>2001:db8:acad:2::1 /64</td> </tr> </tbody> </table>	Device	Interface	IP Address / Prefix	R1	G0/0/0	172.16.1.1 /24	2001:db8:acad:2::1 /64	Week -4																		
Device	Interface	IP Address / Prefix																										
R1	G0/0/0	172.16.1.1 /24																										
		2001:db8:acad:2::1 /64																										

Task No.	Task	Description			Week
			R1	fe80::1	
			G0/0/1	192.168.1.1 /24	
				2001:db8:acad:1::1 /64	
				fe80::1	
			Loopback1	10.1.0.1 /24	
				2001:db8:acad:10::1 /64	
				fe80::1	
			Loopback2	209.165.200.225 /27	
				2001:db8:acad:209::1 /64	
				fe80::1	
			R2	G0/0/0	172.16.1.2 /24
					2001:db8:acad:2::2 /64
					fe80::2
			G0/0/1	192.168.1.2 /24	
					2001:db8:acad:1::2 /64
					fe80::2
			Loopback1	10.2.0.1 /24	
					2001:db8:acad:11::2 /64
					fe80::2
			Loopback2	209.165.200.193 /27	
					2001:db8:acad:210::1 /64
					fe80::2
		<p>Part 1: Build the Network and Configure Basic Device Settings</p> <p>Part 2: Configure and verify IP and IPv6 addressing on R1 and R2</p> <p>Part 3: Configure and verify static and default routing for IPv4 on R1 and R2</p> <p>Part 4: Configure and verify static and default routing for IPv6 on R1 and R2</p>			

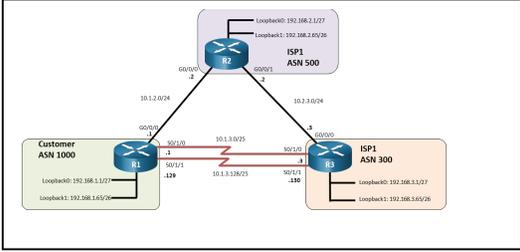
Task No.	Task	Description	Week
		2 5 5 N / A S 0 / 0 / 1 0 0 . 5 (1 D . C . E 1) 2 N / A 2 5 5 N / A . 2 5 5 1 0 S . 0 1 / . 0 1 / . 0 2 N / A R 2 2 5 5 N / A S 0 / 0 / 1 1 0 . 5 (2 D . C . E 2) 2 N / A	

Task No.	Task	Description	Week
		<div style="display: flex; justify-content: space-between;"> <div style="width: 20%;"> <p>253</p> <p>15922.51682</p> <p>G035N</p> <p>/110A</p> </div> <div style="width: 20%;"> <p>255</p> <p>255</p> <p>10255</p> <p>S025</p> <p>/022N</p> <p>112A</p> </div> <div style="width: 20%;"> <p>251</p> <p>922.51682</p> <p>035N</p> <p>110A</p> </div> <div style="width: 20%;"> <p>251</p> <p>922.51682</p> <p>035N</p> <p>110A</p> </div> </div>	
		<div style="display: flex; justify-content: space-between;"> <div style="width: 20%;"> <p>251</p> <p>922.51682</p> <p>035N</p> <p>/110A</p> </div> </div>	
		<div style="display: flex; justify-content: space-between;"> <div style="width: 20%;"> <p>251</p> <p>922.51682</p> <p>035N</p> <p>/110A</p> </div> </div>	

Task No.	Task	Description	Week																																								
		<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr><td style="width: 15px;">2</td><td style="width: 15px;">S</td></tr> <tr><td>5</td><td>3</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>9</td><td>1</td></tr> <tr><td>2</td><td>9</td></tr> <tr><td>2</td><td>F</td></tr> <tr><td>.</td><td>2</td></tr> <tr><td>.</td><td>0</td></tr> <tr><td>1</td><td>.</td></tr> <tr><td>6</td><td>/</td></tr> <tr><td>8</td><td>1</td></tr> <tr><td>2</td><td>1</td></tr> <tr><td>8</td><td>8</td></tr> <tr><td>.</td><td>.</td></tr> <tr><td>5</td><td>.</td></tr> <tr><td>3</td><td>5</td></tr> <tr><td>.</td><td>3</td></tr> <tr><td>.</td><td>.</td></tr> <tr><td>3</td><td>.</td></tr> <tr><td>0</td><td>1</td></tr> </table> </div> <p>Objectives</p> <p>Part 1: Configure Basic Device Settings</p> <ul style="list-style-type: none"> Configure hostnames, interface IP addresses, and access passwords. Configure the OSPF dynamic routing protocol. <p>Part 2: Configure a Site-to-Site VPN Using Cisco IOS</p> <ul style="list-style-type: none"> Configure IPsec VPN settings on R1 and R3. Verify site-to-site IPsec VPN configuration. Test IPsec VPN operation. 	2	S	5	3	1	5	9	1	2	9	2	F	.	2	.	0	1	.	6	/	8	1	2	1	8	8	.	.	5	.	3	5	.	3	.	.	3	.	0	1	
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5	3																																										
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16 17 18	Configuring OSPF		Week -6,7																																								

Task No.	Task	Description	Week																																				
		<table border="1" data-bbox="664 226 1159 909"> <thead> <tr> <th>Device</th> <th>Interface</th> <th>IPv4 Address</th> </tr> </thead> <tbody> <tr> <td rowspan="2">R1</td> <td>G0/0/0</td> <td>172.16.0.2/30</td> </tr> <tr> <td>G0/0/1</td> <td>10.10.0.1/30</td> </tr> <tr> <td rowspan="3">R2</td> <td>Lo0</td> <td>209.165.200.225/27</td> </tr> <tr> <td>G0/0/0</td> <td>172.16.0.1/30</td> </tr> <tr> <td>G0/0/1</td> <td>172.16.1.1/30</td> </tr> <tr> <td rowspan="2">R3</td> <td>G0/0/0</td> <td>172.16.1.2/30</td> </tr> <tr> <td>G0/0/1</td> <td>10.10.4.1/30</td> </tr> <tr> <td rowspan="2">D1</td> <td>G1/0/11</td> <td>10.10.0.2/30</td> </tr> <tr> <td>G1/0/23</td> <td>10.10.1.1/24</td> </tr> <tr> <td rowspan="2">D2</td> <td>G1/0/11</td> <td>10.10.4.2/30</td> </tr> <tr> <td>G1/0/23</td> <td>10.10.5.1/24</td> </tr> <tr> <td>PC1</td> <td>NIC</td> <td>10.10.1.10/24</td> </tr> <tr> <td>PC2</td> <td>NIC</td> <td>10.10.5.10/24</td> </tr> </tbody> </table> <p data-bbox="516 993 1308 1050">Part 1: Build the Network and Configure Basic Device Settings and Interface Addressing</p> <p data-bbox="516 1066 1317 1123">Part 2: Configure and Verify Multiarea OSPF for IPv4 on R1, D1, and D2</p> <p data-bbox="472 1140 959 1171">Part 3: Exploring Link State Announcements</p>	Device	Interface	IPv4 Address	R1	G0/0/0	172.16.0.2/30	G0/0/1	10.10.0.1/30	R2	Lo0	209.165.200.225/27	G0/0/0	172.16.0.1/30	G0/0/1	172.16.1.1/30	R3	G0/0/0	172.16.1.2/30	G0/0/1	10.10.4.1/30	D1	G1/0/11	10.10.0.2/30	G1/0/23	10.10.1.1/24	D2	G1/0/11	10.10.4.2/30	G1/0/23	10.10.5.1/24	PC1	NIC	10.10.1.10/24	PC2	NIC	10.10.5.10/24	
Device	Interface	IPv4 Address																																					
R1	G0/0/0	172.16.0.2/30																																					
	G0/0/1	10.10.0.1/30																																					
R2	Lo0	209.165.200.225/27																																					
	G0/0/0	172.16.0.1/30																																					
	G0/0/1	172.16.1.1/30																																					
R3	G0/0/0	172.16.1.2/30																																					
	G0/0/1	10.10.4.1/30																																					
D1	G1/0/11	10.10.0.2/30																																					
	G1/0/23	10.10.1.1/24																																					
D2	G1/0/11	10.10.4.2/30																																					
	G1/0/23	10.10.5.1/24																																					
PC1	NIC	10.10.1.10/24																																					
PC2	NIC	10.10.5.10/24																																					
19 20 21 22 23	Configuring IPv6 and advance OSPF		Week -8																																				

Task No.	Task	Description					Week
		Device	Interface	IPv4 Address	IPv6 Address	IPv6 Link-Local	
		R1	G0/0/0	172.16.0.2/30	2001:db8:acad:a001::2/64	fe80::1:2	
			G0/0/1	10.10.0.1/30	2001:db8:acad:1001::1/64	fe80::1:1	
		R2	Lo0	209.165.200.225/27	2001:db8:feed:209::1/64	fe80::2:3	
			G0/0/0	172.16.0.1/30	2001:db8:acad:a001::1/64	fe80::2:1	
			G0/0/1	172.16.1.1/30	2001:db8:acad:a002::1/64	fe80::2:2	
		R3	G0/0/0	172.16.1.2/30	2001:db8:acad:a002::2/64	fe80::3:2	
			G0/0/1	10.10.4.1/30	2001:db8:acad:2001::1/64	fe80::3:1	
		D1	G1/0/11	10.10.0.2/30	2001:db8:acad:1001::2/64	fe80::d1:2	
			G1/0/23	10.10.1.0/24	2001:db8:acad:1002::1/64	fe80::d1:1	
		D2	G1/0/11	10.10.4.2/30	2001:db8:acad:2001::2/64	fe80::d2:2	
			G1/0/23	10.10.5.1/24	2001:db8:acad:2002::1/64	fe80::d2:1	
		<p>Part 1: Build the Topology and Configure Basic Device Settings and IP Addressing</p> <p>Part 2: Configure Traditional OSPFv3 for IPv6 on D1</p> <p>Part 3: Configure OSPFv3 for Address Families (AF) IPv4 and AF IPv6</p> <p>Part 4: Verify OSPFv3 AF</p> <p>Part 5: Tune OSPFv3 AF</p>					

Task No.	Task	Description	Week																																		
24 25 26 27	Implement MP-BGP	<div style="text-align: center;">  </div> <table border="1" data-bbox="678 571 1149 1369"> <thead> <tr> <th>Device</th> <th>Interface</th> <th>IPv4 Address</th> </tr> </thead> <tbody> <tr> <td rowspan="5">R1</td> <td>G0/0/0</td> <td>10.1.2.1/24</td> </tr> <tr> <td>S0/1/0</td> <td>10.1.3.1/25</td> </tr> <tr> <td>S0/1/1</td> <td>10.1.3.129/25</td> </tr> <tr> <td>Loopback0</td> <td>192.168.1.1/27</td> </tr> <tr> <td>Loopback1</td> <td>192.168.1.65/26</td> </tr> <tr> <td rowspan="4">R2</td> <td>G0/0/0</td> <td>10.1.2.2/24</td> </tr> <tr> <td>G0/0/1</td> <td>10.2.3.2/24</td> </tr> <tr> <td>Loopback0</td> <td>192.168.2.1/27</td> </tr> <tr> <td>Loopback1</td> <td>192.168.2.65/26</td> </tr> <tr> <td rowspan="5">R3</td> <td>G0/0/0</td> <td>10.2.3.3/24</td> </tr> <tr> <td>S0/1/0</td> <td>10.1.3.3/25</td> </tr> <tr> <td>S0/1/1</td> <td>10.1.3.130/25</td> </tr> <tr> <td>Loopback0</td> <td>192.168.3.1/27</td> </tr> <tr> <td>Loopback1</td> <td>192.168.3.65/26</td> </tr> </tbody> </table> <p data-bbox="516 1415 1312 1604"> Part 1: Build the Network and Configure Basic Device Settings and Interface Addressing Part 2: Configure MP-BGP on all Routers Part 3: Verify MP-BGP Part 4: Configure and Verify IPv6 Summarization </p>	Device	Interface	IPv4 Address	R1	G0/0/0	10.1.2.1/24	S0/1/0	10.1.3.1/25	S0/1/1	10.1.3.129/25	Loopback0	192.168.1.1/27	Loopback1	192.168.1.65/26	R2	G0/0/0	10.1.2.2/24	G0/0/1	10.2.3.2/24	Loopback0	192.168.2.1/27	Loopback1	192.168.2.65/26	R3	G0/0/0	10.2.3.3/24	S0/1/0	10.1.3.3/25	S0/1/1	10.1.3.130/25	Loopback0	192.168.3.1/27	Loopback1	192.168.3.65/26	Week -9
Device	Interface	IPv4 Address																																			
R1	G0/0/0	10.1.2.1/24																																			
	S0/1/0	10.1.3.1/25																																			
	S0/1/1	10.1.3.129/25																																			
	Loopback0	192.168.1.1/27																																			
	Loopback1	192.168.1.65/26																																			
R2	G0/0/0	10.1.2.2/24																																			
	G0/0/1	10.2.3.2/24																																			
	Loopback0	192.168.2.1/27																																			
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R3	G0/0/0	10.2.3.3/24																																			
	S0/1/0	10.1.3.3/25																																			
	S0/1/1	10.1.3.130/25																																			
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	Loopback1	192.168.3.65/26																																			

Task No.	Task	Description	Week																																																																				
28 29	Access List	<div data-bbox="652 262 1172 466" style="text-align: center;"> </div> <table border="1" data-bbox="488 535 1334 1171" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Device</th> <th>Interface</th> <th>IP Address</th> <th>Subnet Mask</th> <th>Default Gateway</th> </tr> </thead> <tbody> <tr> <td rowspan="6">R1</td> <td>G0/0/1</td> <td>N/A</td> <td>N/A</td> <td rowspan="6">N/A</td> </tr> <tr> <td>G0/0/1.20</td> <td>10.20.0.1</td> <td>255.255.255.0</td> </tr> <tr> <td>G0/0/1.30</td> <td>10.30.0.1</td> <td>255.255.255.0</td> </tr> <tr> <td>G0/0/1.40</td> <td>10.40.0.1</td> <td>255.255.255.0</td> </tr> <tr> <td>G0/0/1.1000</td> <td>N/A</td> <td>N/A</td> </tr> <tr> <td>Loopback1</td> <td>172.16.1.1</td> <td>255.255.255.0</td> </tr> <tr> <td>R2</td> <td>G0/0/1</td> <td>10.20.0.4</td> <td>255.255.255.0</td> <td>N/A</td> </tr> <tr> <td>S1</td> <td>VLAN 20</td> <td>10.20.0.2</td> <td>255.255.255.0</td> <td>10.20.0.1</td> </tr> <tr> <td>S2</td> <td>VLAN 20</td> <td>10.20.0.3</td> <td>255.255.255.0</td> <td>10.20.0.1</td> </tr> <tr> <td>PC-A</td> <td>NIC</td> <td>10.30.0.10</td> <td>255.255.255.0</td> <td>10.30.0.1</td> </tr> <tr> <td>PC-B</td> <td>NIC</td> <td>10.40.0.10</td> <td>255.255.255.0</td> <td>10.40.0.1</td> </tr> </tbody> </table> <table border="1" data-bbox="472 1243 1198 1612" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>VLAN</th> <th>Name</th> <th>Interface Assigned</th> </tr> </thead> <tbody> <tr> <td>20</td> <td>Management</td> <td>S2: F0/5</td> </tr> <tr> <td>30</td> <td>Operations</td> <td>S1: F0/6</td> </tr> <tr> <td>40</td> <td>Sales</td> <td>S2: F0/18</td> </tr> <tr> <td>999</td> <td>ParkingLot</td> <td>S1: F0/2-4, F0/7-24, G0/1-2 S2: F0/2-4, F0/6-17, F0/19-24, G0/1-2</td> </tr> <tr> <td>1000</td> <td>Native</td> <td>N/A</td> </tr> </tbody> </table> <p data-bbox="516 1696 1258 1768" style="text-align: center;"> Part 1: Build the Network and Configure Basic Device Settings Part 2: Configure and Verify Extended Access Control Lists </p>	Device	Interface	IP Address	Subnet Mask	Default Gateway	R1	G0/0/1	N/A	N/A	N/A	G0/0/1.20	10.20.0.1	255.255.255.0	G0/0/1.30	10.30.0.1	255.255.255.0	G0/0/1.40	10.40.0.1	255.255.255.0	G0/0/1.1000	N/A	N/A	Loopback1	172.16.1.1	255.255.255.0	R2	G0/0/1	10.20.0.4	255.255.255.0	N/A	S1	VLAN 20	10.20.0.2	255.255.255.0	10.20.0.1	S2	VLAN 20	10.20.0.3	255.255.255.0	10.20.0.1	PC-A	NIC	10.30.0.10	255.255.255.0	10.30.0.1	PC-B	NIC	10.40.0.10	255.255.255.0	10.40.0.1	VLAN	Name	Interface Assigned	20	Management	S2: F0/5	30	Operations	S1: F0/6	40	Sales	S2: F0/18	999	ParkingLot	S1: F0/2-4, F0/7-24, G0/1-2 S2: F0/2-4, F0/6-17, F0/19-24, G0/1-2	1000	Native	N/A	Week -10
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31 32 33	Layer 2 Switches	<div data-bbox="651 365 1170 806" style="text-align: center;"> </div> <table border="1" data-bbox="472 877 1351 1335" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Device</th> <th>Interface</th> <th>IP Address</th> <th>Subnet Mask</th> <th>Default Gateway</th> <th>Switch Port</th> </tr> </thead> <tbody> <tr> <td>R1</td> <td>G0/1</td> <td>192.168.1.1</td> <td>255.255.255.0</td> <td>N/A</td> <td>S1 F0/5</td> </tr> <tr> <td>S1</td> <td>VLAN 1</td> <td>192.168.1.2</td> <td>255.255.255.0</td> <td>N/A</td> <td>N/A</td> </tr> <tr> <td>S2</td> <td>VLAN 1</td> <td>192.168.1.3</td> <td>255.255.255.0</td> <td>N/A</td> <td>N/A</td> </tr> <tr> <td>PC-A</td> <td>NIC</td> <td>192.168.1.10</td> <td>255.255.255.0</td> <td>192.168.1.1</td> <td>S1 F0/6</td> </tr> <tr> <td>PC-B</td> <td>NIC</td> <td>192.168.1.11</td> <td>255.255.255.0</td> <td>192.168.1.1</td> <td>S2 F0/18</td> </tr> </tbody> </table> <p data-bbox="516 1388 987 1415">Part 1: Configure Basic Switch Settings</p> <p data-bbox="516 1434 1187 1493">Build the topology. Configure the hostname, IP address, and access passwords.</p> <p data-bbox="516 1512 1062 1539">Part 2: Configure SSH Access to the Switches</p> <p data-bbox="516 1558 1036 1656">Configure SSH version 2 access on the switch. Configure an SSH client to access the switch. Verify the configuration.</p> <p data-bbox="516 1675 1117 1703">Part 3: Configure Secure Trunks and Access Ports</p> <p data-bbox="516 1722 959 1887">Configure trunk port mode. Change the native VLAN for trunk ports. Verify trunk configuration. Enable storm control for broadcasts. Configure access ports.</p>	Device	Interface	IP Address	Subnet Mask	Default Gateway	Switch Port	R1	G0/1	192.168.1.1	255.255.255.0	N/A	S1 F0/5	S1	VLAN 1	192.168.1.2	255.255.255.0	N/A	N/A	S2	VLAN 1	192.168.1.3	255.255.255.0	N/A	N/A	PC-A	NIC	192.168.1.10	255.255.255.0	192.168.1.1	S1 F0/6	PC-B	NIC	192.168.1.11	255.255.255.0	192.168.1.1	S2 F0/18	-11
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Task No.	Task	Description	Week
		<p>Enable PortFast and BPDU guard. Verify BPDU guard. Enable root guard. Enable loop guard. Configure and verify port security. Disable unused ports. Move ports from default VLAN 1 to alternate VLAN. Configure the PVLAN Edge feature on a port.</p> <p>Part 4: Configure IP DHCP Snooping</p> <p>Configure DHCP on R1. Configure Inter-VLAN communication on R1. Configure S1 interface F0/5 as a trunk. Verify DHCP operation on PC- A and B. Enable DHCP Snooping. Verify DHCP Snooping.</p>	
34	Implement Spanning Tree Protocols	<div data-bbox="651 1016 1170 1304" data-label="Diagram"> </div> <p>Objectives</p> <ul style="list-style-type: none"> • Observe default Spanning Tree behavior • Implement Rapid Spanning Tree • Implement STP tool kit components 	Week -14

Task No.	Task	Description	Week
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		2 5 5 N / A . 2 5 5 1 S 0 0 . / 1 0 . / 1 R 0 . 2 2 N / A	
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Task No.	Task	Description	Week
37	Case Study	As the network administrator for NetSole, a company providing voting solutions to a global client base, you have convinced the organization to move the current infrastructure to the cloud, but your executive leadership has concerns about legal and compliance requirements Please make a proposal to convince the	Week -17
38	Installation of KVM and virtual networking	Install KVM on Centos Assign IPs to Different VMS	Week -18
39	AWS login and feature explore	Create free login on AWS Web Portal Explore EC2 instance •	Week -19
40	AWS Operation on Portal	Explore EC2 Load Balancing on Amazon Web portal Dynamic scalling and policies of autoscalling	Week -20
41	Project	Implement a Project as per instructor	Week -21
42	AWS Storage Management	Explore how to create, delete, Mounting and unmounting EBS volume. Practices on AWS Storage management.	Week -22
43	AWS Basic Security Features	Protect the cloude 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.	Week -23
44	Create VPC and Database management	Crete VPC Cloud on AWS and implement the all technique of database	Week -24
45	AWS Managerial tools	Explore all management tools on by one in AWS	Week -25
46	Disaster Management policies	Implement the different disaster management policies like How to manage Disaster Recovery and Backups, DR and Backups, AWS High Availability Design	Week -25
47	Final project	Final project Assessment	Week -18

Networking and Cloud Computing

Success Story of Debanjan | Great Learning's PG Program in Cloud Computing

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

Netflix on AWS - Customer Success Story

<https://www.youtube.com/watch?v=oH3PAGZJewA>

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=tlQ0CWgszl0>

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

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

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

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

<https://www.youtube.com/watch?v=Qi6Xn7yKIIQ>

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

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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:
<ul style="list-style-type: none"> • Understand the communication skills and how it works. 	<ul style="list-style-type: none"> • Podium • Projector • Computer 		<ul style="list-style-type: none"> • Communication • Self Confidence • Teamwork

<ul style="list-style-type: none"> • Understand what communication skills mean • Understand what skills are important for communication skills 	<ul style="list-style-type: none"> • Flip Chart • Marker 	
--	--	--

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: <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. 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. <ul style="list-style-type: none"> • “IDENTIFY ENTREPRENEURS” TEAM ACTIVITY • “BRAINSTORMING SOCIAL PROBLEMS” TEAM

	<p style="text-align: center;">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>
<p>Session Close: 5 minutes</p>	<p>MENTOR: Close the session with the opportunity for anyone to ask any remaining questions.</p> <p>Instructor: 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
Meet Network Engineers at Google	LifeAtGoogle	https://www.youtube.com/watch?v=pNyaPRFJ8IQ
Network Engineers and AWS (Amazon Web Services)	NetworkChuck	https://www.youtube.com/watch?v=443TT26w1LE
Senior Network Engineer Salary Interview Job Description Career	Ben Lovegrove	https://www.youtube.com/watch?v=ibju0yMiaQ0
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=5fS3rj6eIFg
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	Arnold Schwarzenegger	https://www.youtube.com/watch?v=kzSBrJmXqdg

TIME		
Risk of Success	Denzel Washington	https://www.youtube.com/watch?v=tbnzAVRZ9Xc

SUCCESS STORY*

S. No	Key Information	Detail/Description
1.	Self & Family background	<p>Habid professional Multicloud trainer & Consultant. Working on AWS Google Cloud Azure Cloud & Alibaba cloud from the last 6 years. I am teaching AWS, Google cloud as a master trainer in 12+ countries from the last 5 years.</p> <p>I have been completed 1500+ hours of Multicloud training & completed 50+ Multicloud projects in the last 5 years.</p> <p>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 networks and cloud computing in iqra university (</p>
3.	Post-training activities	<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>Usman 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 Usman 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, 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</p>

		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.

**Example pattern*

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:

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.