QUALIFICATION FILE SUMMARY

Qualification Title	Advance Diploma in Hardware ,Networking and Information Security
Qualification Code	**NIELIT/IS/1/15**
Body/bodies which will assess candidates	**Examination Cell,** National Institute of Electronics and Information Technology, 6-CGO Complex, Electronics Niketan, Lodhi Road, New Delhi. 110003.
Body/bodies, which will award the certificate for the qualification.	**Certification Division,** National Institute of Electronics and Information Technology, 6-CGO Complex, Electronics Niketan,Lodhi Road, New Delhi. 110003.
Body, which will accredit providers to offer the qualification.	**Accreditation Division,** National Institute of Electronics and Information Technology, 6-CGO Complex, Electronics Niketan, Lodhi Road, New Delhi. 110003.
Occupation(s) to which the qualification gives access	• System Administrator • Network Administrator • Systems support • Technical support • Server Administrator
Proposed level of the qualification in the NSQF.	5
Notional Learning Hours	1220 hours.
Entry requirements / recommendations.	10+2, 10+ITI / Graduate
Progression from the qualification.	**Network Administrator –IT Manager- IT Project Manager** Initially, candidate can work as Network Administrator/System Administrator, who would be to capable of implementing, administering, maintaining LAN /WAN Networks and overall Security Systems. The candidate would be in position to plan , design and implement the LAN as well as Windows /Linux Network services in any organisation .
Planned arrangements for RPL.	• Presently only candidates who undergo training shall be assessed. • It will be incorporated once RPL strategy is finalized

Formal structure of the qualification				
	Title of unit or other component (include any identification code used)	**Mandatory/ Optional**	**Estimated size (learning hours)**	**Level**
ADHNS I	PC & PERIPHERAL ARCHITECTURE (ADHNS I)	Mandatory	120	5
ADHNS II	OPERATING SYSTEM & DIAGNOSTIC UTILITIES (ADHNS II)	Mandatory	120	
ADHNS III	BASIC NETWORK (ADHNS III)	Mandatory	120	
ADHNS IV	NETWORKING THROUGH WINDOWS-2012 (ADHNS IV)	Mandatory	120	
ADHNS V	PROGRAMMING TOOLS AND TECHNIQUES (ADHNS V)	Mandatory	120	
ADHNS VI	NETWORKING THROUGH LINUX (ADHNS VI)	Mandatory	120	
ADHNS VII	CLOUD COMPUTING (ADHNS VII)	Mandatory	120	
ADHNS VIII	ADVANCE NETWORKING (ADHNS VIII)	Mandatory	120	
ADHNS IX	WIRELESS NETWORK (ADHNS IX)	Mandatory	120	
ADHNS X	INFORMATION SECURITY (ADHNS X)	Mandatory	120	
ADHNS XI	ENHANCING COMMUNICATION & SOFT SKILL (ADHNS XI)	Mandatory	20	

Please attach any document giving further detail about the structure of the qualification – e.g. a Curriculum or Qualification Pack.Detailed Curriculum attached at Annexure III.

SECTION 1
ASSESSMENT

Name of assessment body:
Examination Cell
National Institute of Electronics and Information Technology
6-CGO Complex, Electronics Niketan,
Lodhi Road, New Delhi. 110003.

Will the assessment body be responsible for RPL assessment?

Give details of how RPL assessment for the qualification will be carried out and quality assured.

Presently, only candidates undergoing training shall be assessed. Later on, candidates having experience and knowledge shall be assessed. The information will be provided on finalization of such procedure.

Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, consistent and fair and show that these are in line with the requirements of the NSQF:

The emphasis is on practical demonstration of skills & knowledge based on the performance criteria. Each OUTCOME is assessed & marked separately. Student is required to pass in all OUTCOMEs individually and marks are allotted. Following assessment methodologies are used.

> A. Written Assessment (Multiple Choice Questions)
> B. Practical Assessment
> C. Viva Voce Assessment
>
> **Supporting evidences for Assessment**
>
> The assessment results are backed by following evidences.
> 1 The assessor collects a copy of the attendance for the training done under the scheme. The attendance sheets are signed and stamped by the In charge / Head of the Training Centre.
> 2 The assessor verifies the authenticity of the candidate by checking the photo ID card issued by the institute as well as any one Photo ID card issued by the Central/Government. The same is mentioned in the attendance sheet.
> 3 The assessor assigns roll number.
> 4 The assessor takes photograph of all the students along with the assessor standing in the middle and with the centre name/banner at the back as evidence.

Please attach any documents giving further information about assessment and/or RPL.
ASSESSMENT EVIDENCE

Complete the following grid for each grouping of NOS, assessment unit or other component as listed in the entry on the structure of the qualification on page 1.

Job Role

- System Administrator
- Network Administrator
- Systems support
- Technical support
- Server Administrator

Title of Unit/Component:

(Detailed Curriculum attached As Annexure-III)

Assessable Outcomes	Assessment criteria for the outcome	Total Mark	Written	Practical	Vivo-voce
1. To Familiarize With PC & Peripheral Architecture	Learn fundamental of Computer, Basic Electronics and Components	200	35	20	8
	Identify components like Diodes and Transistors, Measuring Instruments		30	25	6
	Follow different concepts of Digital and Integrated Circuits, Power Supplies and practical implementation		20	20	6
	Architecture of PC Peripherals		15	10	5
	Total		**100**	**75**	**25**
2. Understand Basic Concept of Operating System & Diagnostic Utilities	Follow Concepts of BIOS, POST & DOS Batch Files, Discovering Windows 7/ 8	200	50	40	15
	Maintain Backup Procedure & Disaster Prevention		25	15	5
	Apply General Troubleshooting And		25	20	5

	Maintenance				
		Total	100	75	25
3. Develop Concept of Basic Network	Identify components of Networks, Media and Connectors, Networking Devices	200	30	25	9
	Concept of Network Model		60	40	13
	Use of Internet and its Service Providers		10	10	3
		Total	100	75	25
4. Explain Concepts of Networking Through Windows 2012	Concepts of Windows 2012 Serve , Managing File System and Security Resources, Accessing Files and Folders: Managing file and folder attributes	200	30	25	6
	Creating Users and Groups, Configuring network services and access, Configure VPN and routing, Web Server Management with IIS		33	20	4
	Install and Manage Active Directory, Configure domain account policies, Configure and manage Group Policy, Auditing and Security, Deploy, manage, and maintain servers		27	30	11
		Total	**100**	**75**	**25**
5. Demonstrate Knowledge of Programming Tools And Techniques	Learn Basics of C Language and HTML	200	50	35	13
	Learn JAVA Programming and PHP Programming and practical implementation of it.		50	40	12
		Total	**100**	**75**	**25**
6. Developing Concept of Networking Through Linux	Follow Concept of CentOS Linux , Installing CentOS Server, Using the Command Line, System Administration	200	25	25	10
	System Management, Configuring Server for Security, Configuring a Network Connection and Introduction to Cryptography, Creating CentOS Server as a File Server,		45	25	10
	Setting of Web server, Squid Proxy, Server and securing Web Services, Setting Up the Firewall with ip tables, Setting Up the Mail Server		30	25	5
		Total	**100**	**75**	**25**
7. Develop Concept of Cloud Computing	Follow Concept of Cloud Computing, Virtualization, Building Cloud Networks and practical implementation	**200**	75	50	15

	Identify Private , Public & Hybrid Clouds and Setting up your own Cloud		25	25	10
		Total	**100**	**75**	**25**
8. Develop Advance Concept of Networking	Explain Internetworking Basics, IP Sub netting and (VLSM), Understand Router User Interface and Command-Line Interface, Routing Basics and Switching Basics	**200**	50	40	10
	Learn Concept of VLAN , Components of a Router, Managing Traffic with Access Control Lists, Understand Network Address Translation and WAN Protocols		50	35	15
		Total	**100**	**75**	**25**
9. Explain Concepts of Wireless Network	Follow Concepts of Wireless Network, Characteristics of Wireless Medium, Understand Physical Layer Alternatives for Wireless Networks,	**200**	40	25	10
	Follow Network Planning, Acquire Knowledge of Wireless LAN, GSM, TDMA Technology and CDMA Technology,		40	35	10
	Use Mobile Data Networks, Bluetooth Technology, Overview of Wireless Broadband Networking		20	15	5
		Total	**100**	**75**	**25**
10. Learn and practice Information Security	Operate and test Information Security, Cryptography, Intruders, Virus and Firewalls, Protocols weaknesses in TCP/IP and other protocols	**200**	40	30	10
	Manage Ethical Hacking, Scanning and Enumeration, Trojans, Backdoors, Viruses, and Worms		30	20	5
	Execute Sniffing, Web Application Vulnerabilities, OS Hardening Understand Network infrastructure security		30	25	10
		Total	**100**	**75**	**25**
11. Enhancing Communication & Soft Skill	Develop Communication Skill	**50**	10	N/A	N/A
	Managing career, staff and professional relationships		20	N/A	N/A
	Ready for interview		20	N/A	N/A
		Total	**50**	**N/A**	**N/A**
	Grand Total	**2050**	**1050**	**750**	**250**

Detailed Curriculum

Name of Unit of Qualification : PC & PERIPHERAL ARCHITECTURE
Duration : 120 Hours
Topics : PC & PERIPHERAL ARCHITECTURE

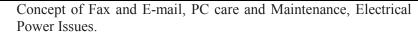| Performance Criteria(OUTCOME) No.	Contents	Hrs.
Introduction to a Computer	- The basic building blocks of a computer system- the CPU , the Arithmetic & Logical Unit . The binary numbers as a language which computer understands, interprets and processes. The Input & Output devices as means of communication with the Computer system. - NUMBER SYSTEM: Decimal odometer, Binary odometer, Why Binary numbers are used, Binary, Decimal and Hexadecimal number system; Conversion from decimal and hexadecimal to Binary and vice versa, BCD numbers, ASCII code, Basic Concept of parity. - The concept of hardware & the software - the two main components of a computer system. The data & the information. The importance of information flow & its impact on growth & productivity. - Study of PC-AT/ATX System, Pentium, Core, Core 2 Cord, Core 2 Duo, I3, I5, I7 Processor Basics of Processor and CPU Block Diagram of Computer and Computer Generation Motherboards, Chipset and Controllers, BIOS and the Boot Process, Computer Memory. - IDE and SATA Devices: Hard Disk Drive and CD/DVDs Drives, SCSI Devices, Floppy Disk, Zip Drive, Backup Drive, Expansion Cards- LAN Card, IDE Card , VGA and SVGA Cards, Sound Card, Interface Cards, I/O cards, Video Cards, USB Card, Fire-Wire Cards, Internal Ports, Cables and Connector Types. - Hands on Lab	25
Basic Electronics and Components	- Introduction, Current, Voltage, emf, Power generation system, Switch- plug wiring, Analyzing Conductivity of elements, Types of Conductors, Semi conducers - Silicon, Germanium. - Electronic Components: Resistors, Capacitors, Inductors, Transformers, Types, working and Properties, Voltage and current sources , Diode, Zener diode, Photo diode, Light emitting diode(LED), Transistors (NPN,PNP), their characteristics and uses, Field effect transistor, Photo transistor. - Passive & active components. Resistance & Capacitance & Inductance. - Connectors, Relays, Switches and Panel Components: Introduction to relays, their characteristics classifications, and performance during pick up and drop out, introduction to connectors and switches, different types and their applications, panel components	25
Introduction to Diodes and Transistors	- Introduction to Diodes, their characteristics and applications, Zanier diodes and their characteristics and impedance, introduction to Bipolar transistors and their applications, functions, specification, testing of Diodes and Transistors. - Introduction to operational amplifiers (OP Amps) and simple	20

	• circuits • Hands on Lab	
Measuring Instruments	• Basics of Digital Multimeters, Cathode Ray Oscilloscope, Soldering & Desoldering Techniques • Hands on Lab	10
Digital and Integrated Circuits	• Introduction to logic levels & gates, Definition symbols and truth tables of NOT.AND, OR, NAND, NOR, EXOR Gates Latches, unidirectional & bi-directional buffers, tristate devices, Clock generators, Flip-flops, Registers, Counters, Multiplexers & Demutiplexers. • Introduction to various logic families and their characteristic, Bipolar Logic Family, Unipolar Logic Families. Latest trends in packaging. • Semiconductor Memories: Hierarchy of memories used in a computer, Classification of memories and trends in PC memory modules. • Hands on Lab	20
Power Supplies	• Constituents of Power Supplies • Introduction to half wave, full wave and bridge rectifier circuits, introduction to regulated power supplies (linear), power supply filters, three terminal regulators and regulated power supply using three terminal regulators. • Hands on Lab	10
Architecture of PC Peripherals	• Switch Mode Power Supply: Discrete components, principle of operation SMPS, converter topologies, PWM IC's and case study. • Monitors: Monitors:- CRT, LCD and LED Displays, CRT construction and working, 9 pin input type-monitor, block diagram of color monitor. • Hard Disk Drive: Its construction, basic principle of operation, disk drive types, installation, cables, connectors and jumper details, formatting and managing hard disk drive. Various interface standards. • Keyboard: Block diagram of keyboard circuit. • Printer: Types & components of printers, printer interface with computer, detailed circuit study of Dot Matrix Printer, function block diagram for various sub-assemblies of printer, principle of operation of Laser and Inkjet printers, various mechanical sub-assemblies, general maintenance aspects. • Hands on Lab	20

Name of Unit of Qualification : **OPERATING SYSTEM & DIAGNOSTIC UTILITIES**

Duration : **120 Hours**

Topics : **OPERATING SYSTEM & DIAGNOSTIC UTILITIES**

Performance Criteria(OUTCOME) No.	Contents	Hrs.
BIOS, POST & DOS Batch Files	• Concept of BIOS, POST its error codes and their interpretation, • Operating System concepts, definition, Batch processing, Time Sharing, Real Time, Multi-tasking, Multi-Programming, Computer Networks, Distributed Processing • Steps in the booting process, AUTOEXEC.BAT and CONFIG.SYS files, Memory usage in the DOS environment, Basic DOS commands, internal and external commands Basic file commands, • Making and access directory from windows Console, operations performed on files. Using the FDISK, FORMAT, DEFRAG, SCANDISK, EMMAKER to optimize memory • Understanding .INI files in Windows • Detailed description of CMOS setup and meaning of its various setting CMOS password setting. • System files FAT and NTFS, Dos 6.22, Windows XP, Windows Vista, Windows 7 and Windows 8 and RedHat Linux and Multi Boot Operating System. • Device Installation Graphics Card, Sound Card, LAN Card, Wireless LAN Card, SCSI Card, External Drive, Flash Cards, Web Camera, CCTV Camera, Mobile Devices, Pen Drive, Firewire Cards, Modem, Plotter, Wireless LAN, Access Point etc • Hands on Lab	40
Discovering Windows 7/ 8	• Discovering the new features, Installing Windows7 and 8 ,Navigating the system, Evaluating alternate installation options, Discovering the features, navigating the system Evaluating alternate installation options, Ensuring optimal configurations, troubleshooting and restoring, creating and modifying security boundaries, operating within an active directory domain. • Configuring and controlling user environments, customizing user account control, implementing discretionary access control (DAC), securing and auditing the system, Encrypting drives and devices. • Configuring TCP/IP functionality, network location awareness, connecting to wireless networks, sharing and accessing resources, accessing the enterprise remotely, Leveraging built in technologies, monitoring and analyzing applications, ensuring application compatibility. • Hands on Lab	30
Back-Up Procedure & Disaster Prevention	• Write protection of your software MS-DOS delete protection, crash recovery, preventing hard disk failures • Back-up & Restore procedures, types of back-up, media for back-up, RAID systems. Preparation of Bootable CD. • Hands on Lab	20
General Troubleshooting And Maintenance	• Diagnostic Tools & PC Maintenance • Introduction, Virus and its types, Effect of Virus for Computer System, Scanning and Antivirus remover tools, Antivirus Utilities for Diagnostic • Safety and Preventive Maintenance Tools, Data Recovery,	30

	Concept of Fax and E-mail, PC care and Maintenance, Electrical Power Issues.	
	• Troubleshooting PC Hardware:- O/S Troubleshooting issues in computer System	
	• Assembly and disassembly of PC and its various parts, startup problems, run problems their identification and remedy, problem of keyboard, displays, printers, FDD's HDD's, CDD's, SMPS motherboard, their identification and remedy. Servicing and Trouble shooting of Mouse and Keyboard, Maintenance of UPS.	
	• Hands on Lab	

Name of Unit of Qualification : **BASIC NETWORK**
Duration : **120 Hours**
Topics : **BASIC NETWORK**

Performance Criteria(OUTCOME) No.	Contents	Hrs.
Introduction to Networks	• Introduction to Computer Networks, Element of Networks, Types of Networks, Network Topologies: Bus, Star, Mesh, Ring etc • Hands on Lab	10
Media and Connectors	• Common LAN Media: STP, UTP, Coaxial cable, Optical fiber, TIA/EIA standards • Making & testing Cable, Straight thru Cable, Crossover Cable , Connectors, Jacks, Patch Panels • Hands on Lab	15
Networking Devices	• NIC, Repeaters, Hub and its types, Bridges and their types, Switches, Routers • Hands on Lab	10
Network Model	• Description of the seven layers of OSI Model, TCP/IP Model, Comparison of OSI & TCP/IP Model. • Hands on Lab	10
Physical and Data Link Layer	• MAC Sub-layer, LLC, MAC Addressing, Framing, Error control, Flow control, Token Ring, Ethernet, FDDI, Address Resolution Protocols • Hands on Lab	10
Network and Transport Layer	• Role of Network layer, Virtual Circuits, Datagram, Packet, Types of Routing, Routing Algorithms and Protocols, ICMP, Introduction to Transport layer, TCP and UDP Protocols and Comparison .Network Layer, IP address, IP address Classes, Basics of Sub-netting, Subnet Masking • Hands on Lab	20
Presentation and Session Layer	• Session layer function, Token Management and Session Layer Protocols, Presentation layer function and Protocols • Hands on Lab	10
Application Layer	• Introduction to Application Layer Protocols and their role. The Domain name system, Electronics Mail, the World Wide Web, FTP, Telnet, HTTP, DHCP • Hands on Lab	15
Internet and its Service Providers	• ISP , WEB HOSTING & REGISTRAR • Internet, connection types, ISP, ISP study • Web hosting, Top Web Hosting Companies in India performing whois to get IP by name, Name by IP & IP address owner information • IANA, IANA Root Zone Database, IANA Number Resources • Local Internet registry (LIR),National Internet Registry (NIR), AfriNIC, APNIC, ARIN, LACNIC, RIPE NCC, Regional Internet Registry (RIR). • Registration of a domain, Top Domain Registrars, Registrar for .EDU.IN, .RES.IN, .AC.IN, .GOV.IN in INDIA • Hands on Lab	20

Name of Unit of Qualification   : NETWORKING THROUGH WINDOWS 2012
Duration   : 120 Hours
Topics   : NETWORKING THROUGH WINDOWS 2012

Performance Criteria(OUTCOME) No.	Contents	Hrs.
Introduction to Windows 2012 Serve	• Windows 2012 server, Windows 2012 server family, Standard Edition ,Datacenter Edition, Foundation Edition ,Essentials Edition, • Plan for a server installation; Installation Requirements ,64-Bit Support, Installing the Operating System, Performing a Clean Installation, Performing an Upgrade Installation plan for server roles; plan for a server upgrade; install Server Core; Configure Server Core • Hands on Lab	10
Managing File System and Security Resources	• Working with file systems, FAT, FAT32 NTFS. File conversion, Configure Distributed File System (DFS), Configure File Server Resource Manager (FSRM),Install the FSRM role • configure quotas; configure file screens; configure reports, Configure file and disk encryption, Configure Bitlocker encryption; configure the Network Unlock feature; configure Bitlocker policies; configure the EFS recovery agent; manage EFS and Bitlocker certificates including backup and restore • Hands on Lab	10
Accessing Files and Folders: Managing file and folder attributes	• Managing shared folder permissions. How user and group Permissions combine? • Configuring and managing the distributed file system. Creating and configuring a Dfs Root/Dfs links, their types, replicas. Configuring client computers to user Dfs. • Managing NTFS file and folder security, NTFS permissions,. How user and group NTFS permissions combine? • Taking ownership of files and folders. Configuring and monitoring disk quotas. Troubleshooting, • Understanding disks and volumes. Types of disks/partitions/volumes. Using disk management. Creating and formatting partitions. Upgrading a disk. Creating a simple volume/spanned, volume/striped, volume/mirrored, volume/RAID-5. Logical drives, recovering disks and volumes • Hands on Lab	10
Users and Groups	• Creating, configuring, managing and troubleshooting User Accounts. Managing user profiles, account policies, user rights, authentication, creating and managing group accounts, groups on the local computer. • Groups in Active Directory. System policy and group policy their types, management, order of application and troubleshooting • Hands on Lab	10
Configuring network services and access	• Configure IPv4 and IPv6 addressing, Configure IP address options; configure Subnetting; configure interoperability between IPv4 and IPv6; configure ISATAP; configure Teredo • Dynamic Host Configuration Protocol (DHCP) service, Create and configure scopes; configure a DHCP reservation; configure DHCP options; configure client and server for PXE boot; configure DHCP relay agent; authorize DHCP server. • Configure DNS zones: Configure primary and secondary zones; DNS zone types Zone delegation ,Split DNS, Forwarders and	10

	conditional forwarders ,Stub zones configure stub zones; configure conditional forwards; configure zone and conditional forward storage in Active Directory; configure zone delegation; configure zone transfer settings; configure notify settings: Configure DNS records: Create and configure DNS Resource Records (RR) including A, AAAA, PTR, SOA, NS, SRV, CNAME, and MX records; configure zone scavenging; configure record options including Time To Live (TTL) and weight; configure round robin; configure secure dynamic updates • Hands on Lab	
Configure VPN and routing	• Install and configure the Remote Access role; implement Network Address Translation (NAT). • configure VPN settings; configure remote dial-in settings for users; configure routing • Hands on Lab	10
Web Server Management with IIS	• Installing IIS 8,Adding the Web Server Role via Service Manager, Installing IIS 8 via PowerShell, Creating a Simple Website, Configuring Site Settings, • Hosting Multiple Websites ,Deploying Sites ,Installing and Configuring SMTP, Adding the SMTP Server, Feature, Setting Up an SMTP Server, Adding the SMTP E-mail Feature to an IIS 8 Website, Integrating FTP into IIS 8 Web Pages, The FTP File Transfer Publishing Service ,Adding FTP to an IIS 8 Website, Advanced Administration, • Using Web Management Services, Connecting, Securing, Logging, Backing Up and Restoring Data • Hands on Lab	10
Introduction to Active Directory	• What is Active Directory? Understanding the Features of Active Directory. Naming conventions logical structure of Active Directory. Domain, organizational units (OUs), trees and forests. Objects and classes, schema, global catalog server. Installing Active Directory Replication, sites, Flexible Single Master Operations (FSMO), Domain Name System (DNS). • Installing Active Directory, Configure and manage Active Directory, Configure service authentication, Create and configure Service Accounts; create and configure Group Managed Service Accounts; create and configure Managed Service Accounts; configure Kerberos delegation; manage Service Principal Names (SPNs) • Configure Domain Controllers, Configure Universal Group Membership Caching (UGMC); transfer and seize operations masters; install and configure a read-only domain controller (RODC); configure Domain Controller cloning. • What does DNS have to do with Active Directory? DNS domain names and naming conventions. Installing DNS for Active Directory, creating and configuring DNS zones, configuring zone transfers. Removing Active Directory. Verifying and troubleshooting an Active Directory installation. Organizational Unit (OU), Creating OUs, configuring OU, properties. Managing Active Directory objects. Locating objects in Active Directory. Publishing resources in Active Directory. Moving objects in Active Directory. Controlling Access to Active Directory Objects. Delegating administration of Active Directory objects • Maintain Active Directory, Back up Active Directory and SYSVOL; manage Active Directory offline; optimize an Active Directory	20

	database; clean up metadata; configure Active Directory snapshots; perform object- and container-level recovery; perform Active Directory restore • Hands on Lab	
Configure domain account policies	• Configure domain user password policy; configure and apply Password Settings Objects (PSOs); delegate password settings management; configure local user password policy; configure account lockout settings • Hands on Lab	5
Configure and manage Group Policy	• Configure Group Policy processing, Configure processing order and precedence; configure blocking of inheritance; configure enforced policies; configure security filtering and WMI filtering; • Configure Group Policy settings, Configure settings including software installation, folder redirection, scripts, and administrative template settings; import security templates; import custom administrative template file • Manage Group Policy objects (GPOs), Back up, import, copy, and restore GPOs; create and configure Migration Table; reset default GPOs; delegate Group Policy management • Hands on Lab	10
Auditing and Security	• Managing, auditing. Enabling and configuring system access, auditing enabling and configuring Object access. Auditing, monitoring and analysing security events, using security templates, troubleshooting. • Hands on Lab	5
Deploy, manage, and maintain servers	• Deploy and manage server images: Install the Windows Deployment Services (WDS) role; configure and manage boot, install, and discover images; update images with patches, hotfixes, and drivers; install features for offline images, Implement patch management: Install and configure the Windows Server Update Services (WSUS) role; configure group policies for updates; configure client-side targeting; configure WSUS synchronization; configure WSUS groups • Backup and Recovery: User data and system state, data backup types. Backup strategies, scheduling, recovering user data and system state, data recovering from a system failure. Using the recovery console to restore a system, using the emergency repair disk to restore a system • Hands on Lab	10

Name of Unit of Qualification : **PROGRAMMING TOOLS AND TECHNIQUES**
Duration : **120 Hours**
Topics : **PROGRAMMING TOOLS AND TECHNIQUES**

Performance Criteria(OUTCOME) No.	Contents	Hrs.
Introduction to C Language	• Algorithms, Flow charts. Computer Language: Classification. • Program Concept: Source program, Compiling, Program execution, Object program. Measures of program performance. C- Language Fundamentals: Tokens, Fundamental data types, Precedence of evaluation. • Flow of Control:- Branching: If statement, If – else and Else – If constructs, nested if statements, switch statements. Looping: for loops, while and do-while loops, nested loops, break and continue statements. • Hands on Lab	30
Introduction to HTML	• What is HTML , HTML Documents, Basic structure of an HTML document , Creating an HTML document , Mark up Tags, Heading-Paragraphs, Line Breaks, HTML Tags. Elements of HTML:- Introduction to elements of HTML, Working with Text, Working with Lists, Tables and Frames, Working with Hyperlinks, Images and Multimedia, Working with Forms and controls. • Hands on Lab	30
Introduction to JAVA Programming	• Introduction to Java :- History of Java, Installation of JDK, Data Types, Identifiers, variables & constants, first java program,Java Script:- Introduction to java Script • Introduction to Class & object:- Basic of Class & object, Object creation, Object Creation, Accessing Object • Hands on Lab	30
Introduction to PHP Programming	• Introduction on PHP:- Introducing PHP and MySQL, The PHP Story, History, Features, Architecture, Sample Applications. • Installation & Configuring the WAMP Server • Basic Programming:- Using Variables, Statements, and Operators • Hands on Lab	30

Name of Unit of Qualification : NETWORKING THROUGH LINUX
Duration : 120 Hours
Topics : NETWORKING THROUGH LINUX

Performance Criteria(OUTCOME) No.	Contents	Hrs.
Introduction to CentOS Linux	• The CentOS Linux File system, The CentOS Shell, The CentOS Linux Utilities • Hands on Lab	10
Installing CentOS Server	• Preparing for the Installation, Starting the CentOS Server Installation Process, Configuring the Server's Hard Drive, Completing the Installation • Hands on Lab	10
Using the Command Line	• Working as root, working with the Shell, Using Bash to Best Effect, Managing Bash with Key Sequences, • Performing Basic File System Management Tasks, Working with Directories, Working with Files, Viewing the Content of Text Files, Finding Files That Contain Specific Text , Creating Empty Files, Piping and Redirection, Piping, Redirection, • Finding Files, Working with Vi Editor: Vi Modes, Saving and Quitting, Cut, Copy, and Paste, Deleting Text. Getting Help: Using man to Get Help, Getting Information on Installed Packages • Hands on Lab	10
System Administration	• Software Management, Software Repositories and Package Databases, Package Management Utilities, Using apt, Installing Software from Tarballs, Configuring a Graphical User Interface, Creating Backups, Making File Backups with tar, Making Device Backups Using dd, Configuring Logging, Configuring syslog • Hands on Lab	10
File System Management	• Mounting Disks, Using the mount Command, Unmounting Devices, Automating Mounts with /etc/fstab, Checking File System Integrity • Working with Links: Working with Symbolic Links, Working with Hard Links. • Configuring Storage, Comparing File Systems, Creating File Systems, Working with Logical Volumes • Hands on Lab	10
Configuring Server for Security	• Setting Up User Accounts, Commands for User Management, Managing Passwords, Modifying and Deleting User Accounts, Configuration Files, Creating Groups, Commands for Group Management, /etc/group, Using Group Passwords, Managing the User's Shell Environment • Configuring Permissions, Read, Write, and Execute: The Three Basic Linux Permissions, Permissions and the Concept of Ownership, Working with Advanced Linux Permissions, Setting Permissions, Using umask to Set Default Permissions for New Files • Working with Access Control Lists, Preparing the File System for ACLs, ACL Limitations, Applying File Attributes, Apply Quota to Allow a Maximum Amount of Files, Installing the Quota Software, Preparing the File System for Quota, Initializing Quota, Setting Quota for Users and Groups, Configuring Administrator Tasks with sudo • Hands on Lab	10
Personalizing the	• Process Monitoring and Management, Different Kinds of	10

System	Processes, Foreground and Background, Managing Processes, Other Tools to Monitor System Activity, Setting Process Priority, Executing Processes Automatically, Configuring cron, Executing Once with at, Tuning the Boot Procedure • Managing the GRUB Boot Loader, The GRUB Configuration File, Installing GRUB, Working with the GRUB Boot Menu, Run levels, • Hands on Lab	
Configuring a Network Connection and Introduction to Cryptography	• Configuring the Network Card, Using ifup, ifdown, and Related Tools, Using ifconfig, Using the ip Tool, Configuring the DNS Resolver, Configuring Network Card Properties with the ethtool Command, Troubleshooting Network Connections, Testing Connectivity, Testing Availability of Services, Monitoring the Network Interface, Monitoring Network Traffic, Configuring Telnet & FTP, Connecting Remotely with SSH, Working with Public/Private Key Pairs, Working with Secure Shell, Configuring SSH, Using Key-Based Authentication, A Short Introduction to Cryptography, Using Public/Private Key–Based Authentication in an SSH Environment • Hands on Lab	10
Using CentOS Server as a File Server	• Sharing Files with NFS, Using the NFS Server, Understanding How the NFS Works, Configuring an NFS Server, Configuring an NFS Client, Monitoring the NFS Server • Sharing Files with Samba, Samba Server Possibilities and Impossibilities, Configuring the Samba Server, Client Access to the Samba Server • Hands on Lab	10
Configuring Network Infrastructure Services	• Configuring DNS, Methods of Name Resolution, Structure of the DNS Hierarchy, Introducing Forward and Reverse DNS, Configuring DNS, Configuring Reversed Lookup, Testing Your Name Server • Configuring DHCP, Understanding the DHCP Protocol, Creating the DHCP Server Configuration, The DHCP Process, The /etc/dhcp/dhcpd.conf Configuration File, Advanced DHCP Configuration Options • Configuring NTP, How NTP Works, Configuring a Stand-Alone NTP Time Server, Pulling or Pushing the Time, Configuring an NTP Client, Checking NTP Synchronization Status, Customizing Your NTP Server, Starting Services with xinetd, Setting up Xinetd, Setting Up Mail Servers, Clients • Hands on Lab	10
Setting up Web server & Squid Proxy Server and securing Web Services	• Setting up Apache, Apache Components, Starting, Stopping, and Testing the Apache Web Server, The Structure of the Apache Configuration Files, Checking the Configuration, Working with Virtual Hosts, Configuring Virtual Hosts, Managing Access to the Web Server, Configuring Host-Based Access Restrictions, Configuring User-Based Access Restrictions • Enabling HTTPS, Creating a Self-Signed Certificate, Configuring Apache to Use the Self-Signed Certificate • Hands on Lab • Configuring a Squid Proxy Server, Installing a Squid Proxy Cache, Configuring Squid Access Control Policies, Configuring User Authentication • Hands on Lab	10

Setting Up the Firewall with iptables	• Using iptables to create a Firewall • Hands on Lab	5
Setting Up the Mail Server	• SMTP, POP3,IMAP, Postfix, Round cube • Hands on Lab	5

Name of Unit of Qualification : CLOUD COMPUTING
Duration : 120 Hours
Topics : CLOUD COMPUTING

Performance Criteria(OUTCOME) No.	Contents	Hrs.
Introduction to Cloud Computing	• What is cloud? , Cloud Computing definition, private, public and hybrid cloud.Services provided by cloud are categorized :Software As a Service(SaaS) ,Infrastructure As a Service(IaaS) ,Platform As a Service(PaaS) ,Desktop As a Service (DaaS) VDI etc. How Cloud Computing Works, Advantages & Disadvantages, Applications for Businesses Cloud Service Providers, • Brief overview of major Cloud Service providers –Amazon AWS, Google App Engine, Microsoft, VMware. , How Companies are using Cloud Computing , Cloud Computing Risks and Issues • Hands on Lab	20
Virtualization	• Virtualization concepts, Objectives, Types of Virtualization & its benefits, Introduction to Various Virtualization OS, HA/DR using Virtualization • Moving VMs, SAN backend concepts, S/W defined Networking (OpenFlow/OpenVSwitch), S/W Defined Datacenter, S/W Defined Storages. • Virtualization for Enterprise using VMware,,Xen,KVM with oVirt, Hyper-V • Hands on Lab	20
Building Cloud Networks	• Designing and Implementing a Data Center-Based Cloud, Industry and International Standards Communication Requirements for Cloud Implementation • Hands on Lab	20
Private , Public & Hybrid Clouds	• What is Private, Public & Hybrid Clouds, and Advantages & Disadvantages? On Premises and Off Premises Cloud services, installing a Cloud service using Eucalyptus, Open Nebula ,Open Stack , Amazon Web Services ,Microsoft Azure ,Google App Engine ,VMware air • Hands on Lab	20
Setting up your own Cloud	• How to build private cloud using open source tools • Understanding various cloud plugins, Setting up your own cloud environment • Autoprovisioning, Custom images, integrating tools like Nagios, Integration of Public and Private Cloud • Hands on Lab	40

Name of Unit of Qualification : **ADVANCE NETWORKING**
Duration : **120 Hours**
Topics : **ADVANCE NETWORKING**

Performance Criteria(OUTCOME) No.	Contents	Hrs.
Internetworking Basics	• Internetworking Basics, Broadcast domain, Collision Domain, Hub, Switch & Router ,Ethernet Cabling: - Straight-Through Cable, Crossover Cable, Roll over Cable • Internet Protocols: - TCP/IP Model, IP Addressing, IP Terminology, IP Addressing Scheme, Private IP Addresses ,TCP/IP Troubleshooting utilities, Troubleshooting IP Addressing • Hands on Lab	10
IP Subnetting and Variable Length Subnet Masks (VLSM)	• Subnetting Basics, How to Create Subnets, Subnet Masks, Classless Inter-Domain Routing (CIDR), Subnetting Class C Addresses, Subnetting Class B Addresses, Subnetting Class A Addresses • Variable Length Subnet Masks (VLSMs), VLSM Design, Implementing VLSM Network • Hands on Lab	10
Introduction to the Router User Interface and Command-Line Interface	• The Cisco Router User Interface, Cisco Router IOS, Connecting to a Cisco Router, Bringing up a Router, Setup Mode, Command-Line Interface, Logging into the Router, Overview of Router Modes, CLI Prompts • Basic commands • Hands on Lab	15
Routing Basics	• IP Routing, Routing Basics, Static Routing, Default Routing, Dynamic Routing, Routing Protocol Basics, Administrative Distances • Routing Protocols, Distance-Vector Routing Protocols, Maximum Hop Count, Route Poisoning • Routing Information Protocol (RIP), Interior Gateway Routing Protocol (IGRP) • Enhanced IGRP (EIGRP) and Open Shortest Path First (OSPF) EIGRP Features and Operation, Open Shortest Path First (OSPF) Basics • Hands on Lab	15
Switching Basics	• Layer 2 Switching basics, Configuring the Catalyst 1900 and 2950 Switches,1900 and 2950 Switch Startup, Setting the Passwords, Setting the Hostname, Setting IP Information, Configuring Interface Descriptions, Erasing the Switch Configuration • Hands on Lab	10
VLAN Basics	• Virtual LANs (VLANs) VLAN Basics, Broadcast Control, Security ,Flexibility and Scalability ,VLAN Memberships, Static VLANs ,Dynamic VLANs, Identifying VLANs, Frame Tagging, LAN Identification Methods , Inter-Switch Link (ISL) Protocol • VLAN Trunking Protocol (VTP),VTP Modes of Operation, VTP Pruning, Routing between VLANs ,Configuring VLANs, Assigning Switch Ports to VLANs ,Configuring Trunk Ports ,Configuring Inter- VLAN Routing, Configuring VTP. • Hands on Lab	15
Components of a	• Managing a Cisco Internetwork The Internal Components of a	10

Router	Cisco Router, The Router Boot Sequence Understanding the Configuration Register Bits, Checking the Current Configuration Register Value, Changing the Configuration Register, Recovering Passwords, • Backing Up and Restoring the Cisco IOS, Verifying Flash Memory, Backing Up the Cisco IOS, Restoring or Upgrading the Cisco Router IOS ,Backing Up and Restoring the Cisco Configuration, Erasing the Configuration • Hands on Lab	
Managing Traffic with Access Control Lists	• Managing Traffic with Access Lists Introduction to Access Lists, Standard Access Lists, Wildcard Masking, Standard Access List Example, Controlling VTY (Telnet) Access, Extended Access Lists, Extended Access List Example, Named Access Lists, Monitoring Access Lists • Hands on Lab	15
Network Address Translation	• Network Address Translation NAT, Introduction to Network addresses Translation (NAT), Port address translation (PAT), Static NAT, Dynamic NAT, NAT Overloading • Hands on Lab	10
WAN Protocols	• Introduction of WAN, Cabling the WAN, HDLC, PPP, LCP, Frame Relay, ISDN, DSL/ADSL • Hands on Lab	10

Name of Unit of Qualification   : WIRELESS NETWORK
Duration   : 120 Hours
Topics   : WIRELESS NETWORK

Performance Criteria(OUTCOME) No.	Contents	Hrs.
Overview of Wireless Network	• Introduction to wireless Network, different generation of Wireless System • Hands on Lab	10
Characteristics of Wireless Medium	• Radio propagation mechanisms; reflection, diffraction and scattering, multipath & Doppler • Hands on Lab	5
Physical Layer Alternatives for Wireless Networks	• Wireless transmission techniques, Consideration in the design of wireless Modem, Short Distance Base Band Transmission, Comparison of modulation themes, Coding techniques for wireless communications • Hands on Lab	5
Wireless Medium Access Alternatives	• Introduction to multiple access technique, Frequency Division Multiple Access (FDMA) and Time Division Multiple Access (TDMA),. Code Division Multiple Access (CDMA), Comparison of CDMA, TDMA, FDMA, and Random Access Methods for mobile Data Services, Access methods for wireless LANs. • Hands on Lab	10
Network Planning	• Wireless network topologies, cellular topology, cell fundamentals, capacity expansion techniques, network planning for CDMA systems. • Hands on Lab	5
Introduction to Wireless LAN	• ISM band, 802.11a/b/g wireless standards • Adhoc, infrastructure mode of WLAN, Access Point in Repeater Mode • Security in WLAN, MAC Filtering, WEP/WPA • Evaluation of WLAN, Wireless Home Networking, IEEE 802.11 standard for WLAN • Hands on Lab	30
GSM and TDMA Technology:	• What is GSM? GSM Services and features, system architecture, Call Establishment Mechanism, Handover Mechanism, Security Mechanism. • Hands on Lab	10
CDMA Technology	• What is CDMA? CDMA Forward channel, CDMA Reverse channel, packet & frame formats, mobility management • Hands on Lab	10
Mobile Data Networks	• What is mobile Data?, GPRS, Mobility Support in GPRS, Short Messaging Service in GSM, Wireless Application Protocol (WAP) • Hands on Lab	10
Bluetooth Technology	• Introduction to Bluetooth technology, Overall architecture, protocol stack, physical connection, MAC mechanism, connection management. • Hands on Lab	15
Overview of Wireless Broadband Networking	• Planning and designing wireless Broadband, satellite communications and application. • Hands on Lab	10

 Name of Unit of Qualification   : Information Security

Duration : 120 Hours

Topics : Information Security

Performance Criteria (OUTCOME) No.	Contents	Hrs.
Introduction to Information Security	• Information Security: Introduction, History of Information security, What is Security, CIA Security Model, Introduction-Characteristics of Networks, Security Concepts,–Kinds of security breaches – Threats and Risks, Points of vulnerability • Attacks – Passive and Active, Security Services, Confidentiality, Authentication, Non-Repudiation, Integrity, Access Control, Availability, Components of Information System. • Hands on Lab	5
Cryptography	• Concepts and Techniques, symmetric and asymmetric key cryptography, Symmetric key Ciphers, and Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Diffie-Hellman Key exchange • Message Authentication and Hash Functions: Authentication requirements and functions, MAC and Hash Functions, MAC Algorithms: Secure Hash Algorithm, Whirlpool, HMAC, Digital signatures, X.509, Kerberos. • Hands on Lab	10
Security at Layers	• Security at layers (Network, Transport, Application): IPSec, Secure Socket Layer(SSL), Transport Layer Security (TLS), Secure Electronic Transaction(SET), Pretty Good Privacy(PGP), S/MIME • Hands on Lab	10
Intruders, Virus and Firewalls	• Intruders, Intrusion detection, password management, Virus and Related threats, Countermeasures, Firewall design principles, Types of firewalls • Hands on Lab	10
Protocols weaknesses in TCP/IP and other protocols	• Buffer overflow, brute force attacks, protocols attacks, cross site and other CGI vulnerabilities etc, Spoofing, Denial of service, Operating system Hardening, Internet protocols and security SSL.TLS, IPSec, SSH, Application security, WWW Security ,Secure Email. Antivirus, Network scanners, • Firewall, IDS, Log analysis, Security Infrastructure, PKI, VPN, Ecommerce, security, Security Audits, Asset classification and Risk Analysis,Audit Trail, Reporting, Passwords, shadow files, one-time passwords, Bio-metric based identification and authentication systems. Smart cards. Kerberos. • Hands on Lab	10
Introduction to Ethical Hacking	• Ethical Hacking Terminology, Different Types of Hacking Technologies, Different Phases Involved in Ethical Hacking and Stages of Ethical Hacking: Passive and Active Reconnaissance, Scanning, Gaining Access, Maintaining Access, Covering Tracks, • Types of Hacker Classes, Skills Required to Become an Ethical Hacker, Vulnerability Research, Ways to Conduct Ethical Hacking, Creating a Security Evaluation Plan, Types of Ethical Hacks, Testing Types, Ethical Hacking Report ,Footprinting and Social Engineering, Footprinting, Information Gathering Methodology • Competitive Intelligence, DNS Enumeration Whois, and ARIN Lookups, Types of DNS Records, Traceroute, E-Mail Tracking	10

	,Web Spiders , Social Engineering, Common Types Of Attacks, Insider Attacks, Identity Theft, Phishing Attacks, Online Scams, URL Obfuscation, Social-Engineering Countermeasures. • Hands on Lab	
Scanning and Enumeration	• Scanning, types of Scanning , Scanning Methodology ,Ping Sweep Techniques, Nmap Command Switches, SYN, Stealth, XMAS, NULL, IDLE, and FIN Scans, TCP Communication Flag Types, War-Dialling Techniques, Banner Grabbing and OS Fingerprinting Techniques, Proxy Servers, Anonymizers, HTTP Tunnelling Techniques • IP Spoofing Techniques , Enumeration, Null Sessions, SNMP Enumeration, Steps Involved in Performing Enumeration System Hacking Understanding Password-Cracking Techniques, Understanding the LanManager Hash Cracking Windows 2000 Passwords, Redirecting the SMB Logon to the Attacker SMB Redirection, SMB Relay ,MITM Attacks and Countermeasures NetBIOS DoS Attacks, Password-Cracking Countermeasures, Understanding Different Types of Passwords Passive Online Attacks, Active Online Attacks, Offline ,Attacks Non electronic Attacks, Understanding Key loggers and Other Spyware Technologies • Hands on Lab	10
Hiding Techniques and Privilege Escalation	• Understand Escalating Privileges, Executing Applications, Buffer Overflows, Understanding Rootkits, Planting Rootkits on Windows Machines, Rootkit Embedded TCP/IP Stack Rootkit, Countermeasures, Understanding How to Hide Files, NTFS File Streaming NTFS Stream, Countermeasures, Understanding Steganography Technologies, Understanding How to Cover Your Tracks and Erase Evidence, Disabling Auditing, Clearing the Event Log • Hands on Lab	10
Trojans, Backdoors, Viruses, and Worms	• Trojans and Backdoors, Overt and Covert Channels, Types of Trojans, Reverse-Connecting Trojans, Netcat Trojan ,Indications of a Trojan Attack, Wrapping, Trojan Construction Kit and Trojan Makers ,Countermeasure Techniques in Preventing Trojans, Trojan-Evading Techniques, System File Verification Sub objective to Trojan Countermeasures Viruses and Worms, Difference between a Virus and a Worm, Types of Viruses, Understand Antivirus Evasion Techniques, Understand Virus Detection Methods Sniffers • Hands on Lab	10
Protocols Susceptible to Sniffing	• Active and Passive Sniffing, ARP Poisoning, Ethereal Capture and Display Filters, MAC Flooding, DNS Spoofing Techniques, Sniffing Countermeasures Denial of Service and Session Hijacking Denial of Service, Types of DoS Attacks, DDoS Attacks, BOTs/BOTNETs, "Smurf" Attack, "SYN" Flooding, DoS/DDoS Countermeasures, Session Hijacking, Spoofing vs. Hijacking, Types of Session Hijacking, Sequence Prediction, Steps in Performing Session Hijacking, Prevention of Session Hijacking • Hands on Lab	10
Web Application Vulnerabilities	• Hacking Web Servers, Web Application Vulnerabilities, and Web-Based Password Cracking Techniques, Hacking Web Servers, Types of Web Server Vulnerabilities, Attacks against Web Servers, IIS Unicode Exploits, Patch Management Techniques,	10

	Web Server Hardening Methods Web Application Vulnerabilities, Objectives of Web Application Hacking, Anatomy of an Attack, Web Application Threats, Google Hacking, Web Application Countermeasures Web-Based Password Cracking Techniques, Authentication Types, Password Cracker, Password Attacks: Classification ,Password Cracking Countermeasures SQL Injection and Buffer Overflows SQL Injection, Steps to Conduct SQL Injection, SQL Server Vulnerabilities, SQL Injection • Countermeasures Buffer Overflows, Types of Buffer Overflows and Methods of Detection, Stack Based Buffer Overflows, Buffer Overflow Mutation Techniques • Hands on Lab	
OS Hardening	• Windows & Linux Hardening Methods, Penetration Testing Methodologies, Security Assessments, Penetration Testing Methodologies, Penetration Testing Steps, Pen-Test Legal Framework , Automated Penetration Testing Tools • Hands on Lab	5
Introduction to Network infrastructure security	• Internet infrastructure, key components in the internet infrastructure, internet infrastructure security • Switch Security: Introduction, How switches can be attacked, • Router Security: Over view of Internet routing, External and internal attacks, RIP attacks and countermeasures, OSPF attacks and countermeasures, BGP Attacks and countermeasures • DNS Security, Introduction, DHCP attacks, DNS attacks • Hands on Lab	10

Name of Unit of Qualification : **Communication and Soft Skill**
Duration : **10 Hours**
Topics : **Communication and Soft Skill**

Performance Criteria(OUTCOME) No.	Contents	Hrs.
Acquiring Communication Skill	• Communication , verbal and non-verbal communication	6
Managing career, staff and professional relationships	• Building professional relationship, Relationship at work , Making the most of personal and professional relationships, Competency Description, Managing Difficult Business Relationships	6
Preparing for interview	• Interview Techniques: Planning For The Interview, Preparing for an Interview, Interview Formats, Stages Of The Interview, Types Of Interview Questions • Best Bet for Interview Preparation: Mock Interviews, The Benefits of Mock Interviews Experience & Skills, • Curriculum Vitae:Overview, types of CV, Covering letter, Writing a Resume, Acceptance Letter, Thank You Letter	8