Ministry of cooperatives
Labour and Social Welfare

Iran Technical and Vocational
Training Organization

Deputy of training
Plan and curriculums office

Job Training standard

Title

Cisco Certified Entry Networking Technician (CCENT)
Routing And Switching
ICND 2

Occupational group

Information Technology (IT)

International code

2513-53-129-1

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Revision Process:

- Scientific content
- According to market
- Equipment
- Tools

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Definitions:

Job standard:

The characteristics ' required competencies and abilities for Efficient Performance in work environment is called "the Job standard", and sometimes “The Occupational standard”

Training standard:

The Training Map for achieving the Job’s subset Competencies.

Job title:

Is a set of Tasks and Abilities which is expected from an employed person in the defined level

Job description:

A statement covering the most important elements of a job, namely the position or title of the job, the duties, job’s relation with other jobs in a occupational field, the responsibilities, workplace conditions and required performance standards.

Course duration:

The minimum of time which is required to achieve the training objects.

Admission requirements:

The minimum of competencies and abilities which are obligatory for a potential admission.

Evaluation:

The process of collecting evidence and judgment about wetter a competency is achieved or not.
Include: written examination, practical examination

Required Qualifications for Trainers:

The minimum of Trainer’s technical and vocational abilities which the trainer is required to have.

Competency:

The ability of efficient performing a duty in a variety of workplaces conditions

Knowledge:

The minimum set of facts and mental capacities which is necessary for achieving a competency. This can include science, (Mathematics, physics, chemistry or biology), technology or technical.

Skill:

The minimum coordination between mind and body for achieving an ability or competency. It normally applied to practical skills.

Attitude:

A set of emotional behaviors required for achieving a competency and can have non-technical skills and occupational ethics.

Safety:

The cases which doing or not doing something can cause harm or accident

Environmental Consideration:

A set of consideration about the act which should be done to minimize the environmental damage or pollution.

job title:
Cisco Certified Entry Networking Technician (ICND2 Routing And Switching)
Job description:
Cisco Certified Entry Networking Technician (CCENT) validates the ability to install, operate and troubleshoot a small enterprise branch network, including basic network security. With a CCENT, a network professional demonstrates the skills required for entry-level network support positions - the starting point for many successful careers in networking. The curriculum covers networking fundamentals, WAN technologies, basic security and wireless concepts, routing and switching fundamentals, and configuring simple networks. CCENT is the first step toward achieving CCNA, which covers medium-size enterprise branch networks with more complex connections.
admission requirements:
minimum degree of education: Post first year of high school **minimum physical and mental ability:** **prerequisite skills: CCENT ICND1**
Course duration:
Course duration: 180 hours -Theoretical :60 Hours -Practical :120 Hours -Apprenticeship:… Hours -Project:… Hours
Evaluation :(%)
IRANTVTO Evaluation :(%)
Written Examination:25% Practical Examination:65% Ethics:10%
Required Qualifications for Trainers:
CISCO CCNA degree holders with 2 years experiences

job/competency training standard

competencies /tasks

`	Title
1	Spanning Tree Protocol Concepts
2	Spanning Tree Protocol Implementation
3	Troubleshooting LAN Switching
4	Troubleshooting IPv4 Routing
5	Creating Redundant First-Hop Routers
6	Virtual Private Networks
7	Implementing OSPF for IPv4
8	Understanding EIGRP Concepts
9	Implementing EIGRP for IPv4
10	Troubleshooting IPv4 Routing Protocols
11	Implementing Point-to-Point WANs
12	Understanding Frame Relay Concepts
13	Implementing Frame Relay
14	Identifying Other Types of WANs
15	Troubleshooting IPv6 Routing
16	Implementing OSPF for IPv6
17	Implementing EIGRP for IPv6
18	Managing Network Devices
19	Managing IOS Files
20	Managing IOS Licensing

Title: Spanning Tree Protocol Concepts	time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipments ,tools, materials ,books
Knowledge and Skill : LAN Switch Forwarding Logic	Determined by the instructor			From Cisco
Switch Verification				
Viewing the MAC Address Table				
Determining the VLAN of a Frame				
Verifying Trunks				
Spanning Tree Protocol (IEEE 802.1D)				
What IEEE 802.1D Spanning Tree Does				
How Spanning Tree Works				
The STP Bridge ID and Hello BPDU				
Electing the Root Switch				
Choosing Each Switch's Root Port				
Choosing the Designated Port on Each LAN Segment				
Influencing and Changing the STP Topology				
Making Configuration Changes to Influence the STP Topology				
Reacting to State Changes That Affect the STP Topology				
How Switches React to Changes with STP				
Changing Interface States with STP				
Optional STP Features				
EtherChannel				
PortFast				
BPDU Guard				
Rapid STP (IEEE 802.1w)				
Attitude: **Speed and accuracy in doing the right thing**				
Health & Safety: **Compliance with safety protection in the workplace**				
Environmental Consideration: **Compliance with environmental protection**				

Title: Spanning Tree Protocol Implementation	time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipments ,tools, materials ,books
Knowledge and Skill : STP Configuration and Verification	Determined by the instructor			From Cisco
Setting the STP Mode				
Per-VLAN Configuration Settings				
The Bridge ID and System ID Extension				
Per-VLAN Port Costs				
Verifying STP Operation				
Configuring STP Port Costs				
Configuring Priority to Influence the Root Election				
Configuring PortFast and BPDU Guard				
Configuring EtherChannel				
Configuring a Manual EtherChannel				
Configuring Dynamic EtherChannels				
STP Troubleshooting				
Determining the Root Switch				
Determining the Root Port on Nonroot Switches				
STP Tiebreakers When Choosing the Root Port				
Suggestions for Attacking Root Port Problems				
Determining the Designated Port on Each LAN Segment				
Suggestions for Attacking Designated Port				
STP Convergence				
Troubleshooting EtherChannel				
Incorrect Options on the channel-group Command				
Configuration Checks Before Adding Interfaces to EtherChannels				
Attitude: **Speed and accuracy in doing the right thing**				
Health & Safety: **Compliance with safety protection in the workplace**				
Environmental Consideration: **Compliance with environmental protectio**				

Title: Troubleshooting LAN Switching	Time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipments ,tools, materials ,books
Knowledge and Skill : Generalized Troubleshooting Methodologies Analyzing and Predicting Normal Network Operation Data Plane Analysis Control Plane Analysis Problem Isolation Root Cause Analysis Troubleshooting the LAN Switching Data Plane Confirm the Network Diagrams Using CDP Isolate Interface Problems Interface Status Codes and Reasons for Nonworking States The notconnect State and Cabling Pinouts Determining Switch Interface Speed and Duplex Issues Related to Speed and Duplex Isolate Filtering and Port Security Problems Isolate VLAN and Trunking Problems Access VLANs Not Being Defined or Not Being Active Identify Trunks and VLANs Forwarded on Those Trunks Data Plane Problems Verify the Accuracy of the Diagram Using CDP Check for Interface Problems Check for Port Security Problems Check for VLAN and VLAN Trunk Problems Data Plane Behavior ARP Request (Broadcast) ARP Reply (Unicast)	Determined by the instructor			From Cisco

Attitude: **Speed and accuracy in doing the right thing**	
Health & Safety: **Compliance with safety protection in the workplace**	
Environmental Consideration: **Compliance with environmental protection**	

Title: Troubleshooting IPv4 Routing	time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipment's ,tools, materials ,books
Knowledge and Skill : Host IPv4 Routing Logic	Determined by the instructor			From Cisco
Routing Logic Used by IPv4 Routers				
IP Routing Logic on a Single Router				
IP Routing from Host to Host				
Building New Data Link Headers Using ARP Information				
Problem Isolation Using the ping Command				
Ping Command Basics				
Strategies and Results When Testing with the ping Command				
Testing Longer Routes from Near the Source of the Problem				
Using Extended Ping to Test the Reverse Route				
Testing LAN Neighbors with Standard Ping				
Testing LAN Neighbors with Extended Ping				
Testing WAN Neighbors with Standard Ping				
Using Ping with Names and with IP Addresses				
Problem Isolation Using the traceroute Command				
traceroute Basics				
How the traceroute Command Works				
Standard and Extended traceroute				
Using traceroute to Isolate the Problem to Two Routers				
Problems Between the Host and the Default Router				
Root Causes Based on a Host's IPv4 Settings				
Mismatched Masks Impact Route to Reach Subnet				
Typical Root Causes of DNS Problems				
Wrong Default Router IP Address Setting				
Root Causes Based on the Default Router's Configuration				

DHCP Relay Issues Router LAN Interface and LAN Issues Problems with Routing Packets Between Routers IP Forwarding by Matching the Most Specific Route Using show ip route and Subnet Math to Find the Best Route Using show ip route address to Find the Best Route Routing Problems Caused by Incorrect Addressing Plans Recognizing When VLSM Is Used or Not Overlaps When Not Using VLSM Overlaps When Using VLSM Configuring Overlapping VLSM Subnets Router WAN Interface Status Filtering Packets with Access Lists				
Attitude: **Speed and accuracy in doing the right thing**				
Health & Safety: **Compliance with safety protection in the workplace**				
Environmental Consideration: **Compliance with environmental protection**				

Title : **Creating Redundant First-Hop Routers**	time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipments ,tools, materials ,books
Knowledge and Skill : FHRP Concepts	Determined by the instructor			From Cisco
First Hop Redundancy Protocol				
HSRP Concepts				
HSRP Failover				
HSRP Load Balancing				
GLBP Concepts				
FHRP Configuration and Verification				
Configuring and Verifying HSRP				
Configuring and Verifying GLBP				
Attitude: **Speed and accuracy in doing the right thing**				
Health & Safety: **Compliance with safety protection in the workplace**				
Environmental Consideration: **Compliance with environmental protection**				

Title: Virtual Private Networks	time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipments ,tools, materials ,books
Knowledge and Skill : VPN Fundamentals IPsec VPNs SSL VPNs GRE Tunnels GRE Tunnel Concepts Routing over GRE Tunnels GRE Tunnels over the Unsecured Network Configuring GRE Tunnels Verifying a GRE Tunnel	Determined by the instructor			From Cisco
Attitude: **Speed and accuracy in doing the right thing**				
Health & Safety: **Compliance with safety protection in the workplace**				
Environmental Consideration: **Compliance with environmental protection**				

Title: Implementing OSPF for IPv4	time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipments ,tools, materials ,books
Knowledge and Skill : OSPF Protocols and Operation	Determined by the instructor			From Cisco
Maintaining Neighbors and the LSDB				
Using Designated Routers on Ethernet Links				
Scaling OSPF Using Areas				
OSPF Areas				
How Areas Reduce SPF Calculation Time				
OSPF Area Design Advantages				
Link-State Advertisements				
Router LSAs Build Most of the Intra-Area Topology				
Network LSAs Complete the Intra-Area Topology				
LSAs in a Multi-Area Design				
Calculating the Best Routes with SPF				
Administrative Distance				
OSPF Configuration and Verification				
OSPFv2 Configuration				
Single-Area Configurations				
Multi-Area Configuration				
Verifying the Multi-Area Configuration				
Verifying the Correct Areas on Each Interface on an ABR				
Verifying Which Router Is DR and BDR				
Verifying the Number and Type of LSAs				
Verifying OSPF Routes				
OSPF Metrics (Cost)				
Setting the Cost Based on Interface Bandwidth				
OSPF Load Balancing				
Attitude: **Speed and accuracy in doing the right thing**				
Health & Safety: **Compliance with safety protection in the workplace**				
Environmental Consideration: **Compliance with environmental protection**				

Title: Understanding EIGRP Concepts	time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipments ,tools, materials ,books
EIGRP and Distance Vector Routing Protocols Basic Distance Vector Routing Protocol Features	Determined by the instructor			From Cisco
The Concept of a Distance and a Vector				
Full Update Messages and Split Horizon				
Route Poisoning				
EIGRP Sends Partial Update				
MessagesEIGRP Maintains Neighbor Status Using Hello				
Interior Routing Protocol Features				
EIGRP Neighbors				
Exchanging EIGRP Topology Information				
Calculating the Best Routes for the Routing Table				
The EIGRP Metric Calculation				
Caveats with Bandwidth on Serial Links				
EIGRP Convergence				
Feasible Distance and Reported Distance				
EIGRP Successors and Feasible Successors				
The Query and Reply Process				
Attitude: **Speed and accuracy in doing the right thing**				
Health & Safety: **Compliance with safety protection in the workplace**				
Environmental Consideration: **Compliance with environmental protection**				

Title: Implementing EIGRP for IPv4	time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipments ,tools, materials ,books
Knowledge and Skill : Core EIGRP Configuration and Verification Configuring EIGRP Using a Wildcard Mask Verifying EIGRP Core Features Finding the Interfaces on Which EIGRP is Enabled Displaying EIGRP Neighbor Status Displaying the IPv4 Routing Table EIGRP Metrics, Successors, and Feasible Successors Viewing the EIGRP Topology Table Finding Successor Routes Finding Feasible Successor Routes Convergence Using the Feasible Successor Route Other EIGRP Configuration Settings Load Balancing Across Multiple EIGRP Routes Tuning the EIGRP Metric Calculation Autosummarization and Discontiguous Classful Networks Automatic Summarization at the Boundary of a Classful Network Discontiguous Classful Networks	Determined by the instructor			From Cisco
Attitude: **Speed and accuracy in doing the right thing**				
Health & Safety: **Compliance with safety protection in the workplace**				
Environmental Consideration: **Compliance with environmental protection**				

Title: Troubleshooting IPv4 Routing Protocols	time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipments ,tools, materials ,books
Troubleshooting Routing Protocol Problems Interfaces Enabled with a Routing Protocol	Determined by the instructor			From Cisco
EIGRP Interface Troubleshooting				
Examining Working EIGRP Interfaces				
Examining the Problems with EIGRP Interfaces				
OSPF Interface Troubleshooting				
Neighbor Relationships				
EIGRP Neighbor Verification Checks				
OSPF Neighbor Troubleshooting				
Finding Area Mismatches				
Finding Duplicate OSPF Router IDs				
Finding OSPF Hello and Dead Timer Mismatches				
Other OSPF Issues				
Mismatched OSPF Network Types				
Mismatched MTU Settings				
Attitude: **Speed and accuracy in doing the right thing**				
Health & Safety: **Compliance with safety protection in the workplace**				
Environmental Consideration: **Compliance with environmental protection**				

Title: Implementing Point-to-Point WANs	time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipments ,tools, materials ,books
Leased Line WANs with HDLC Layer 1 Leased Lines	Determined by the instructor			From Cisco
The Physical Components of a Leased Line				
Leased Lines and the T-Carrier System				
The Role of the CSU/DSU				
Layer 2 Leased Lines with HDLC				
Configuring HDLC				
Leased-Line WANs with PPP				
PPP Concepts				
PPP Framing				
PPP Control Protocols				
PPP Authentication				
Configuring PPP				
CHAP Configuration and Verification				
Troubleshooting Serial Links				
Troubleshooting Layer 1 Problems				
Troubleshooting Layer 2 Problems				
Keepalive Failure				
PAP and CHAP Authentication Failure				
Troubleshooting Layer 3 Problems				
Attitude: **Speed and accuracy in doing the right thing**				
Health & Safety: **Compliance with safety protection in the workplace**				
Environmental Consideration: **Compliance with environmental protection**				

Title: Understanding Frame Relay Concepts	time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipments ,tools, materials ,books
Knowledge and Skill : Virtual Circuits	Determined by the instructor			From Cisco
LMI and Encapsulation Types				
Frame Relay Encapsulation and Framing				
Frame Relay Addressing				
Frame Relay Local Addressing				
Frame Forwarding with One DLCI Field				
Network Layer Addressing with Frame Relay				
Frame Relay Layer 3 Addressing: One Subnet Containing All Frame Relay DTEs				
Frame Relay Layer 3 Addressing: One Subnet Per VC				
Frame Relay Layer 3 Addressing: Hybrid Approach				
Attitude: **Speed and accuracy in doing the right thing**				
Health & Safety: **Compliance with safety protection in the workplace**				
Environmental Consideration: **Compliance with environmental protection**				

Title: Implementing Frame Relay	time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipments ,tools, materials ,books
Knowledge and Skill : Frame Relay Configuration and Verification Planning a Frame Relay Configuration Configuring Using Physical Interfaces and One IP Subnet Configuring the Encapsulation and LMI Frame Relay Address Mapping Configuring Point-to-Point Subinterfaces Configuring with Multipoint Subinterfaces OSPF Issues on Frame Relay Multipoint and Physical Interfaces Frame Relay Troubleshooting Layer 1 Issues on the Access Link Layer 2 Issues on the Access Link PVC Problems and Status Frame Relay Mapping Issues End-to-End Encapsulation Mismatched Subnet Numbers	Determined by the instructor			From Cisco
Attitude: **Speed and accuracy in doing the right thing**				
Health & Safety: **Compliance with safety protection in the workplace**				
Environmental Consideration: **Compliance with environmental protection**				

Title: Identifying Other Types of WANs	time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipments ,tools, materials ,books
Knowledge and Skill : Private WANs to Connect Enterprises	Determined by the instructor			From Cisco
Leased Lines				
Frame Relay				
Ethernet WANs				
MPLS				
VSAT				
Public WANs and Internet Access				
Internet Access (WAN) Links				
Dial Access with Modems and ISDN				
Digital Subscriber Line				
Cable Internet				
Mobile Phone Access with 3G/4G				
PPP over Ethernet				
Attitude: **Speed and accuracy in doing the right thing**				
Health & Safety: **Compliance with safety protection in the workplace**				
Environmental Consideration: **Compliance with environmental protection**				

Title: Troubleshooting IPv6 Routing	time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipments ,tools, materials ,books
Knowledge and Skill : Unicast IPv6 Addresses and IPv6 Subnetting	Determined by the instructor			From Cisco
Assigning Addresses to Hosts				
Stateful DHCPv6				
Stateless Address Autoconfiguration				
Router Address and Static Route Configuration				
Configuring IPv6 Routing and Addresses on Routers				
IPv6 Static Routes on Routers				
Verifying IPv6 Connectivity				
Verifying Connectivity from IPv6 Hosts				
Verifying IPv6 from Routers				
Troubleshooting IPv6				
Problems Using Any Function That Requires DNS				
Host Is Missing IPv6 Settings: Stateful DHCP Issues				
Host Is Missing IPv6 Settings: SLAAC Issues				
Traceroute Shows Some Hops, But Fails				
Routing Looks Good, But Traceroute Still Fails				
Attitude: **Speed and accuracy in doing the right thing**				
Health & Safety: **Compliance with safety protection in the workplace**				
Environmental Consideration: **Compliance with environmental protection**				

Title: Implementing OSPF for IPv6	time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipments ,tools, materials ,books
Knowledge and Skill : OSPFv3 Configuration	Determined by the instructor			From Cisco
Multi-Area OSPFv3 Configuration				
Single Area Configuration				
Adding Multi-Area Configuration on the Area Border Router				
Other OSPFv3 Configuration Settings				
Setting OSPFv3 Interface Cost to Influence Route Selection				
OSPF Load Balancing				
Injecting Default Routes				
OSPF Concepts, Verification, and Troubleshooting				
OSPFv3 Interfaces				
Verifying OSPFv3 Interfaces				
Troubleshooting OSPFv3 Interfaces				
OSPFv3 Neighbors				
Verifying OSPFv3 Neighbors				
Troubleshooting OSPFv3 Neighbors				
OSPFv3 LSDB and LSAs				
Verifying OSPFv3 LSAs				
Troubleshooting OSPFv3 LSAs				
OSPFv3 Metrics and IPv6 Routes				
Verifying OSPFv3 Interface Cost and Metrics				
Troubleshooting IPv6 Routes Added by OSPFv3				
Attitude: **Speed and accuracy in doing the right thing**				
Health & Safety: **Compliance with safety protection in the workplace**				
Environmental Consideration: **Compliance with environmental protection**				

Title: Implementing EIGRP for IPv6	time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipments ,tools, materials ,books
EIGRPv6 Configuration EIGRPv6 Configuration Basics	Determined by the instructor			From Cisco
Other EIGRPv6 Configuration Settings				
Setting Bandwidth and Delay to Influence EIGRPv6 Route Selection				
EIGRP Load Balancing				
EIGRP Timers				
EIGRPv6 Concepts, Verification, and Troubleshooting				
EIGRPv6 Interfaces				
EIGRPv6 Neighbors				
EIGRPv6 Topology Database				
EIGRPv6 IPv6 Routes				
Attitude: **Speed and accuracy in doing the right thing**				
Health & Safety: **Compliance with safety protection in the workplace**				
Environmental Consideration: **Compliance with environmental protection**				

Title: Managing Network Devices	time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipments ,tools, materials ,books
Knowledge and Skill : Simple Network Management Protocol	Determined by the instructor			From Cisco
The Management Information Base				
Configuring SNMP Version 2c				
SNMP Version 3				
System Message Logging (Syslog)				
System Message Format				
System Message Severity Levels				
Configuring and Verifying Syslog				
Using a Syslog Server				
NetFlow				
Network Flows				
Configuring NetFlow				
Verifying and Using NetFlow				
The NetFlow Collector				
Attitude: **Speed and accuracy in doing the right thing**				
Health & Safety: **Compliance with safety protection in the workplace**				
Environmental Consideration: **Compliance with environmental protection**				

Title: Managing IOS Files	time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipments ,tools, materials ,books
Managing Cisco IOS Files Upgrading a Cisco IOS Software Image into Flash Memory The Cisco IOS Software Boot Sequence The Three Router Operating Systems The Configuration Register How a Router Chooses Which OS to Load Recovering If the IOS Does Not Load Verifying the IOS Image Using the show version Command Password Recovery The General Ideas Behind Cisco Password Recovery/Reset Managing Configuration Files Configuration File Basics Copying and Erasing Configuration Files Initial Configuration (Setup Mode)	Determined by the instructor			From Cisco
Attitude: **Speed and accuracy in doing the right thing**				
Health & Safety: **Compliance with safety protection in the workplace**				
Environmental Consideration: **Compliance with environmental protection**				

Title: Managing IOS Licensing	time			
	theoretical	practical	total	
Knowledge ,skill ,attitude ,safety, Environmental Consideration				Equipments ,tools, materials ,books
Knowledge and Skill : IOS Packaging IOS Images per Model, Series, and per Software Version/Release Original Packaging: One IOS Image per Feature Set Combination New IOS Packaging: One Universal Image with All Feature Sets IOS Software Activation with Universal Images Managing Software Activation with Cisco License Manager Manually Activating Software Using Licenses Showing the Current License Status Adding a Permanent Technology Package License Right-to-Use Licenses	Determined by the instructor			From Cisco
Attitude: **Speed and accuracy in doing the right thing**				
Health & Safety: **Compliance with safety protection in the workplace**				
Environmental Consideration: **Compliance with environmental protection**				

Equipment standard form

	Title	Technical specification	Quantity
۱	Computer	Ram:2G VGA:Intel CPU:i3 HDD:256	7
2	Switch	Switch Cisco 2960 & 2950	1
3	Router	Router Cisco 2911 & 2901 & 2811	1
4	Console Cable		2
5	Ethernet Cable		2
6	Packet Tracer	Last Version	7
7	Video Projector		1
8	Smart Board & Whiteboard		1

***Required quantity for each 15 Trainees**

Resources (books, site, software…)

title	author	publication
CISCO.com		
Packet Tracer Software **Boson NetSim Software** **GNS 3**		
Cisco CCENT ICND1 200-101	**Wendell Odom**	**Cisco press**