Government of Pakistan

**National Vocational and Technical Training Commission**

**Prime Minister's Hunarmand Pakistan Program**

"Skills for All"

# Course Contents / Lesson Plan

**Course Title:** Certificate in CISCO Network Administration

**Duration:** 6 Months

| Course Title | Certificate in CISCO Network Administration |
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| **Objectives and Expectations** | **Employable skills and hands-on practice for Certificate in CISCO Network Administration**<br>This Course will cover the theory, design, engineering, and installation of networks to connect digital computers. The course will prepare students to plan and implement a network. Also includes peer-to-peer networks, the client-server model, network operating systems, and an introduction to wide-area networks. Understanding with different Network Architecture, Designing Techniques, Management and configuration techniques with hand zone experience. Troubleshooting and monitoring a network while providing High Availability to Organization/Company. Also Securing network form unauthorized access and attackers by implementing Security levels and access<br>The Course Objectives<br>• Understand the principles and concepts on computer networks.<br>• Understand general-purpose computer networks.<br>• Understand the computer network applications.<br>• Understand the knowledge on designing and building a complete Network system.<br>• Understanding of Networking techniques<br>• Campus Design & Enterprise Network<br>• Configuration of Advance Routing<br>• Management of Network<br>• Troubleshooting Skills<br>• Network Monitoring Skills<br>• Network Designing<br>• High Availability of Network<br>• Remote Site Management<br>• Programmability and Automation<br><br>**Main Expectations:**<br><br>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.<br>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.<br><br>**i.** Specially designed practical tasks to be performed by the trainees have been included in the Annexure-I to this document. The record of all tasks performed individually or in groups must be preserved by the management of the training Institute clearly labeling name, trade, session, etc so that these are ready to be physically inspected/verified through monitoring visits from time to time. The weekly distribution of |

tasks has also been indicated in the weekly lesson plan given in this document.

**ii.** To materialize the main expectations, a special module on **Job Search & Entrepreneurial Skills** has been included in the latter part of this course ($5^{th}$ & $6^{th}$ month) through which, the trainees will be made aware of the Job search techniques in the local as well as international job markets (Gulf countries). Awareness around the visa process and immigration laws of the most favored labor destination countries also form a part of this module. Moreover, the trainees would also be encouraged to venture into self-employment and exposed to the main requirements in this regard. It is also expected that a sense of civic duties/roles and responsibilities will also be inculcated in the trainees to make them responsible citizens of the country.

**iii.** A module on **Work Place Ethics** has also been included to highlight the importance of good and positive behavior in the workplace in the line with the best practices elsewhere in the world. An outline of such qualities has been given in the Appendix to this document. Its importance should be conveyed in a format that is attractive and interesting for the trainees such as through PPT slides +short video documentaries. Needless to say that if the training provider puts his heart and soul into these otherwise non-technical components, the image of the Pakistani workforce would undergo a positive transformation in the local as well as international job markets.

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

- Motivational Lectures
- Success Stories
- Case Studies

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

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

**(i) Motivational Lectures**

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

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

- Ending Points to persuade the trainees on changing themselves.

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

As this tool is expected that the training providers would make arrangements for regular well planned motivational lectures as part of a coordinated strategy interspersed throughout the training period as suggested in the weekly lesson plans in this document.
Course-related motivational lectures online link is available in **Annexure-II**.

**(ii) Success Stories**

Another effective way of motivating the trainees is using Success Stories. Its inclusion in the weekly lesson plan at regular intervals has been recommended till the end of the training.
A success story may be disseminated orally, through a presentation, or using a video/documentary of someone that has risen to fortune, acclaim, or brilliant achievement. A success story shows how a person achieved his goal through hard work, dedication, and devotion. An inspiring success story contains compelling and significant facts articulated clearly and easily comprehendible words. Moreover, it is helpful if it is assumed that the reader/listener knows nothing of what is being revealed. The optimum impact is created when the story is revealed in the form of:-

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

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

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| | 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.<br>Depending on suitability to the trade, the weekly lesson plan in this document may suggest case studies be presented to the trainees. The trainer may adopt a PowerPoint presentation or video format for such case studies whichever is deemed suitable but only those cases must be selected that are relevant and of a learning value.<br>The Trainees should be required and supervised to carefully analyze the cases.<br>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.<br>Case studies can be implemented in the following ways: -<br>i. A good quality trade-specific documentary ( At least 2-3 documentaries must be arranged by the training institute)<br>ii. Health &Safety case studies (2 cases regarding safety and industrial accidents must be arranged by the training institute)<br>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** | By the end of this course, the trainees should gain the following competencies:<br>• Understanding of Networking techniques<br>• Campus Design & Enterprise Network<br>• Configuration of IP Connectivity<br>• Configuration of Advance Routing and Routing Protocols<br>• Management of Network<br>• Security of Network<br>• Problems Solving Skills<br>• Troubleshooting Skills<br>• Network Monitoring Skills<br>• Network Designing<br>• High Availability of Network<br>• Remote Site Management<br>• Secure and Encrypted traffic b/w branches<br>• Implementation of Network Policies<br>• Programmability and Automation |
| **Course Execution Plan** | The total duration of the course: **6 months (26 Weeks)**<br>Class hours: **4 hours per day**<br>Theory: **20%**<br>Practical: **80%**<br>Weekly hours: **20 hours per week (5 days a week)**<br>Total contact hours: **520hours** |

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| **Companies offering jobs in the respective trade** | • PTCL<br>• Huawei<br>• Wateen<br>• NetSole<br>• Storm Fiber<br>• Multinet<br>• Nescom<br>• Transworld<br>• Netcom<br>• Worldcall<br>• Aplha Enterprises<br>• Amigo Technology |
| **Job Opportunities** | • Network Engineer<br>• Network Administrator<br>• IT Support Officer<br>• Manager / Assistant Manager Networks<br>• Network support technician |
| **No of Students** | 25 |
| **Learning Place** | Classroom / Lab |
| **Instructional Resources** | Learning Material:<br><br>For Students:<br><br>● https://www.cisco.com/c/en/us/tech/index.html<br>● https://www.juniper.net/documentation/<br>● https://docs.fortinet.com/<br>● https://www.cisco.com/c/en/us/tech/multiprotocol-label-switching-mpls<br>● https://www.cisco.com/c/en/us/support/docs/ip/open-shortest-path-first-ospf/7039-1.html<br>● https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/iproute_bgp/configuration/xe-16/irg-xe-16-book.html<br>● https://www.youtube.com/watch?v=svkGASq8mNM<br>● https://www.cisco.com/c/en/us/td/docs/security/asa/roadmap/asaroadmap.html<br><br>For Instructor:<br><br>● https://www.netacad.com/<br>● https://www.coursera.org/<br>● https://www.microsoft.com/mct/<br>● https://admin.microsoft.com/Adminportal/Home#/homepage<br>● https://support.huawei.com/learning/<br>● https://mylearn.vmware.com/<br>● https://www.fortinet.com/ |

**MODULES**

| Scheduled Week | Module Title | Learning Units | Remarks |
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| **Week 1** | Introduction to Networks | • **Motivational Lecture** **(** *For further detail please see Annexure: II)*<br>• Motivational Lecture<br>• Course Introduction<br>• Success stories<br>• Job market<br>• Course Applications<br>• Institute Ethics<br>• Introduction to Information Technology<br>• Introduction to Computer Hardware<br>• Introduction to Computer Software<br>• Basic Networking Terms<br>• TCP/IP & OSI Model<br>• Introduction to Network Devices | **TASK1**<br>**TASK2**<br>**TASK3**<br>*Details may be seen at Annexure-I* |
| **Week 2** | Addressing Schemes/Lab Setup | • **Success stories** **(** *For further detail please see Annexure: III)*<br>IPv4 Addressing:<br>• History of IPv4 Addressing<br>• Format of IPv4 Addressing<br>• Classification of IPv4 Addressing | **TASK 4**<br>*Details may be seen at Annexure-I* |

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| | | • Calculating Number of networks in classes<br>• Calculation number of hosts per network<br>• Concept of Network-id and Broadcast-id<br>• Subnet Mask and Wildcard Mask<br>• Concept of Default Gateway<br>• Routed & Non-Routed Ports<br>• Rules of IP addressing for Routed Ports<br>• Classless IP addressing:<br>• Subnetting and Super-netting<br>IPv6 Addressing:<br>• History of IPv6 Addressing<br>• Format of IPv6 addressing<br>• Network Prefix and Interface ID<br>• Types of IPv6 Addresses<br>MAC Addressing:<br>• History of MAC addressing<br>• Format of MAC addresses<br>• Types of MAC addresses<br>Download and Install Recommended Software:<br>1. Putty/Secure CRT | |

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| | | 2. Cisco Packet Tracer<br>3. GNS3 | |
| **Week 3** | Basic Labs/ Advanced Configuration | ● **Motivational Lecture** **(** *For further detail please see Annexure: II)*<br>● Basic Lab Setup with Cisco and Huawei Devices.<br>● LAN and WAN cables<br>● Physical Overview of Routers and Switches.<br>● How to access network devices locally.<br>● Difference between local and remote access.<br>● Introduction to terminal applications such as Putty, Hyper terminal and Secure CRT etc.<br>● Introduction to Cisco IOS and CLI.<br>● Initial Configuration of Cisco IOS.<br>● Introduction of different modes of Cisco IOS.<br>● Configure and verify clock<br>● Configure and verify hostname<br>● Configure and verify user access verification or login password<br>● Configure and verify enable password<br>● Configure and verify enable secret<br>● Learn how to modify, copy, write and | **TASK 5**<br>**TASK 6**<br>**TASK7**<br>**TASK8**<br>**TASK9**<br>*Details may be seen at Annexure-I* |

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| | | erase configuration.<br>● Verify running-config and startup-config<br>● Create username, password and their privileges<br>● Configure and verify NTP: Network Time Protocol<br>● Password Recovery<br>● Introduction to LAN and WAN interfaces.<br>● How to configure and troubleshoot Ethernet and Serial interfaces.<br>● Configure description on interfaces.<br>● Configure ipv4 and ipv6 addresses on interfaces.<br>● Configure Keepalive, clock rate and encapsulation on interfaces.<br>● How to make admin up and down interfaces.<br>● Verify connectivity with test traffic.<br>● Introduce ICMP-echo and echo-reply.<br>● Use of ping command and understand output.<br>● Impact of round-trip time.<br>● Remote-access with TELNET and SSH<br>● IOS and Configuration Backup with | |

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| | | TFTP<br>● Configure and verify CDP<br>● Configure and verify LLDP | |
| **Week 4** | Basic Routing | ● **Success stories** **(** *For further detail please see Annexure: III)*<br>● Introduction to Routing for reachability.<br>● Understand next hop. How to configure next hop with:<br>● Outgoing interface<br>● Next Hop IP address<br>● Understand static routing.<br>● Configure and verify static routing for IPv4<br>● Introduction to Dynamic Routing<br>● Types of routing protocols<br>● Interior gateway protocols:<br>● RIP: Routing Information Protocol<br>● OSPF: Open Shortest Path First<br>● IS-IS: Intermediate System to Intermediate System<br>● Exterior Gateway protocols:<br>● BGP: Border Gateway Protocol<br>● Administrative Distance or preference | **Task 10**<br>**Task 11**<br>**Task 12**<br>**Task 13**<br>*Details may be seen at Annexure-I*<br>**1st Monthly Test at end of month (Week-4)** |

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| | | of routing methods.<br>● Configure and verify Default Routing.<br>● Configure and verify DHCP Relay Agent. | |
| **Week 5** | Deep Dive into Dynamic Routing | ● **Motivational Lecture** **(** *For further detail please see Annexure: II)*<br>● Understand and Implement Routing Information Protocol.<br>● OSPF: Open Shortest Path First<br>● Link State Algorithm<br>● OSPF Process-id.<br>● OSPF Router-id.<br>● Configure Loopback Interfaces<br>● OSPF Area-id.<br>● OSPF contiguous wildcard mask<br>● OSPF Metric: cost<br>● OSPF Tables:<br>● Configure and verify single area OSPF.<br>● Design and implement multiple area OSPF.<br>● Regular and transit area.<br>● Define Internal Router, Backbone Router, Backbone Internal Router, Area Border Router and ASBR. | **TASK14**<br><br>*Details may be seen at Annexure-I* |

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| | | • Introduce and configure redistribution.<br>• Define seed/external metric.<br>• Type 1 and Type 2 seed metric.<br>• Static routes with null-0 for testing. | |
| **Week 6** | OSPF and Policy Based Routing | • **Success stories** **(** *For further detail please see Annexure: III)*<br>• Introduction to PBR tools:<br>• Route-map<br>• IP prefix-list<br>• Distribute-list<br>• ACL<br>• Example1:<br>• Industry Scenario-1 to implement PBR<br>• Example2:<br>• Industry Scenario-2 to implement PBR<br>OSPF Packet types<br>• OSPF neighbor states<br>• OSPF over multi-access networks<br>• DR, BDR and DRO roles in multi-access networks.<br>• Introducing OSPF LSA types 1 to 7.<br>• Regular area types:<br>- Stub Area<br>- Totally Stubby area | **TASK15**<br>*Details may be seen at Annexure-I* |

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| | | - NSSA: Not So Stubby Area<br>- Totally NSSA | |
| **Week 7** | OSPF Design constraints and filtering | ● **Motivational Lecture** **(** *For further detail please see Annexure: II)*<br>● Configure and verify OSPF Virtual Links.<br>● Continuous and discontinuous OSPF backbones.<br>● OSPF filters:<br>● IP prefix-lists<br>● Area filters<br>● Passive interface<br>● Route summarization<br>● authentication<br>● Class Project to revise and understand industrial challenges related to OSPF and Policy based<br>● routing. | **TASK 16**<br>**TASK 17**<br>**TASK 18**<br>*Details may be seen at Annexure-I* |
| **Week 8** | Deep Dive into Exterior Gateway Protocol | ● **Success stories** **(** *For further detail please see Annexure: III)*<br>● Introduction to EGP Historical Background Introduction to Multihoming BGP fundamentals.<br>● Internal and External BGP. BGP attributes: | **TASK 19**<br>**TASK 20**<br>**TASK 21**<br>**TASK 22**<br>**TASK 23**<br>**2nd** |

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| | | • Weight<br>• Local preference As-path<br>• Multi exit discriminator Origin<br>• Router-id<br>• BGP route-summarization<br>• PBR with BGP attributes and PBR tools Full Mesh i-BGP<br>• Route-reflector configuration BGP configuration best practices BGP Packet types and states BGP authentication) | **Monthly Test**<br><br>*Details may be seen at Annexure-I*<br><br>**2nd Monthly Test at end of month (Week-8)** |
| **Week 9** | Deep Dive into Intermediate System to Intermediate System. | • **Motivational Lecture** **(** *For further detail please see Annexure: II)*<br>• Understanding IS-IS routing protocol.<br>• Importance of IS-IS in ISPs.<br>• Comparison of OSPF and IS-IS<br>• IS-IS L1, L2 and L1L2 Router roles<br>• IS-IS L1, L2 and L1L2 neighbor relation.<br>• IS-IS PDUs: | **TASK 24**<br>**TASK 25**<br>**TASK 26**<br>**TASK 27**<br>*Details may be seen at Annexure-I* |

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| | | • L1 Hello PDU<br>• L2 Hello PDU<br>• L1 & L2 PSNP<br>• L1 & L2 CSNP<br>• IS-IS over multi-access network<br>• DIS role in multi-access network<br>• Route Leaking from L2 into L1<br>• IS-IS for AF IPv6<br>• Configure and verify Static Routing for IPv6 addresses.<br>• Configure and verify RIP-ng<br>• Configure and verify OSPF-v3<br>• Configure and verify BGP (AF-IPv6) | |
| **Week 10** | MPLS & MPLS L3 VPN | • **Success stories** **(** *For further detail please see Annexure: III)*<br>• Understanding Switching Architectures:<br>• Control Plane<br>• Data Plane<br>• Understanding Routing Information Base<br>• Understanding Forwarding Information Base<br>• Understanding MPLS | **TASK 28**<br>**TASK 29**<br>*Details may be seen at Annexure-I* |

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| | | • MPLS header<br>• MPLS Labels<br>• Label Information Base<br>• Label Forwarding Information Base<br>• Label Allocation<br>• Label Distribution<br>• Label Retention<br>• Configure and verify basic MPLS<br>• Understanding MPLS VPN<br>• VRF<br>• Route Distinguisher<br>• Route Targets<br>• MP-BGP | |
| **Week 11** | Ethernet Switching | • **Motivational Lecture** **(** *For further detail please see Annexure: II)*<br>• Forwarding on the basis of MAC Addresses Address Resolution Protocol<br>• ARP Table/Cache Switchport Modes Access Ports Trunk Ports<br>• Static Trunk Dynamic Trunk DTP<br>• Dynamic Desirable Dynamic Auto Dot1q and ISL SPAN<br>• RSPAN | **TASK 30**<br>**TASK 31**<br>**TASK 32**<br>**TASK 33**<br>*Details may be seen at Annexure-I* |

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| | | • Broadcast Domain Collision Domain | |
| **Week 12** | VLANS/ Inter VLAN Routing | • **Success stories** **(** *For further detail please see Annexure: III)*<br>• Introduction to VLAN<br>• Configure and verify basic VLAN configuration. VTP: VLAN Trunking Protocol<br>• VTP mode server VTP mode client<br>• VTP mode Transparent VTP Updates<br>• VTP Pruning VTP Versions<br>• Introduction to GVRP Native VLAN<br>• Private VLANS<br>• Voice VLANS<br>• Inter VLAN routing with Access ports Inter VLAN routing with Router on a Stick Inter VLAN routing with SVI (MLS)<br>• Inter VLAN routing with Routed and Non-Routed Ports Concept of SVI | *Details may be seen at Annexure-I* |
| | **Build your CV** | Download professional CV template from any good site (https://www.coolfreecv.com or relevant)<br>• Add Personal Information<br>• Add Educational details<br>• Add Experience/Portfolio<br>• Add contact details/profile links | |
| **Week 13** | **Mid-Term Assignment/Exam** | | |

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| **Week 14** | L2 Redundancy<br>STP/RSTP/MSTP | **Motivational Lecture ( *For further detail please see Annexure: II)***<br>● Introduction to L2 redundancy Infinite switching loops Broadcast storm<br>● Inconsistent MAC address table Introduction to Spanning-tree protocol Bridge-id<br>● Root Bridge<br>● Non-Root Bridge Switch Role Election<br>● Port Role Election Root Port Designated Port<br>● Non-Designated/Block Port Impact of Bridge-id<br>● Path Cost Sender's Port-id<br>● Per VLAN STP: PVST PVST+<br>● Load-balancing and redundancy<br>● Implementing Portfast feature.<br>● BPDU Filter Root Guard Loop Guard<br>● Understand & Implement RSTP<br>● Understand & Implement MST | **TASK 34**<br>*Details may be seen at Annexure-I* |
| **Week 15** | Link Aggregation<br>Link Bundling<br>EtherChannel<br>Gateway Redundancy | ● **Motivational Lecture ( *For further detail please see Annexure: II)***<br>● Introduction to link aggregation Configure and verify EtherChannel Port Channel<br>● Channel Group<br>● Static Implementation Dynamic | **TASK 34**<br>*Details may be seen at Annexure-I* |

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| | | EtherChannel with<br>- PagP<br>- LACP<br>● Different Load-balancing techniques. Introduce First Hop Redundancy<br>● Hot Standby Routing Protocol HSRP tracking | |
| **Week 16** | Gateway Redundancy & Switch Security | ● **Success stories** **(** *For further detail please see Annexure: III)*<br>● Implementing VRRP Object Tracking Implementing GLBP<br>- AVG<br>- AVF<br>● Implementing GLBP Object Tracking Implementing Switch Port Security DHCP Snooping<br>● Dynamic ARP Inspection VACL<br>● VLAN access-maps | **TASK 35**<br>**TASK 36**<br>**3rd Monthly Test**<br>*Details may be seen at Annexure-I* |
| | **Create an account profile on Fiverr (at least two gigs) and Upwork** | Create an account by following these steps:<br>Step 1: Personal Info<br>Step 2: Professional Info<br>Step 3: Linked Accounts<br>Step 4: Account Security | |
| **Week 17** | IP Traffic Management | ● **Motivational Lecture** **(** *For further detail please see Annexure: II)*<br>● Introduction to Access Control List | **TASK 37**<br>*Details may be seen at Annexure-I* |

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| | | • Configure and verify standard ACL<br>• Configure and verify extended ACL<br>• Contiguous and dis-contiguous wildcard mask<br>• Implement named and numbered ACL<br>• Introduction to public and private IP addresses<br>• Introduction to NAT and PAT.<br>• Configure and verify network address translation<br>• Configure and verify PAT/NAT-overloading | **3rd Monthly Test at end of month (Week-17)** |
| **Week 18** | Multicasting & QoS | • **Success stories** **(** *For further detail please see Annexure: III)*<br>• Motivational Lecture<br>• ( For further detail please see Annexure: II)<br>• Multicast Source & Client<br>• Multicast Routing<br>• Protocol Independent Multicast<br>• PIM Dense Mode<br>• PIM Sparse Mode<br>• Rendezvous Point: RP<br>• Multicast Domain<br>• BSR | **TASK 38**<br>*Details may be seen at Annexure-I* |

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| | | • IGMP<br>• Introduction to Quality of Service Network Congestion Management Classification and Marking<br>• IP Precedence DSCP<br>• Congestion avoidance with WRED Queueing Techniques<br>• Policing and Shaping | |
| **Week 19** | Implementing VPNs DMVPN | • **Motivational Lecture** **(** *For further detail please see Annexure: II)*<br>• Introduction to Virtual Private Networks<br>• Configure and verify GRE tunnels Configure and verify IP-Sec<br>• IKE 1<br>• IKE 2<br>• Configure and verify DMVPN<br>• Phase 1<br>• Phase 2<br>• Phase 3 | **TASK 39**<br>*Details may be seen at Annexure-I* |
| **Week 20** | WLAN (Wireless LAN) | • **Success stories** **(** *For further detail please see Annexure: III)*<br>• Introduction to Wireless Networks<br>• Introduction to Wireless LANs<br>• Wireless LAN 802.11 Service Sets<br>• Introduction to Wireless Security | **TASK 40**<br>*Details may be seen at Annexure-I*<br>**4th Monthly Test at end of month** |

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| | | • Wireless Authentication Methods<br>• Wireless Encryption and Integrity<br>• Wi-Fi Protected Access (WPA)<br>• Cisco Wireless Network Architectures<br>• Cisco WLC Deployment Models<br>• Cisco Wireless AP Modes<br>• Cisco Wireless LAN Controller (WLC) Basic Configuration<br>• Cisco WLC WPA2 PSK Authentication | **(Week-20)** |
| **Week 21** | Employable Project/Assignment (6 weeks (i.e 21-26) in addition to regular classes. | • **Motivational Lecture**<br>**(** *For further detail please see Annexure: II)*<br>• Guidelines to the Trainees for selection of students employable project like final year project (FYP)<br>• Assign Independent project to each Trainee<br>• A project based on trainee's aptitude and acquired skills.<br>• Designed by keeping in view the emerging trends in the local market as well as across the globe.<br>• The project idea may be based on Entrepreneur.<br>• Leading to the successful employment.<br>• The duration of the project will be 6 | **TASK41**<br>*Details may be seen at Annexure-I* |

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| | | weeks<br>• Ideas may be generated via different sites such as:<br>https://1000projects.org/<br>https://nevonprojects.com/<br>https://www.freestudentprojects.com/<br>https://technofizi.net/best-computer-science-and-engineering-cse-project-topics-ideas-for-students/<br>• Final viva/assessment will be conducted on project assignments.<br>• At the end of session the project will be presented in skills competition<br>• The skill competition will be conducted on zonal, regional and National level.<br>• The project will be presented in front of Industrialists for commercialization | |
| **Week 22** | Switch Security/ Automation & Device Programmability | • **Success stories** **(** *For further detail please see Annexure: III)*<br>• Port Security<br>• AAA and 802.1X Authentication<br>• AAA Authentication on Switch<br>• VLAN Access-List (VACL) | **TASK 42**<br>*Details may be seen at Annexure-I* |

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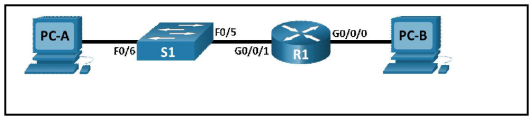
| | | • VLAN Hopping<br>• DHCP Snooping<br>• ARP Poisoning<br>• DAI (Dynamic ARP Inspection)<br>• Introduction to REST API<br>• Network Automation and Orchestration<br>• Data Models and Structures<br>• Device Programmability | |
| | **How to search and apply for jobs in at least two labor marketplace countries (KSA, UAE, etc.)** | • Browse the following website and create an account on each website<br>▪ Bayt.com – The Middle East Leading Job Site<br>▪ Monster Gulf – The International Job Portal<br>▪ Gulf Talent – Jobs in Dubai and the Middle East<br>• Find the handy 'search' option at the top of your homepage to search for the jobs that best suit your skills.<br>• Select the job type from the first 'Job Type' drop-down menu, next, select the location from the second drop-down menu.<br>• Enter any keywords you want to use to find suitable job vacancies.<br>• 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.<br>• Search for jobs by:<br>▪ Company<br>▪ Category<br>▪ Location<br>▪ All jobs<br>▪ Agency<br>• Industry | |

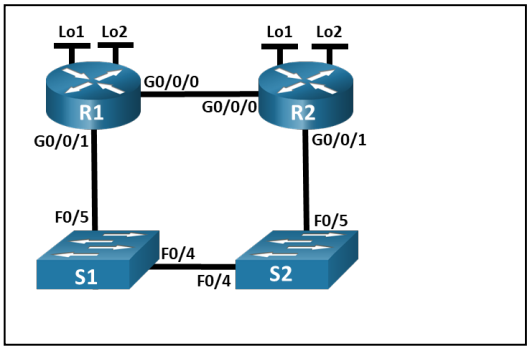
| | | | |
|---|---|---|---|
| **Week 23** | Troubleshooting | • Understand network troubleshooting tools and techniques<br>• Ping Syslog:<br>• Debugging Conditional debugging Traceroute<br>• telnet<br>• Advanced show commands with filters<br>• Class Project1: Troubleshoot RIP related issues. Class Project2: Troubleshoot OSPF related issues | **TASK 43**<br><br>*Details may be seen at Annexure-I* |
| **Week 24** | Firewall – Part 1 | • **Success stories** **(** *For further detail please see Annexure: III)*<br>• Introduction to firewall<br>• Firewall Security Levels<br>• Dynamic NAT Configuration<br>• Dynamic NAT with DMZ<br>• PAT Configuration<br>• Per-Session vs Multi-Session PAT<br>• Static NAT<br>• NAT Port Forwarding<br>• Access-List Introduction<br>• Remove Access-List<br>• Object-Group Access-List<br>• Time Based Access-List | **TASK 44**<br><br>*Details may be seen at Annexure-I* |

| | | | |
|---|---|---|---|
| **Week 25** | Firewall – Part 2 | • **Motivational Lecture** **(** *For further detail please see Annexure: II)*<br>• Sub-Interfaces, VLANs and Trunking<br>• Site-to-Site IPsec VPN<br>• IPsec VPN Dynamic Peer<br>• Remote Access IPsec VPN<br>• VPN Filter<br>• Anyconnect Remote Access SSL VPN<br>• Active / Standby Failover Configuration | **TASK 45**<br><br>*Details may be seen at Annexure-I* |
| **Week 26** | Entrepreneurship and Final Assessment in project | • **Success stories** **(** *For further detail please see Annexure: III)*<br>• Job Market Searching<br>• Self-employment<br>• Freelancing sites<br>• Introduction<br>• Fundamentals of Business Development<br>• Entrepreneurship<br>• Startup Funding<br>• Business Incubation and Acceleration<br>• Business Value Statement<br>• Business Model Canvas<br>• Sales and Marketing Strategies<br>• How to Reach Customers and Engage CxOs | |

| | | | |
|---|---|---|---|
| | | • Stakeholders Power Grid<br>• RACI Model, SWOT Analysis, PEST Analysis<br>• SMART Objectives<br>• OKRs<br>• Cost Management (OPEX, CAPEX, ROCE etc.)<br>• Final Assessment | |

## 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<br>Installation of Packet Tracer & GNS3<br>Import Router Images in GNS3<br>Router Modes<br>Ping & Extended Ping<br>How to Telnet a Router | **Week-2** |
| **4A** | Configure Basic Router Settings |  <br>**Part 1: Set Up the Topology and Initialize Devices**<br>• Cable equipment to match the network topology.<br>• Initialize and restart the router and switch.<br>**Part 2: Configure Devices and Verify Connectivity**<br>• Assign static IPv4 and IPv6 information to the PC interfaces.<br>• Configure basic router settings.<br>• Configure the router for SSH.<br>• Verify network connectivity.<br>**Part 3: Display Router Information**<br>• Retrieve hardware and software information from the | **Week-2** |

<table>
<tr><th>Task No.</th><th>Task</th><th>Description</th><th>Week</th></tr>
<tr><td></td><td></td><td>router.<br>• Interpret the output from the startup configuration.<br>• Interpret the output from the routing table.<br>• Verify the status of the interfaces.</td><td></td></tr>
<tr><td>5<br>6<br>7<br>8<br>9</td><td>Configure Routers through CLI</td><td>Objectives<br>Part 1: Build the Network and Configure Basic Device Settings<br>Part 2: Configure different Modes of Router<br>Part 3: Take the Console of the router & configure Basic Password<br>Part 4: Recover the Console password<br>Part 5: Configure encapsulation and clock rate on interfaces<br>Part 6: Assign IPv4 & IPv6 addresses and verify connectivity with test traffic<br>Part 7: Remote Access with Telnet</td><td>Week-3</td></tr>
<tr><td>10<br>11<br>12<br>13</td><td>Configure IPv4 and IPv6 Static and Default Routes</td><td> 

<table>
<tr><th>Device</th><th>Interface</th><th>IP Address / Prefix</th></tr>
<tr><td>R1</td><td>G0/0/0</td><td>172.16.1.1 /24</td></tr>
<tr><td></td><td></td><td>2001:db8:acad:2::1 /64</td></tr>
<tr><td></td><td></td><td>fe80::1</td></tr>
</table></td><td>Week-4</td></tr>
</table>

| Task No. | Task | Description | Week |
|---|---|---|---|

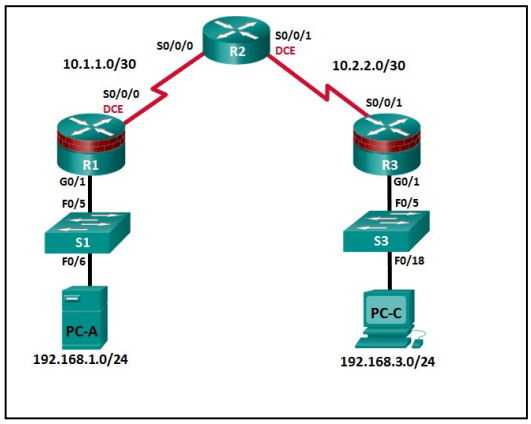
| | | |
|---|---|---|
| R1 | G0/0/1 | 192.168.1.1 /24 |
| | | 2001:db8:acad:1::1 /64 |
| | | fe80::1 |
| | Loopback1 | 10.1.0.1 /24 |
| | | 2001:db8:acad:10::1 /64 |
| | | fe80::1 |
| | Loopback2 | 209.165.200.225 /27 |
| | | 2001:db8:acad:209::1 /64 |
| | | fe80::1 |
| R2 | G0/0/0 | 172.16.1.2 /24 |
| | | 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 |

**Part 1: Build the Network and Configure Basic Device Settings**

**Part 2: Configure and verify IP and IPv6 addressing on R1 and R2**

**Part 3: Configure and verify static and default routing for IPv4 on R1 and R2**

**Part 4: Configure and verify static and default routing for IPv6 on R1 and R2**

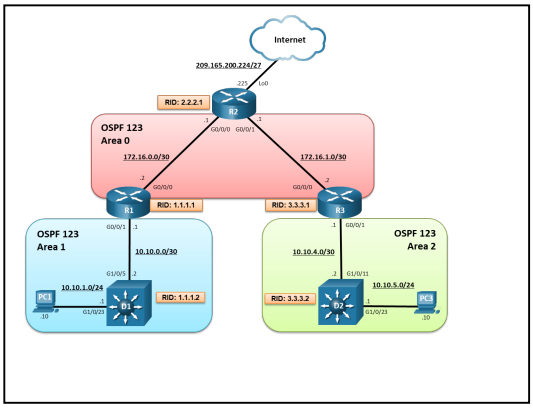
| Task No. | Task | Description | Week |
|---|---|---|---|
| 14<br>15 | **Configure Single & Multi Area OSPF** |  <br> | **Week-5** |

| 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 |
| | S0/0/0 (DCE) | 10.1.1.1 | 255.255.255.252 | N/A | N/A |
| R2 | S0/0/0 | 10.1.1.2 | 255.255.255.252 | N/A | N/A |
| | S0/0/1 (DCE) | 10.2.2.2 | 255.255.255.252 | N/A | N/A |
| R3 | G0/1 | 192.168.3.1 | 255.255.255.0 | N/A | S3 F0/5 |
| | S0/0/1 | 10.2.2.1 | 255.255.255.252 | N/A | N/A |
| PC-A | NIC | 192.168.1.3 | 255.255.255.0 | 192.168.1.1 | S1 F0/6 |
| PC-C | NIC | 192.168.3.3 | 255.255.255.0 | 192.168.3.1 | S3 F0/18 |

## Objectives

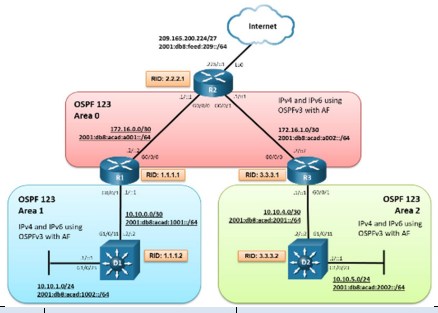
**Part 1: Configure Basic Device Settings**

- Configure hostnames, interface IP addresses,Routers's ID and access passwords.
- Configure the OSPF dynamic routing protocol.

| Task No. | Task | Description | Week |
|---|---|---|---|
| | | | |
| 16<br>17<br>18 | **Configuring IPv6 and advance OSPF** |  <br><br><br>**Part 1: Build the Network and Configure Basic Device Settings and Interface Addressing**<br><br>**Part 2: Configure and Verify Multiarea OSPF for IPv4 on R1, D1, and D2**<br><br>Part 3: Exploring Link State Announcements<br>Part 4: Configure area 1 stub & T.Stub | **Week-6,7** |

| 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 |

| Task No. | Task | Description | Week |
|---|---|---|---|



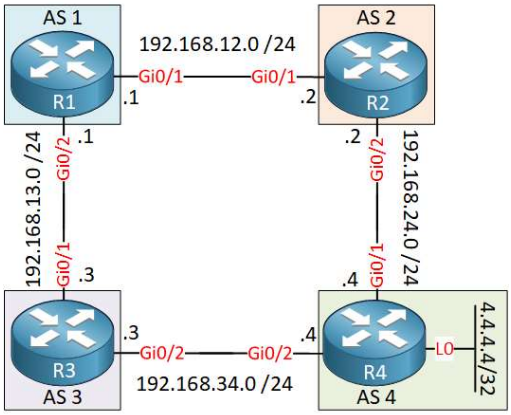
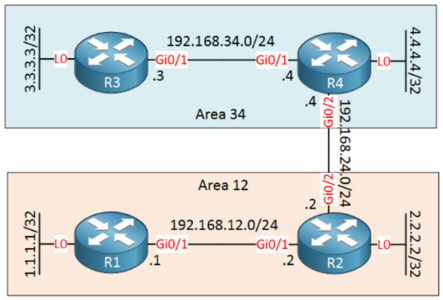

| Device | Interface | IPv4 Address | IPv6 Address | IPv6 Link-Local |
|---|---|---|---|---|
| R1 | G0/0/0 | 172.16.0.2/30 | 2001:db8:acad:a001::2/64 | fe80::1:2 |
| | G0/0/1 | 10.10.0.1/30 | 2001:db8:acad:1001::1/64 | fe80::1:1 |
| R2 | Lo0 | 209.165.200.225/27 | 2001:db8:feed:209::1/64 | fe80::2:3 |
| | 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 |

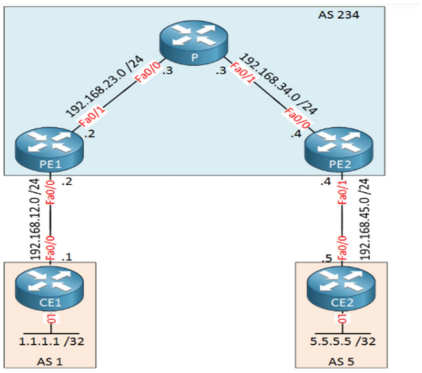
**Part 1: Build the Topology and Configure Basic Device Settings and IP Addressing**

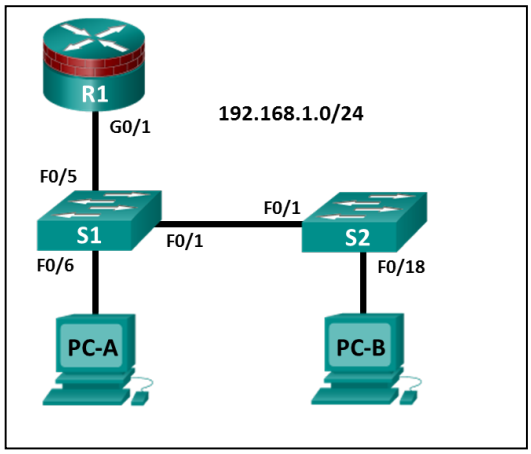
**Part 2: Configure Traditional OSPFv3 for IPv6 on D1**

**Part 3: Configure OSPFv3 for Address Families (AF) IPv4 and AF IPv6**

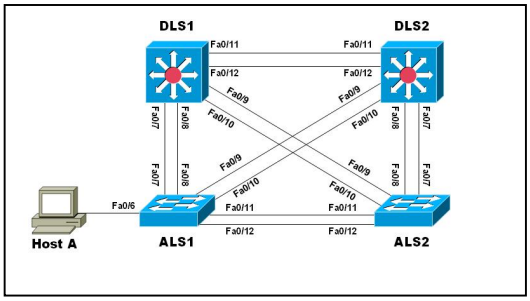
**Part 4: Verify OSPFv3 AF**

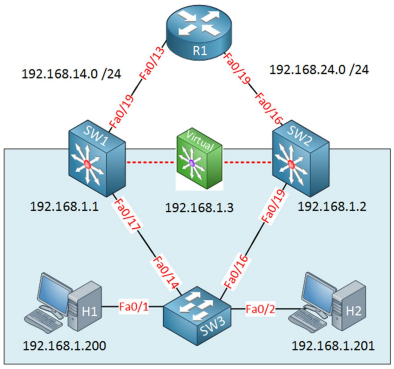
| Task No. | Task | Description | Week |
|---|---|---|---|
| | | **Part 5: Tune OSPFv3 AF** | |
| 19<br>20<br>21<br>22<br>23 | |  <br><br>**Objectives:**<br>**Part 1: Describe the usage of bgp weights to influence bgp route selection process**<br>**Part 2: Change bgp Local Preference attribute**<br>**Part 3: Configure bgp MED value with a route-map**<br>**Part 4: Configure AS path prepending**<br>**Part 5: Monitor how ebgp loop avoidance mechanism happens.** | **Week-8** |
| 24<br>25<br>26<br>27 | **ISIS Configuration** |  <br><br>**Objectives:**<br>R1 and R2 are in area 12, R3 and R4 in area 34. R1 and R3 are intra-area routers configure as level 1 routers. R2 and R4 form the backbone, configure as level 1-2 routers<br>Configure Route Leaking | **Week-9** |

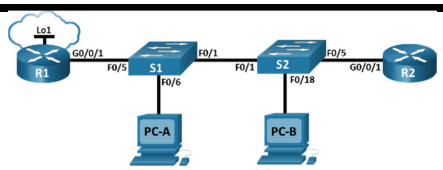
| Task No. | Task | Description | Week |
|---|---|---|---|
| | | Configure Pseudonode | |
| 28<br>29 | **MPLS L3 VPN Configuration** |  <br><br>**Objective**<br>There are five routers where AS 234 is the service provider. There's one customer with two sites, AS 1 and AS 5. Our customer wants to exchange 1.1.1.1 /32 and 5.5.5.5 /32 between its sites using BGP. To achieve<br>• Configure IGP and LDP within the service provider network.<br>• Configure VRFs on the PE routers.<br>• Configure IBGP between the PE routers.<br>• Configure BGP between the PE and CE routers | **Week-10** |

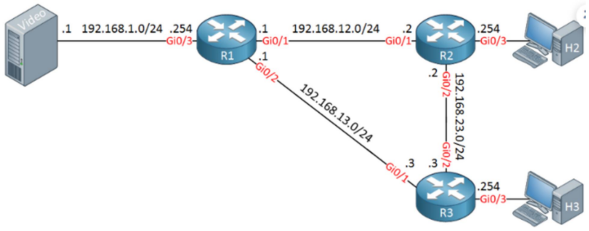
| Task No. | Task | Description | Week |
|---|---|---|---|
| 30<br>31<br>32<br>33 | **Securing Layer 2 Switches** |  <br><br><br>**Part 1: Configure Basic Switch Settings**<br>Build the topology.<br>Configure the hostname, IP address, and access passwords.<br>**Part 2: Configure SSH Access to the Switches**<br>Configure SSH version 2 access on the switch.<br>Configure an SSH client to access the switch.<br>Verify the configuration.<br>**Part 3: Configure Secure Trunks and Access Ports**<br>Configure trunk port mode. | **Week-11** |

| 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 |

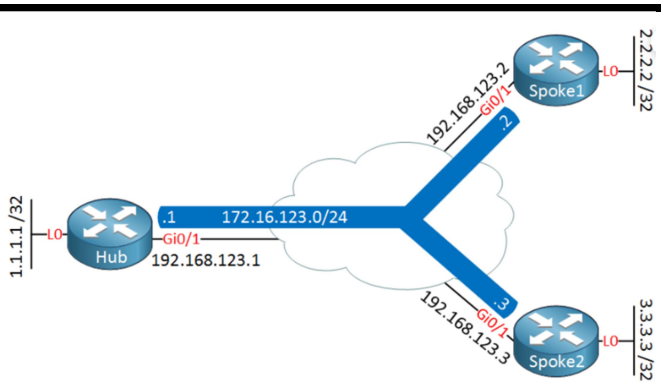
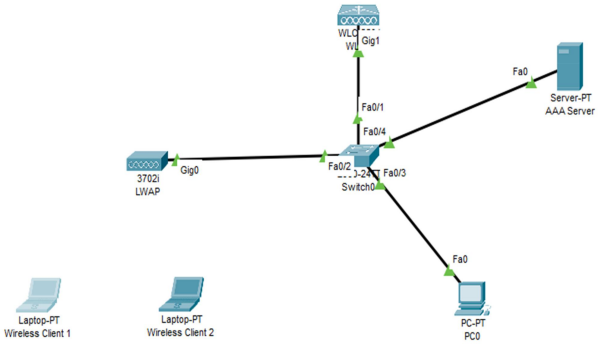
| Task No. | Task | Description | Week |
|---|---|---|---|
| | | Change the native VLAN for trunk ports.<br>Verify trunk configuration.<br>Enable storm control for broadcasts.<br>Configure access ports.<br>Enable PortFast and BPDU guard.<br>Verify BPDU guard.<br>Enable root guard.<br>Enable loop guard.<br>Configure and verify port security.<br>Disable unused ports.<br>Move ports from default VLAN 1 to alternate VLAN.<br>Configure the PVLAN Edge feature on a port.<br>**Part 4: Configure IP DHCP Snooping**<br>Configure DHCP on R1.<br>Configure Inter-VLAN communication on R1.<br>Configure S1 interface F0/5 as a trunk.<br>Verify DHCP operation on PC- A and B.<br>Enable DHCP Snooping.<br>Verify DHCP Snooping. | |
| **34** | **Implement Spanning Tree Protocols** |  <br>**Objectives**<br>• Observe default Spanning Tree behavior<br>• Implement Rapid Spanning Tree<br>• Implement STP tool kit components<br>• Configure Etherchannel<br>• Configure Portfast and enable Protection | **Week-14 & 15** |

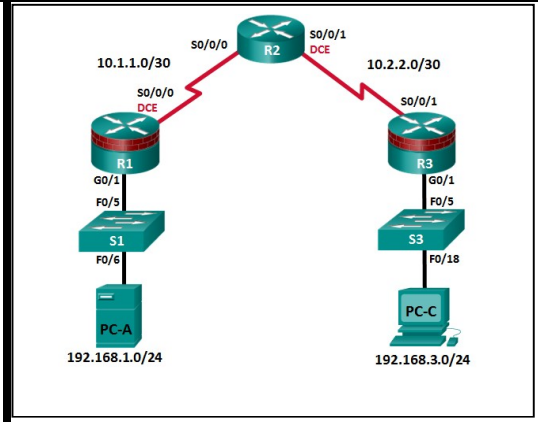
| Task No. | Task | Description | Week |
|---|---|---|---|
| | | | |
| 35<br>36 | |  <br><br>**Part 1: Configure Vrrp groups G1 & G2 and assing virtual ips**<br>**Part 2: Configure vrrp priority and enable preemtion and also enable tracking** | Week-16 |

<table>
<tr><th>Task No.</th><th>Task</th><th>Description</th><th>Week</th></tr>
<tr><td>37</td><td>Access List</td><td>


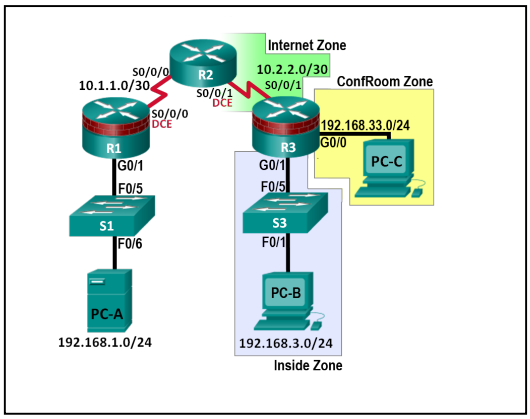
<table>
<tr><th>Device</th><th>Interface</th><th>IP Address</th><th>Subnet Mask</th><th>Default Gateway</th></tr>
<tr><td rowspan="6">R1</td><td>G0/0/1</td><td>N/A</td><td>N/A</td><td rowspan="6">N/A</td></tr>
<tr><td>G0/0/1.20</td><td>10.20.0.1</td><td>255.255.255.0</td></tr>
<tr><td>G0/0/1.30</td><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>Loopback 1</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>
</table>
Part 1: Build the Network and Configure Basic Device Settings<br>Part 2: Configure and Verify Extended Access Control List
</td><td>Week-17</td></tr>
<tr><td>38</td><td>Multicast Configuration</td><td>


Part-1 Configure Unicast Routing<br>Part-2 Configure PIM DM
</td><td>Week-18</td></tr>
</table>

| Task No. | Task | Description | Week |
|---|---|---|---|
| | | OR<br>Part-3 Configure PIM SP<br>Part-4 Configure IGMP snooping<br>Part-5 Monitor RPF | |
| 39 | **DM VPN Configuration** |  <br>Configure three routers, one hub and two spoke routers. The underlay network uses subnet 192.168.123.0/24 and the overlay network (our tunnel interfaces) use 172.16.123.0/24.<br>• Configure DM VPN phase 1<br>• Configure DM VPN phase 2<br>• Configure DM VPN phase 3 | **Week-19** |
| 40 | **WLAN split-MAC Architecture** |  <br>• Configure WLC wizard Configuration<br>• Configure switch basic configuration<br>• Access the WLC through Management IP<br>• Configure SSID for the guest wireless users | **Week-20** |
| 41 | **Project** | Implement a Project as per instructor | **Week-21** |

<table>
<tr><th>Task No.</th><th>Task</th><th>Description</th><th>Week</th></tr>
<tr><td>42</td><td>Securing Administrative Access Using AAA and RADIUS</td><td>


<table>
<tr><th>Device</th><th>Interface</th><th>IP Address</th><th>Subnet Mask</th><th>Default Gateway</th></tr>
<tr><td rowspan="2">R1</td><td>G0/1</td><td>192.168.1.1</td><td>255.255.255.0</td><td>N/A</td></tr>
<tr><td>S0/0/0 (DCE)</td><td>10.1.1.1</td><td>255.255.255.252</td><td>N/A</td></tr>
<tr><td rowspan="2">R2</td><td>S0/0/0</td><td>10.1.1.2</td><td>255.255.255.252</td><td>N/A</td></tr>
<tr><td>S0/0/1 (DCE)</td><td>10.2.2.2</td><td>255.255.255.252</td><td>N/A</td></tr>
<tr><td rowspan="2">R3</td><td>G0/1</td><td>192.168.3.1</td><td>255.255.255.0</td><td>N/A</td></tr>
<tr><td>S0/0/1</td><td>10.2.2.1</td><td>255.255.255.252</td><td>N/A</td></tr>
<tr><td>PC-A</td><td>NIC</td><td>192.168.1.3</td><td>255.255.255.0</td><td>192.168.1.1</td></tr>
<tr><td>PC-C</td><td>NIC</td><td>192.168.3.3</td><td>255.255.255.0</td><td>192.168.3.1</td></tr>
</table>
Part 1: Configure Basic Device Settings
<ul>
<li>Configure hostnames, interface IP addresses, and access passwords.</li>
<li>Configure the OSPF dynamic routing protocol.</li>
</ul>
Part 2: Configure a Site-to-Site VPN Using Cisco IOS
<ul>
<li>Configure IPsec VPN settings on R1 and R3.</li>
<li>Verify site-to-site IPsec VPN configuration.</li>
<li>Test IPsec VPN operation.</li>
</ul>
</td><td>Week-22</td></tr>
</table>

<table>
<tr><th>Task No.</th><th>Task</th><th>Description</th><th>Week</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>43</td><td>Trouble shooting</td><td>Task will be given on the real time.</td><td>Week-23</td></tr>
<tr><td>44</td><td>Configuring Zone-Based Policy Firewalls</td><td>


<table>
<tr><th>Device</th><th>Interface</th><th>IP Address</th><th>Subnet Mask</th><th>Default Gateway</th><th>Switch Port</th></tr>
<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></td><td>S0/0/0 (DCE)</td><td>10.1.1.1</td><td>255.255.255.252</td><td>N/A</td><td>N/A</td></tr>
<tr><td>R2</td><td>S0/0/0</td><td>10.1.1.2</td><td>255.255.255.252</td><td>N/A</td><td>N/A</td></tr>
<tr><td></td><td>S0/0/1 (DCE)</td><td>10.2.2.2</td><td>255.255.255.252</td><td>N/A</td><td>N/A</td></tr>
<tr><td>R3</td><td>G0/0</td><td>192.168.33.1</td><td>255.255.255.0</td><td>N/A</td><td>N/A</td></tr>
<tr><td></td><td>G0/1</td><td>192.168.3.1</td><td>255.255.255.0</td><td>N/A</td><td>S3 F0/5</td></tr>
<tr><td></td><td>S0/0/1</td><td>10.2.2.1</td><td>255.255.255.252</td><td>N/A</td><td>N/A</td></tr>
<tr><td>PC-A</td><td>NIC</td><td>192.168.1.3</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>192.168.3.3</td><td>255.255.255.0</td><td>192.168.3.1</td><td>S3 F0/1</td></tr>
<tr><td>PC-C</td><td>NIC</td><td>192.168.33.3</td><td>255.255.255.0</td><td>192.168.33.1</td><td>N/A</td></tr>
</table>
</td><td>Week-24-25</td></tr>
</table>

| Task No. | Task | Description | Week |
|---|---|---|---|
| | | **Part 1: Basic Router Configuration**<br>• Configure host names, interface IP addresses, and access passwords.<br>• Configure the static routes to enable end-to-end connectivity.<br>**Part 2: Configuring a Zone-Based Policy Firewall (ZPF)**<br>• Use the CLI to configure a Zone-Based Policy Firewall.<br>Use the CLI to verify the configuration. | |
| **47** | **Final project** | Final project Assessment | **Week-26** |

## Certificate in CISCO Network Administration

Success Story of Debanjan
https://www.youtube.com/watch?v=Ospoci_cmgc

**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=Qi6Xn7yKlIQ

**Hisham Sarwar Motivational Story | Pakistani Freelancer**

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

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

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

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

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

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

# Annexure-II

## SUGGESTIVE FORMAT AND SEQUENCE ORDER OF MOTIVATIONAL LECTURE.

**Mentor**

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

**Session- 1 (Communication):**

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

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

| **Activity:** | **Participant Time** | **Teacher Time** | **Mentor Time** |
|---|---|---|---|
| Intro Attend and contribute to the scheduled. | | | |
| Understand good communication skills and how it works. | | | |
| Understand what good communication skills mean | | | |
| Understand what skills are important for good communication skills | | | |
| **Key learning outcomes:** | **Resources:** | | **Enterprise skills developed:** |
| • Understand the communication skills and how it works. | • Podium<br>• Projector<br>• Computer | | • Communication<br>• Self Confidence<br>• Teamwork |

| | | |
|---|---|---|
| • Understand what communication skills mean<br>• Understand what skills are important for communication skills | • Flip Chart<br>• Marker | |

| Schedule | Mentor Should do |
|---|---|
| **Welcome:**<br>**5 min** | Short welcome and ask the **Mentor** to introduce him/herself.<br>Provide a brief welcome to the qualification for the class.<br>Note for Instructor: Throughout this session, please monitor the session to ensure nothing inappropriate is being happened. |
| **Icebreaker:**<br>**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.<br>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:**<br>**20mins** | Provide a brief introduction of the qualification to the class and play the "Onboarding Video or Presentation". In your introduction cover the following:<br>1. Explanation of the program and structure. (Kamyab jawan Program)<br>2. How you will use your communication skills in your professional life.<br>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)<br>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:**<br>**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.<br>• "IDENTIFY ENTREPRENEURS" TEAM ACTIVITY<br>• "BRAINSTORMING SOCIAL PROBLEMS" TEAM |

| | |
|---|---|
| | ACTIVITY"<br>*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.*<br>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.<br>Type up notes for their strategy if this is helpful - it can be included underneath the Team Contract. |
| **Session Close:**<br>**5 minutes** | **MENTOR:** Close the session with the opportunity for anyone to ask any remaining questions.<br>**Instructor:**<br>Facilitate the wrap-up of the session. A quick reminder of what is coming up next and when the next session will be. |

## MOTIVATIONAL LECTURES LINKS.

| TOPIC | SPEAKER | LINK |
|---|---|---|
| **Meet Network Engineers at Google** | **LifeAtGoogle** | **https://www.youtube.com/watch?v=pNyaPRFJ8lQ** |
| **Network Engineers** | **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=OrQte08Ml90 |
| **Just Control Your Emotions** | Qasim Ali Shah | https://www.youtube.com/watch?v=JzFs__yJt-w |
| **How to Communicate Effectively** | Qasim Ali Shah | https://www.youtube.com/watch?v=PhHAQEGehKc |
| **Your ATTITUDE is Everything** | Tony Robbins<br>Les Brown<br>David Goggins<br>Jocko Willink<br>Wayne Dyer<br>Eckart Tolle | https://www.youtube.com/watch?v=5fS3rj6eIFg |
| **Control Your EMOTIONS** | Jim Rohn<br>Les Brown<br>TD Jakes<br>Tony Robbins | https://www.youtube.com/watch?v=chn86sH0O5U |
| **Defeat Fear, Build Confidence** | Shaykh Atif Ahmed | https://www.youtube.com/watch?v=s10dzfbozd4 |
| **Wisdom of the Eagle** | Learn Kurooji | https://www.youtube.com/watch?v=bEU7V5rJTtw |
| **The Power of ATTITUDE** | Titan Man | https://www.youtube.com/watch?v=r8LJ5X2ejqU |
| **STOP WASTING TIME** | Arnold Schwarzenegger | https://www.youtube.com/watch?v=kzSBrJmXqdg |
| **Risk of Success** | Denzel Washington | https://www.youtube.com/watch?v=tbnzAVRZ9Xc |

## Annexure-III

**SUCCESS STORY***

| S. No | Key Information | Detail/Description |
|---|---|---|
| 1. | **Self & Family background** | Habid professional Network & Multicloud trainer & Consultant. Working on Cisco , 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.<br><br>I have been completed 1500+ hours of Multicloud training & completed 50+ Multicloud projects in the last 5 years.<br>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.<br>**If at first, you don’t succeed, try try again** |
| 2. | **How he came on board NAVTTC Training/ or got trained through any other source** | Certification in networks and cloud computing in iqra university ( |
| 3. | **Post-training activities** | “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.<br><br>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.<br><br>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 |

| | | |
|---|---|---|
| | | the internet.” |
| 4. | **Message to others**<br><br>**(under training)** | Take the training opportunity seriously<br>Impose self-discipline and ensure regularity<br>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***

# Annexure-IV:

## Workplace/Institute Ethics Guide

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

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

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

7. **Organizational Skills:**

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

8. **Communication:**

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

9. **Cooperation:**

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

10. **Respect:**

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