

**Government of Pakistan**

**National Vocational and Technical Training Commission**

**Prime Minister's Hunarmand Pakistan Program**

"Skill for All"



**Course Contents/ Lesson Plan**

**Course Title:** Computer Network Assistant

**Duration:** 3 Months

## Course Details / Description & Preliminaries

<b>Course Title</b>	<b>Computer Network Assistant</b>
<b>Objectives and Expectations</b>	<p><b>Employable skills for students having minimum F.sc(Pre-Engr)/ICS/DIT qualification through an intensive course on Computer Network Assistant.</b></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 soft skills as well as entrepreneurial skills deemed essential for that purpose i.e. communication skills; marketing skills (including freelancing); personal grooming of the trainees and inculcation of the positive work ethics to foster better citizenship in general and improve the image of Pakistani work force in particular.</p> <p><b>Main Expectations:</b></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</p>

<p><b>Key Features of Training &amp; Special Modules</b></p>	<p>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 individual trainee to prepare them for such market roles during/after the training.</p> <ul style="list-style-type: none"><li data-bbox="516 506 1469 1115">i. Specially designed practical tasks to be performed by the trainees have been included in the Annexure-I to this document. Their weekly distribution has also been indicated in the weekly lesson plan given in 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.</li><li data-bbox="516 1146 1469 1869">ii. In order to materialize the main expectations, a special module on <b>Job Search &amp; Entrepreneurial Skills</b> has been included in the course 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 labour destination countries also forms 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 be inculcated in the trainees to make them responsible citizens of the country.</li></ul>
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<p><b>Training Tools/ Methodology</b></p>	<p><b>iii.</b> A module on <b>Work Place Ethics</b> has also been included to highlight the importance of good and positive behavior at work place 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 Pakistani workforce would undergo a positive transformation in the local as well as international job markets.</p> <p>In order to maintain interest and motivation of the trainees throughout the course, modern techniques such as:</p> <ul style="list-style-type: none"> <li>• Motivational lectures</li> <li>• Success stories</li> <li>• Case studies (In documentary or presentation format)</li> </ul> <p>These would be employed as additional training tools wherever possible (these are explained in the subsequent section on Training Methodology).</p> <p>Lastly, evaluation of the competencies acquired by the trainees will be done objectively at various stages of the training and 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.</p> <p><b>(i) Motivational Lectures</b></p> <p>The proposed methodology for the training under reference employs motivation as a tool. Hence besides the purely technical content, a</p>
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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 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.

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 longer time without boredom and loss of interest because they can clearly 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).

This tool is designed for training providers to ensure 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.

#### **(ii) Success Stories**

Another effective way of motivating the trainees is by means of 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 by means of 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. Optimum impact is created when the story is revealed by the person himself either:

- Directly (in person) or,
- Through an audio/ videotaped message.

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 at 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 class room 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 to be presented to the trainees.

	<p>The trainer may adopt a power point presentation or video format for such case studies whichever is deemed suitable but it's important that only those cases are selected that are relevant and of a learning value.</p> <p>The Trainees should be required and supervised to carefully analyze the cases. For the purpose they must be encouraged to inquire and collect specific information / data, actively participate in the discussions and intended solutions of the problem / situation. Case studies can be implemented in the following ways:-</p> <ol style="list-style-type: none"> <li>i. A good quality trade specific documentary( At least 2-3 documentaries must be arranged by the training institute)</li> <li>ii. Data security &amp; Safety case studies (2 cases regarding data security, database management and safety must be arranged by the training institute).</li> <li>iii. Field visits (At least one visit to a trade specific major industry/ Software house/ Data base setup site must be arranged by the training institute)</li> </ol>
<p><b>Learning Outcome of the Course</b></p>	<p>By the end of this course, the trainees should gain the following competencies:</p> <ul style="list-style-type: none"> <li>• Understanding of Networking techniques</li> <li>• Campus Design &amp; Enterprise Network</li> <li>• Configuration of IP Connectivity</li> <li>• Management of Network</li> <li>• Problems Solving Skills</li> <li>• Troubleshooting Skills</li> <li>• Network Monitoring Skills</li> <li>• Network Designing</li> <li>• High Availability of Network</li> <li>• Implementation of Network Policies</li> </ul>

<b>Job Opportunities</b>	<ul style="list-style-type: none"> <li>• Network Specialist</li> <li>• Network Administrator</li> <li>• Network Technician</li> <li>• Network Analyst</li> <li>• Network Manager</li> <li>• Network Engineer</li> <li>• Network Solutions Architect</li> </ul>
<b>Entry level of trainees</b>	<p>F.sc(Pre-Engr)/ICS/DIT qualification besides the following:</p> <ul style="list-style-type: none"> <li>▪ To have knowledge of Basic Computers</li> <li>▪ To have knowledge of Basic concepts of networking</li> </ul>
<b>Course Execution Plan</b>	Total Duration of Course: 3 Months (12 Weeks)
	Class Hours: 5 Hours per day (5 Days a Week)
	Theory: 20% Practical: 80%
	Total Duration of Course: 3 Months (13 Weeks)
	Class Hours: 5 Hours per day (5 Days a Week)
<b>No of Students</b>	25
<b>Learning Place</b>	Classroom / Lab/software house/network setup

## WEEKLY SCHEDULE OF TRAINING

Scheduled Week	Module Title	Learning Units	Remarks
Week 1	Introduction to Computers	<p><b>Course Introduction:</b></p> <ul style="list-style-type: none"> <li>• <b>Motivational Lecture</b> (For further detail please see Page No: 3-4)</li> <li>• Job market &amp; Course Applications</li> <li>• Information Technology Achievements, Current technologies and Emerging Trends.</li> <li>• Introduction to Computer &amp; its History</li> <li>• Computer generations</li> <li>• Computer in Real life</li> </ul> <p><b>Introduction to Freelancing</b></p> <p><b>Computer Hardware:</b></p> <ul style="list-style-type: none"> <li>• Introduction to Computer Hardware.</li> <li>• Hands on training &amp; Assembling,</li> <li>• Devices Installation &amp; their working</li> <li>• Hardware Troubleshooting</li> <li>• <b>Institute/Work ethics</b> (For further detail please see Annexure-II at the end)</li> </ul>	<p style="text-align: center;"><b>Task-1</b> (Details may be seen at Annexure 1)</p>
Week 2	Introduction to Computer Software and Network Fundamentals	<p><b>Computer Software:</b></p> <ul style="list-style-type: none"> <li>• Basic Introduction to Operating Systems</li> <li>• Installations and Configuration of OS</li> <li>• Troubleshooting OS</li> <li>• Effective Software &amp; Tools and their utilization</li> </ul> <p><b>Network Fundamentals:</b></p> <ul style="list-style-type: none"> <li>• Basic and Current Technologies, Emerging Trends</li> <li>• Understand the Concept of Network</li> <li>• Explain Different types of Networks</li> <li>• Define kinds of terminologies of network</li> <li>• Define Physical Layout/Design of Network</li> <li>• Transmission mediums</li> </ul>	<p><b>Task-2 &amp; 3</b> (Details may be seen at Annexure 1)</p>

		<ul style="list-style-type: none"> <li>• Define Transmission mediums</li> <li>• <b>Case Study</b> (Data security &amp; Safety) (For further detail please see Page No: 5-6)</li> <li>• Understand &amp; work on different types of Bounded / Guided media</li> <li>• Understand &amp; work on different types of unbounded / unguided media</li> <li>• Understand, use and punch various type of connectors</li> <li>• <b>Success story</b> (For further detail please see Page No: 4-5 and Annexure-III at the end)</li> </ul>	<p><b>Task-3</b> (Details may be seen at Annexure 1)</p>
Week 3	<p><b>Client End OS / Window 10</b></p> <p><b>Job Search &amp; Entrepreneurial Skills</b>(Job Search)</p>	<ul style="list-style-type: none"> <li>• <b>Motivational Lecture</b> (For further detail please see Page No: 3-4)</li> <li>• Understanding Operating System.</li> <li>• Understand and Install MS Windows-10</li> <li>• Understand and manage different types of File/ Folder System</li> <li>• Administrative Tools &amp; Configuration of OS.</li> <li>• Understand and manage various tasks, utilities, etc.</li> <li>• Supporting Tools &amp; their Utilization. Hacks, Tip, Tricks &amp; Troubleshooting</li> </ul> <p><b>A session on:</b></p> <ul style="list-style-type: none"> <li>• Job market</li> <li>• Job related skills.</li> <li>• Interpersonal skills</li> <li>• Communication skills</li> </ul> <ul style="list-style-type: none"> <li>• <b>Institute/Work ethics</b> (For further detail please see Annexure-II at the end)</li> <li>• <b>Success story</b> (For further detail please see Page No: 4-5 and Annexure-III at the end)</li> </ul>	<p><b>Task-4</b> (Details may be seen at Annexure 1)</p>

<p><b>Week 4</b></p>	<p><b>IP Connectivity /Network Advance Topics</b></p>	<p><b>Network Terminologies:</b></p> <ul style="list-style-type: none"> <li>• OSI Model</li> <li>• TCP/IP Model</li> <li>• IP Address</li> <li>• IP Address Version</li> <li>• Classification of IPv4 Address</li> <li>• Classful vs Classless Routing Protocols</li> <li>• Sub netting</li> <li>• Network design</li> <li>• Basics of Network</li> <li>• <b>Freelancing concepts</b>, how to start, step by step process from account opening to taking orders and contract signing</li> <li>• Freelancing platforms</li> <li>• <b>Success story</b> (For further detail please see Page No: 4-5 and Annexure-III at the end)</li> </ul>	<p><b>Task-5</b> (Details may be seen at Annexure 1)</p> <p><b>1<sup>st</sup> Monthly Test</b></p>
<p><b>Week 5</b></p>	<p><b>Switching</b></p>	<p><b>Switching:</b></p> <ul style="list-style-type: none"> <li>• Different types of switch and function of switching.</li> <li>• Administrative Controls</li> <li>• Remote Access Methods</li> <li>• Console Connection &amp; Configurations <u>V LANS</u></li> <li>• Intro to Vlan</li> <li>• Configuration of Vlan</li> <li>• Configuring Inter-VLAN Routing</li> <li>• Vlan pruning</li> <li>• Configuring Inter-VLAN Routing</li> <li>• What is Vlan trunking protocol</li> <li>• VTP Methods</li> <li>• How to configure VTP(LAB)</li> <li>• Intro to Dynamic Trunking Protocols &amp; modes</li> <li>• <b>Freelancing continued....</b></li> <li>• <b>Case Study</b> (For further detail please see Page No: 5-6)</li> </ul>	<p><b>Task-6</b> (Details may be seen at Annexure 1)</p>

		<ul style="list-style-type: none"> <li>• <b>Institute/Work ethics</b> (For further detail please see Annexure-II at the end)</li> </ul>	
<b>Week 6</b>	<b>Introduction to Window Server 2019</b>  <b>Job Search &amp; Entrepreneurial Skills</b> (CV Building)	<ul style="list-style-type: none"> <li>• <b>Motivational Lecture</b> (For further detail please see Page No: 3-4)</li> <li>• Install Windows Server 2019 (32/64 Bits)</li> <li>• Advance Features &amp; Environment</li> <li>• Supporting Tools &amp; their utilization</li> <li>• Use DNS &amp; Win Server</li> <li>• Understand and use DHCP</li> <li>• Understand and use Remote Access Server</li> <li>• Session on CV Building.</li> <li>• How to make notable CV.</li> <li>• Dos and Don'ts of CV making.</li> <li>• <b>Case Study</b> (Data security &amp; Safety) (For further detail please see Page No: 5-6)</li> </ul>	<b>Task-7</b> (Details may be seen at Annexure 1)
<b>Week 7</b>	<b>Introduction to Window Server 2019</b>  <b>Virtualization</b>	<ul style="list-style-type: none"> <li>• Understand and use Application of File server</li> <li>• Understand and use Remote Access Server</li> <li>• Understand and use Print Server</li> <li>• Understand and use Active Directory</li> <li>• Understand and use Radius Server</li> <li>• Virtualization</li> <li>• <b>Success story</b> (For further detail please see Page No: 4-5 and Annexure-III at the end)</li> </ul>	<b>Task-8</b> (Details may be seen at Annexure 1)
<b>Week 8</b>	<b>Overview of the previous weeks &amp; Mid Term Examination</b>		
<b>Week 9</b>	<b>Trouble Shooting of a Network</b>	<ul style="list-style-type: none"> <li>• Overview of Mid-Term Examination</li> <li>• <b>Motivational Lecture</b> (For further detail please see Page No: 3-4)</li> <li>• Troubleshoot basic connectivity issues</li> <li>• Troubleshoot file sharing and printer sharing</li> </ul>	<b>Task-9</b> (Details may be seen at Annexure 1)

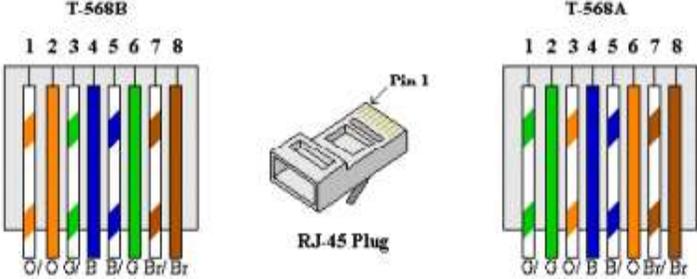
	<p><b>Job Search &amp; Entrepreneurial Skills</b> (General overseas Employment)</p>	<ul style="list-style-type: none"> <li>• Troubleshoot malfunctioning in programs</li> <li>• Troubleshoot Audio Drivers</li> <li>• Troubleshoot I/O Devices</li> <li>• Troubleshoot Server 2019</li> <li>• Troubleshoot Communication devices</li> <li>• Session on Self-Employment</li> <li>• How to start a Business.</li> <li>• Requirements (Capital, Physical etc.)</li> <li>• Benefits/Advantages of self-employment</li> <li>• Journalizing</li> <li>• <b>Success story</b> (For further detail please see Page No: 4-5 and Annexure-III at the end)</li> </ul>	<p><b>2<sup>nd</sup> Monthly Test</b></p>
<p><b>Week 10</b></p>	<p><b>Security Operation Center</b></p>	<ul style="list-style-type: none"> <li>• <b>Motivational Lecture</b> (For further detail please see Page No: 3-4)</li> <li>• What is SOC?</li> <li>• Different types of Logs</li> <li>• Syslog vs event viewer</li> <li>• What is Security Information and Event Management?</li> <li>• SIEM solutions</li> <li>• Freelancing sites and starting actual work been started</li> <li>• <b>Case Study</b> (For further detail please see Page No: 5-6)</li> <li>• <b>Institute/Work ethics</b> (For further detail please see Annexure-II at the end)</li> </ul>	<p><b>Task-10</b> (Details may be seen at Annexure 1)</p> <p><b>Freelancing</b> (Details may be seen at Annexure IV)</p>
<p><b>Week 11</b></p>	<p><b>Routing</b></p>	<ul style="list-style-type: none"> <li>• Intro to Router, types of ports and types of memory</li> <li>• Connectivity of devices</li> <li>• Administrative controls of Routers</li> <li>• Static &amp; Dynamic Routing</li> <li>• Intro to OSPF &amp; Configuration</li> <li>• Intro to EIGRP</li> <li>• Configuration of EIGRP</li> <li>• Intro to Routing Information Protocol</li> <li>• Configuration of Routing Information Protocol</li> <li>• <b>Freelancing</b> (Get some small projects of General Topics)</li> </ul>	<p><b>Task-11</b> (Details may be seen at Annexure 1)</p>

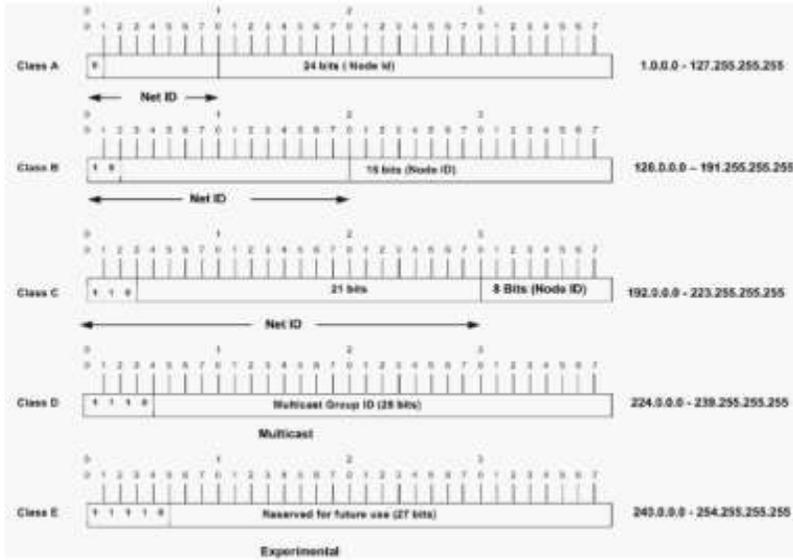


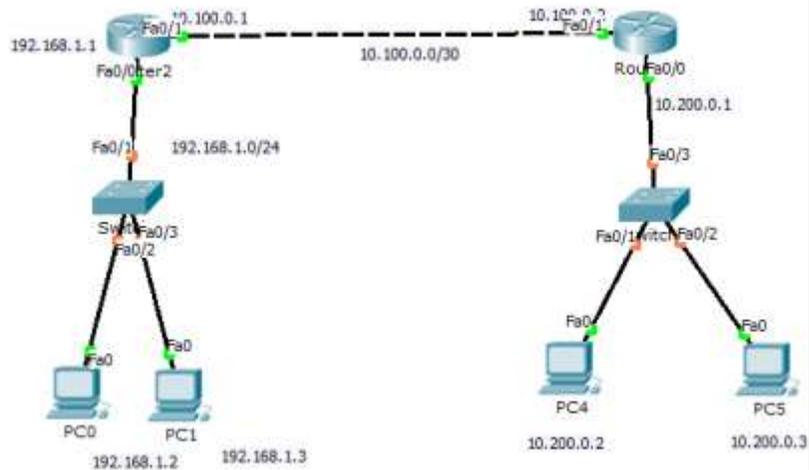
## Annexure 1

**Note: The following tasks are required to be performed multiple times by each trainee/group until sufficient proficiency level is acquired. The trainer is required to determine the number of times the task needs to be repeated by a trainee as per his/her low/medium/high level of skill and proficiency during any stage of the course.**

<b>Task #</b>	<b>Task</b>	<b>Description</b>	<b>Week</b>
<b>Task 1</b>	Hands on Training & Assembling of Computer and its Devices,	<p>The trainer shall explain the detail working of individual hardware used and demonstrate the assembly of computer system. This exercise is recommended as group activity and all students expected to perform individually.</p> <p><b>Activity:</b> Assemble Computer System from Scratch  <b>Activity:</b> Install PCI devices and PCI express devices  <b>Required:</b> Full Computer Hardware and other connecting devices.</p>	<b>Week-1</b>
<b>Task 2</b>	Hands-on Installations and Configuration of OS, Tools, and their utilization	<p>Trainer is required to demonstrate all possible methods for OS installation and Boot Options along with repair options, device driver's installation and their configuration. This exercise is recommended as group activity and all students expected to perform individually.</p> <p><b>Activity:</b> Install Window Operating System  <b>Activity:</b> Install Any Open Source Operating System.  <b>Activity:</b> Install Sound, Network and graphic card drivers.  <b>Required:</b> Working different Window's / Opensource CDs/DVDs/USB, CD/DVD ROM.</p>	<b>Week-2</b>
<b>Task 3</b>	Understand and punch various type of Network connectors	<p>Trainer is required to explain the usage of all possible network media / cables types and later demonstrate the creation / setting-up of all possible cables types through the usage of proper tools. Each student is expected to perform the practical individually.</p> <p><b>Activity:</b> Using one-meter CAT6 cable develop cross-over and straight cable, test and verify it.</p>	

			
<b>Task 4</b>	Understanding and Manage Window 10 OS	<p><b>Required:</b> Different Network Cables, Connectors and Tools</p> <p>All students are required to have a hands-on practice over window 10 platform. Trainer is required to first demonstration and explain the Window 10 OS environment over the multimedia projector and then administer student’s activity.</p> <p>Practice includes all Window 10 Environment, types of File / folder system, Administrative Tools, their utilities, devices installations, Desktop management etc.  <a href="https://www.youtube.com/watch?v=FEFM3R3dCIA">https://www.youtube.com/watch?v=FEFM3R3dCIA</a></p> <p><b>Activity:</b> Install and Configure Window 10 on your system.</p> <p><b>Activity:</b> Configure all Device driver from scratch, non-default drivers</p> <p><b>Activity:</b> Explore Administrative tool and explain working of each tool</p> <p><b>Required:</b> Desktop Computer with Window 10</p>	<b>Week-3</b>
<b>Task 5</b>	Network Models and design demonstration	<p>The trainer is required to familiarize the students by demonstration through visual aid, the concept of available network models and design. A practical assignment must be adapted for the purpose.</p> <p>Trainer is also required to teach sub netting procedure to the students and evaluate their performance through multiple practice sessions.</p>	<b>Week-4</b>

		 <p><b>Activity:</b> Determine the Subnets (Trainer can create their own examples and exercise)  Device A: 172.16.17.30/20  Device B: 172.16.28.15/20</p>	
<b>Task 6</b>	Hands-on with Network Managed Switch	<p>The trainer is required to familiarize the students with available managed and Non-Managed Switches and their use. A hands-on practical for managed switch access methods be arranged. Administrative Controls commands and their usage be introduced to the students.</p> <p>The Trainer is required to provide set of commands and exercises to students to get students to perform different tasks using Switch.</p> <p><b>Packet tracer:</b> Students should be introduced with the Packer Tracer software and a brief tutorial may be demonstrated. All students are required to perform Packet tracer task individually in the lab and practical assignments shall be performed.  <a href="https://www.youtube.com/watch?v=QmL0AXymS5U">https://www.youtube.com/watch?v=QmL0AXymS5U</a>  <a href="https://www.youtube.com/watch?v=Gey0r1mUyr0">https://www.youtube.com/watch?v=Gey0r1mUyr0</a></p> <p><b>Activity:</b> The trainer is required to create different exercises for the students to get them going at the Packet Tracer.  <b>Activity:</b> Create the Environment and Configure connections</p>	<b>Week-5</b>

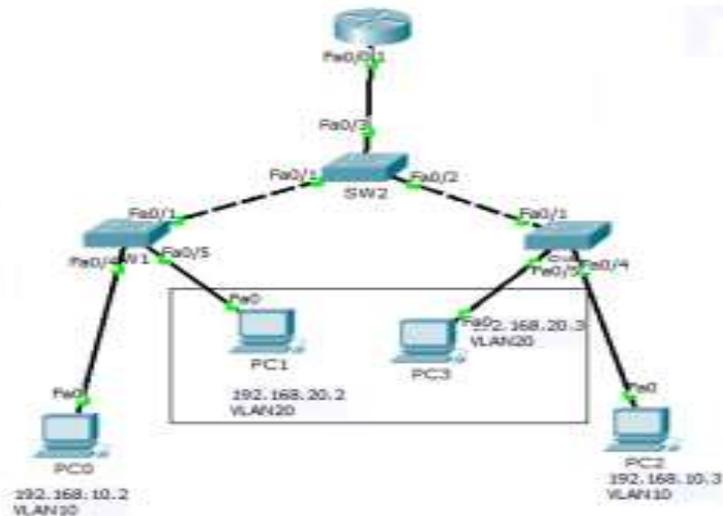


**VLANS:** The concept of VLAN be introduced as basic switching, VLAN Configuration methods and commands with Inter-VLAN Routing configuration, Vlan pruning and trunking configuration. CISCO VTP Methods and their configuration may also be introduced and practically performed on Packet tracer.

<https://www.youtube.com/watch?v=7pgCDxU9vvY>

<https://www.youtube.com/watch?v=hWp1CumPE9E>

**Activity:** Create and Configure VLANs and test and verify inter-VLAN communication.



**Required:** Desktop Computer with Packet Tracer, Managed and Non-Managed Switches

<p><b>Task 7</b></p>	<p>Windows Server 2019 Installation and Configuration</p>	<p>All students are required to have a hands-on practice over window Server 2019 platform. Trainer is required to first demonstration and explain the Server multimedia projector and then administer student's activity.  <a href="https://www.youtube.com/watch?v=kif7U0YBI_8">https://www.youtube.com/watch?v=kif7U0YBI_8</a>  <a href="https://www.youtube.com/watch?v=zVI7yKplo4">https://www.youtube.com/watch?v=zVI7yKplo4</a>  <a href="https://www.youtube.com/watch?v=k3fZjVOIXnA">https://www.youtube.com/watch?v=k3fZjVOIXnA</a></p> <p><b>Activity:</b> Students are required to install Window Server 2019.  <b>Activity:</b> Configure 2 NIC card on the Server.</p> <p>Practice includes all window Server 2019 Environment, Advance Features, Roles, Tools, their utilities etc.</p> <p><b>DNS, DHCP &amp; Win Server:</b> Instructure should explain and demonstrate the configuration of DNS, DHCP and Win Server roles / server in window server 2019 in details. This is a group activity and each student should get a hands-on on the server by installing and configuring the said roles.  <a href="https://www.youtube.com/watch?v=-TsqAHUWdQU">https://www.youtube.com/watch?v=-TsqAHUWdQU</a>  <a href="https://www.youtube.com/watch?v=eo8EvgCxT-8">https://www.youtube.com/watch?v=eo8EvgCxT-8</a>  <a href="https://www.youtube.com/watch?v=neIT5T8ceFk">https://www.youtube.com/watch?v=neIT5T8ceFk</a></p> <p><b>Activity:</b> Install and configure Server Role of DNS and test.  <b>Activity:</b> Install and configure Server Role of DHCP and test in Lab Environment.</p> <p><b>Required:</b> Windows Server 2019 Installation and Configuration</p>	<p><b>Week-6</b></p>
<p><b>Task 8</b></p>	<p><b>Window Server 2019 Roles and Virtualization</b></p>	<p>All students are required to have a hands-on practice over listed window Server 2019 Roles / Servers. Trainer is required to demonstration and explain different Server roles and then administer student's activity.</p> <p><b>Activity:</b> Install and configure Server Role of File server and test in Lab Environment.  <b>Activity:</b> Install and configure Server Role of Print Server. server and test in Lab Environment.  <b>Activity:</b> Install and configure Server Role of Remote Access Server and test in Lab Environment.</p>	<p><b>Week-7</b></p>

		<p><b>Activity:</b> Install and configure Server Role of Active Directory and test in Lab Environment.</p> <p><b>Activity:</b> Install and configure Server Role of Radius Server and test in Lab Environment.</p> <p>All above activities are group activity, but each student is required to perform individually.</p> <p><b>Virtualization:</b> Trainer is required to explain and demonstrate the concept of virtualization and its types i.e. Desktop Virtualization, Application Virtualization, Server Virtualization Storage Virtualization, Network Virtualization and the software tools involved like Hyper V, Virtual Box, VMLite, VMWare etc.</p> <p><b>Activity:</b> Install and configure Hyper V, Virtual Box, VM Lite, VMWare softwares and configure as per instructions.</p> <p><b>Activity:</b> Install multiple OS through virtualization on a single computer system.</p> <p><b>Activity:</b> Implement virtualization and resource sharing between any of the two/ three server Roles on a single system.</p> <p><b>Required:</b> Computer, Internet Connection, DVD/USB of Window Server 2019.</p>	
<p><b>Task 9</b></p>	<p><b>Network Environment Trouble Shooting</b></p>	<p>The trainer is required to provide Network Environment and attached Equipment to the Students.</p> <p><b>Activity:</b> Create 5 computer network and provide ping result of each connected computer with file sharing.</p> <p><b>Activity:</b> Student are to connect printer over the network and print from different computers through printer sharing.</p> <p><b>Activity:</b> Search for System Error codes and explain their meaning and solutions. Trainer to provide environment for the purpose and guide students.</p> <p><b>Required:</b> Printer, Computer, Server OS and NICs</p>	<p><b>Week-9</b></p>

<p><b>Task 10</b></p>	<p><b>Security Operation Center</b></p>	<p>Trainer is required to explain the security features of Window Server 2019 like New Shielded VM Improvements, Device Guard Policy Updates without Reboot, Kernel Control Flow Guard (CFG), System Guard Runtime Monitor, Virtual Network Encryption and Windows Defender ATP Agent Included OOB.</p> <p><a href="https://www.vembu.com/blog/new-security-features-windows-server-2019/">https://www.vembu.com/blog/new-security-features-windows-server-2019/</a></p> <p><b>Activity:</b> Students are to activate and implement above features for practice purpose.</p> <p><b>Logs:</b> Trainer is required to familiarize the students with different security and system log in Window Server 2019 and demonstrate all logs one by one for better understanding. System, Application and Security.</p> <p><b>Activity:</b> Student are to activate different logs and then view activity in those logs after performing action prescribed by the instructor.</p> <p><b>SIEM: Trainer is to explain the concept of</b> Security Information and Event Management to students and demonstrate its implementation through prescribed tool like Arcsight ESM, IBM QRadar and Splunk.</p> <p><b>Required:</b> Computer with Window Server 2019</p>	<p><b>Week-10</b></p>
<p><b>Task 11</b></p>	<p><b>Routing and Protocols</b></p>	<p>Trainer is required to explain and demonstrate the concept of Router and Routing to students, its port types, memory types, access methods and connectivity and Administrative controls.</p> <p><b>Activity:</b> Hands-on activity by students to physically connect the router over the Network and perform different access methods.</p> <p><b>Protocols:</b> Practical demonstration and explanation of routing protocols like Static &amp; Dynamic Routing, OSPF, EIGRP, RIP and their Configuration through Packet Tracer, full command manual.</p>	<p><b>Week-11</b></p>

		<p><b>Activity:</b> Implement and configure Static and Dynamic Routing Protocol over the given scenario using Packet Tracer.</p> <p><b>Activity:</b> Implement and configure OSPF Routing protocol over the given scenario using Packet Tracer.</p> <p><b>Activity:</b> Implement and configure EIGRP Routing protocol over the given scenario using Packet Tracer.</p> <p><b>Activity:</b> Implement and configure RIP 1 &amp; 2 Routing protocol over the given scenario using Packet Tracer.</p> <p><b>Required:</b> Computers, Packet Tracer, Managed Switch</p>	
<b>Task 12</b>	<b>Advance Routing and Protocols</b>	<p>Trainer is required to explain and demonstrate the concept of advance Routing Protocols.</p> <p><b>Protocols:</b> Practical demonstration and explanation of routing protocols like BGP and HSRP, their Configuration through Packet Tracer, full command manual.</p> <p><b>Activity:</b> Implement and configure BGP Routing Protocol over the given scenario using Packet Tracer.</p> <p><b>Activity:</b> Implement and configure HSRP Routing Protocol over the given scenario using Packet Tracer.</p> <p><b>ACLs:</b> Concept and demonstration of ACLs through Packet Tracer.</p> <p><b>Activity:</b> Implement and configure ACLs over the given scenario using Packet Tracer.</p> <p><b>DHCP Snooping:</b> Concept and demonstration of DHCP Snooping.  <a href="https://networklessons.com/switching/dhcp-snooping">https://networklessons.com/switching/dhcp-snooping</a></p> <p><b>Activity:</b> Implementation of DHCP Snooping</p> <p><b>Required:</b> Computers, Packet Tracer, Managed Switch</p>	<b>Week-12</b>

## **Field Project**

The final Project shall be the end of the course where students are required to fulfill / complete the given tasks / project comprising of multiple activities that shall result in overall practices of the learned topics.

The Trainer shall assign projects to the group of 4 students, the project tasks can be single unit task or a set of tasks depending upon the nature of the project. The projects can be designed at Packer Tracer Level or Physical level in the Lab.

Specifically there will be three parts of each project:

1. Physical Network Design and Implementation
2. Window Server 2019 Roles
3. Network Switching and Routing

The groups will work among themselves in the Lab on the assigned resources under the supervision of trainer and complete the required project.

### **Expected outcome**

- Each group will develop one report of given assignment, the report may contain task procedure and configuration.
- Each group will prepare presentation to be presented to panel.
- Demonstration of the Live Project

### **Evaluation**

Each group will be evaluated by expert panel on the basis of following

- Content of report
- Feedback of trainer
- Presentation by group

### Workplace/Institute Ethics Guide

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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 importance of work and manifested by determination or desire to work hard.

The following ten work ethics are defined as essential for employee's 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 own weight and help others who are struggling. Recognize when to speak up with an ideas 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 life time

**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. Takes 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 workplace 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.

### Suggestive Format and Sequence Order of Success Story

S.No	Key Information	Detail/Description
1.	<b>Self &amp; Family background</b>	<ul style="list-style-type: none"> <li>• Self-introduction</li> <li>• Family background and socio economic status,</li> <li>• Education level and activities involved in</li> <li>• Financial hardships etc</li> </ul>
2.	<b>How he came on board NAVTTC Training/ or got trained through any other source</b>	<ul style="list-style-type: none"> <li>• Information about course, apply and selection</li> <li>• Course duration, trade selection</li> <li>• Attendance, active participation, monthly tests, interest in lab work</li> </ul>
3.	<b>Post training activities</b>	<ul style="list-style-type: none"> <li>• How job / business (self-employment) was set up</li> <li>• How capital was managed (loan (if any) etc).</li> <li>• Detail of work to share i.e. where is job or business being done; how many people employed ( in case of self-employment/ business )</li> <li>• Monthly income or earnings and support to family</li> <li>• Earning a happy life than before</li> </ul>
4.	<b>Message to others (under training)</b>	<ul style="list-style-type: none"> <li>• Take the training opportunity seriously</li> <li>• Impose self-discipline and ensure regularity</li> <li>• Make Hard work pays in the end so be always ready for the same.</li> </ul>

- **Note: Success story is a source of motivation for the trainees and can be presented in a number of ways/forms in a NAVTTC skill development course as under: -**
  - i. To call a passed out successful person of institute. He/she will narrate his/her success story to the trainees in his/her own words and meet trainees as well.
  - ii. To see and listen to a recorded video/clip (5 to 7 minutes) showing a successful person Audio video recording that has to cover the above-mentioned points.
  - iii. The teacher displays the picture of a successful trainee (name, trade, institute, organization, job, earning per month etc) and narrates his/her story in teacher's own motivational words.

## References

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A Practical Guide to Computer Network and Internet Technologies

Author: Babu R. Dawadi.

<https://www.vembu.com/blog/n0ew-security-features-windows-server-2019/>

<https://networklessons.com/switching/dhcp-snooping>

<https://www.youtube.com/watch?v=FEFM3R3dCIA>

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