

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT**COURSE CURRICULUM****COURSE TITLE: NETWORK MANAGEMENT AND ADMINISTRATION
(COURSECODE: 3360703)**

Diploma Programmes in which this course is offered	Semester in which offered
Computer Engineering	Sixth

1. RATIONALE

To access remote programs, data, and hardware resources lying either on the same organization's computers or from other enterprises or public sources for resource sharing, e-commerce, use of social network etc, connecting the IT resources is the prime requirement of today. The computer networks provide communication possible. In this scenario the management and administration of network in effective manner becomes an important aspect. The course introduces students to the fundamentals of network management, primarily for TCP/IP networks. The students of this course will be able to design, install, configure and experience hands-on management of typical network components. They will also be able to administer and manage the network. After learning this course student will be employable in the industry working in the area of network installation and management or they can start their own business providing hardware and software solutions to different organization in the area of networking.

2. COMPETENCY

The course content should be taught and implemented with the aim to develop required skills in the students so that they are able to acquire following competency:

- **Plan, install, configure, administer and manage a computer network**

3. COURSE OUTCOMES

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

- Explain Directory Services and Remote Access
- Set-up and use Virtual Private Network
- Explain Network protocols and services
- Install and configure Network server operating system
- Configure various services on Windows server platform
- Troubleshoot Network

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PA	ESE	PA	200
3	0	4	7	70	30	40	60	

Legends: L-Lecture; T – Tutorial/Teacher Guided Theory Practice; P - Practical; C – Credit
ESE - End Semester Examination; PA - Progressive Assessment.

5. COURSE CONTENT DETAILS

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit – I Exploring Directory Services and Remote Access	1a.Describe Directory Service 1b.Describe different Directories Access Protocols.	1.1 Directory Services: Define Directory Service, Definition of Novelle Directory, Windows Domain, MS Active Directory, X500 Directory Access Protocol, Lightweight Directory Access Protocol, Forests, Trees, Roots and Leaves.
	1c.Describe Active Directory Architecture. 1d.Write LDAP Notation. 1e.Identify Globally unique identifiers.	1.2 Active Directory Architecture: Object Types, Object Naming, Canonical Names, LDAP Notation, Globally unique identifiers, User Principle Names, Domain, Trees & Forests.
	1f.Set-up Remote Network Access. 1g. Explain PSTN, ISDN, DSL, CATV.	1.3 Remote Network Access: Need of Remote Network Access, PSTN, ISDN, DSL, CATV.
	1h. Set-up and configure VPN. 1i. List VPN Protocols.	1.4 Virtual Private Network: VPN Protocols, Types of VPN, VPN Clients, SSL VPNs.
Unit– II Network Protocols and Services	2a.Explain DHCP architecture & RARP. 2b. Differentiate various IP addressing schemes.	2.1 Dynamic Host Control Protocol(DHCP): DHCP Origins, Reverse Address Resolution Protocol (RARP), The Bootstrap Protocol (BOOTP), DHCP Objectives, IP Address assignments, DHCP Architecture.

Unit	Major Learning Outcomes	Topics and Sub-topics
	2c. List DNS Objectives. 2d. Draw DNS Hierachy. 2e. Describe Name Resolutions. 2f. List Resolvers. 2g.Explain DNS registration process.	2.2 Introduction to Domain Name Systems (DNS): DNS Objectives, Domain Naming, Top Level Domains, Second Level Domains, Sub-domains, DNS Functions, Resource Records, DNS Name Resolution, Resolves, DNS Requests, Root Name Servers, Resolving a Domain Name, DNS Name Registration.
	2h. Set-up Local and network Print Devices.	2.3 Network Printing Concepts: Locally Connected Print Devices, Setting up local Print Devices, Shared Print Devices, Sharing Locally Attached Print Devices, Describe Windows Network Printing and Add print Wizard.
Unit– III Network Planning and Implementation	3a. Design and configure a small Network. 3b. List out Network Applications.	3.1 Designing Network – Accessing Network Needs, Applications, Users, Network Services, Security and Safety, Growth and Capacity Planning, Meeting Network Needs – Choosing Network Type, Choosing Network Structure, Choosing Servers.
	3c. Install and Configure Windows Server. 3d. Create Domain controller.	3.2 Installing and Configuring Windows Server - Preparing for Installation, Creating windows server boot disk, Installing windows server, Configuring server/ client. 3.3 Setting windows server - Creating Domain controller, Adding the DHCP and WINS roles, Adding file server and print server, Adding Web based Administration.

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit– IV Network Configuration	4a. Manage User Accounts and Security Group.. 4b. Administer shared resources. 4c. Configure back-up and print Server.	4.1 Working With User Accounts - Adding a User, Modifying User Account, Deleting or Disabling a User Account. 4.2 Working With Windows Security Groups – Creating Group, Maintaining Group Membership. 4.3 Working with Shares – Understanding Share Security, Cresting Shares, Mapping Drives 4.4 Administering Printer Shares – Setting up Network Printer 4.5 Working with Windows Backup – Using Windows Servers Backup Software
Unit– V Troubleshooting of Networking	5a. Troubleshoot Network faults. 5b. Set Priorities. 5c. Work with network troubleshooting tools.	5.1 Understanding the Problem – Troubleshooting, Segmenting the Problem, and Isolating the Problem, Setting Priorities. 5.2 Troubleshooting Tools – Hardware Tools, Software Tools, Monitoring and Troubleshooting Tools
	5d. Assign files permissions to users/groups.	5.3 Internal Security – Account Security, File and Directory permissions, Practices and user education

6. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (Theory)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Exploring Directory Services and Remote Access	08	04	04	04	12
II	Network Protocols and Services	10	06	06	06	18
III	Network Planning and Implementation	10	04	06	06	16
IV	Network Configuration	08	02	04	08	14
V	Troubleshooting of Networking	06	00	04	06	10
	Total	42	16	24	30	70

Legends: R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

7. SUGGESTED LIST OF EXERCISES/PRACTICALS

The practical/exercises should be properly designed and implemented with an attempt to develop different types of cognitive and practical skills (*Outcomes in cognitive, psychomotor and affective domain*) so that students are able to acquire the competencies.

Following is the list of practical exercises for guidance.

Note: Here only outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of Programme Outcomes/Course Outcomes in affective domain as given in a common list at the beginning of curriculum document for this programme. Faculty should refer to that common list and should ensure that students also acquire those Programme Outcomes/Course Outcomes related to affective domain

NOTE: In all the Practical Exercise, the configurations and operations have to be performed on windows platform except where O. S. is specified.

S. No.	Unit No.	Practical Exercises (Outcomes' in Psychomotor Domain)	Hrs. required
1	I	Execute Basic TCP/IP utilities and commands. (eg: ping, ipconfig, tracert, arp, tcpdump, whois, host, netsat, nslookup, ftp, telnet etc...)	02
2	I	Configure a router (Ethernet & Serial Interface) using router commands including access lists on any network simulator (eg. packet Tracer)	04
3	I	Configure VPN components and Set-up VPN.	05
4	I/III	Design and implement small network using actual physical	04

S. No.	Unit No.	Practical Exercises (Outcomes' in Psychomotor Domain)	Hrs. required
		components with IP address scheme	
5	I	Configuration of the following a) Remote Login Service – TELNET/SSH b) Configuration of FTP server and accessing it via FTP Client.	04
6	II	Setting up and Configuring Local Print Device and Network Print Device	02
7	III	Creating Windows Server Boot Disk.	01
8	III	Installing Windows Server	02
9	III	Installing and configuring Linux Server	03
10	III	Configure following services on Linux server: i) Managing User accounts and device configuration	02
11	III	ii) Configure and use Telnet and VNC	02
12	III	iii) Windows connectivity through Samba Server	03
13	III	iv) Configure web server and FTP server	02
14	III	v) Configure proxy server	01
15	III	Installing Active Directory & Creating AD Objects	04
16	III	Create Domain Controller	03
17	IV/V	Create new Users & assign privileges/ Permission.	02
18	IV	Modify/ Delete/Deactivate Users and groups	02
19	IV	Configure Print Server & Backup Server	04
20	V	Identify, Segment Network Faults and troubleshoot	04
21	V	Manage Microsoft Windows Internet Security Services (WINS)	04
22	V	Manage Microsoft Certificate Services.	03
23	IV/V	Manage Desktop Configuration using Group Policy & Remote Installation Services.	03
Total Hours (Perform any practical from above for total 56 hours duration so that all of the units are covered)			66

8. SUGGESTED LIST OF STUDENT ACTIVITIES

Following is the list of proposed student activities like:

- i. Visit to various network service providers' site.
- ii. Survey of latest tools available to manage and administering website, and its presentation
- iii. Presentation/demonstration of assigned project.

9. SPECIAL INSTRUCTIONAL STRATEGIES (if any)

- i. Concepts should be introduced in classroom input sessions and by giving demonstration through projector.
- ii. More focus should be given on practical work which will be carried out in laboratory sessions. If possible some theory sessions may be conducted in labs so that theory and practice can go hand in hand.
- iii. Group Discussion and presentation of live websites related to networking
- iv. Faculty should allow students to use their creativity and let them struggle to learn on their own during practical sessions. However, faculty should remain around the students and should help them when they are stuck.

10. SUGGESTED LEARNING RESOURCES**A) List of Books:**

S. No.	Title of Book	Author	Publication
1.	The Complete Reference Networking	Craig Zacker	Tata McGraw Hill
2.	The Real World Network Troubleshooting Manual	Alan Sugano	Firewall Media
3.	Networking A Beginner's Guide	Bruce Hallberg	Tata McGraw-Hill
4.	Introduction to Networking	Bruce Hallberg	Tata McGraw-Hill
5.	Networking + Certification Training Kit	Richard A. McMahon, Sir	Microsoft Press
6.	MCSE Training Kit Networking Essential Plus	Microsoft Press	MicroSoft Press

B) List of Major Equipment/ Instrument with Broad Specifications

- i. Computer System with latest configuration and memory, laptops, servers
- ii. Open source Free software for Network Management & Administration.
- iii. Multimedia projector
- iv. Internet Access
- v. Access to library resources
- vi. Crimping Tool & Cable Tester.
- vii. Cable samples.

C) List of Software / Learning Websites

- i. Software: Microsoft windows operating system vista7/8 and windows 2008/2012 server, linux server. VNC Server
- ii. Hardware: Switches, Routers, Practical kits
- iii. For TCP/IP commands: <http://commandwindows.com/tcpiputil.htm>
- iv. For router configuration: <https://perso.ens-lyon.fr/christophe.crespelle/enseignements/ASR/cisco-config.pdf>
- v. Active directory services :
<http://www.serverwatch.com/tutorials/article.php/1474461/Active-Directory-Tutorial-A-Quick-Start--Set-Up-Guide.htm>

11. COURSE CURRICULUM DEVELOPMENT COMMITTEE**Faculty Members from Polytechnics**

- **Prof. P. P. Kotak**, H. O. D Computer Department, A. V. P. T. I., Rajkot
- **Prof. R. M. Shaikh**, H.O.D Computer Department, K. D. Polytechnic, Patan
- **Prof. K. N. Raval**, H.O.D Computer Department, R. C. Technical Institute, Ahmedabad
- **Prof. (Ms.) Manisha P. Mehta**, Sr. Lecturer in Computer Technology, K. D. Polytechnic, Patan
- **Prof R. M. Shah**, Sr. Lecturer in Computer Technology, Government Polytechnic, Ahmedabad.
- **Prof. S. R. Solanki**, Sr. Lecturer in Computer Engg., Government Polytechnic, Dahod

Coordinator and Faculty Members from NITTTR Bhopal

- **Dr. Shailendra Singh**, Professor and Head, Department of Computer Engineering and Applications,
- **Dr. R. K. Kapoor**, Associate Professor, Department of Computer Engineering and Applications,