GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME : DIPLOMA IN INFORMATION TECHNOLOGY

LEVEL NAME : PROFESSIONAL COURSES

COURSE CODE : IT405E

COURSE TITLE : NETWORK ADMINISTRATION AND SECURITY

PREREQUISITE : Nil

TEACHING SCHEME : TH: 03; TU: 00; PR: 04(CLOCK HRs.)

TOTAL CREDITS : 05 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)

TH. TEE : 03 HRs

PR. TEE : 02 HRs (Internal)

PT : 01 HR

❖ RATIONALE:

Engineering students must be able to use basics of computer and its security in real time environment. This course increases student's ability towards troubleshooting the problems occurred regarding security of computer and its network. It also describes basics of attacks occurred over the computer in the network. This subject is network application based subject. It gives the practical knowledge of designing computer network while using any type of topologies. This subject covers the installation and configuration of any network operating system. With the proper configuration of operating system on the server, the students will manage and administer the network resources or devices such as printers, scanner, driver and also software like files, folders, directories, applications, programs etc.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Justify the solutions for real world problems regarding security of computer.
2. Design the computer network.
3. Configure the networking resources and software from the server.
4. Troubleshoot network devices in the case of breakdown.
5. Use the different types of network technologies for internet connection.
6. Identify and repair the network faults

❖ **COURSE DETAILS:**

A. THEORY :

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	Hrs.
1. Introduction to security	1. Describe need of computer security 2. State the importance of security 3. State security goals 4. State Hackers classification	1.1 Define 'Secure' , Protecting Valuables, Characteristics of Computer Intrusion 1.2 Attacks – Vulnerabilities, Threats , 1.3 Attacks and Control Methods, Motive, Opportunity, Malware: Viruses, Logic bombs 1.4 The Meaning of Computer Security – Security Goals , Computer criminals: Amateurs, Crackers or Malicious Hackers, Career Criminals, Terrorists 1.5 Method's of Defense Hacking as Defense mechanism, The Methodology of Hacking , Classification of hackers & controls	**6**
2. Security Alerts	1. Define different terms related to physical security 2. Describe the various types of security Techniques 3. State security Policies	2.1 Role of people in security : Password selection, Piggybacking, Shoulder surfing, Dumpster diving, Installing unauthorized software/ Hardware. Security awareness, Individual user responsibilities, Security policies, standards, procedures and guidelines 2.2 Physical security : Access controls 2.3 Biometrics : finger prints , hand prints , Retina detect patterns, voice patterns, signature and writing patterns, keystrokes, 2.4 Weak / Strong Passwords and Password Cracking , Insecure Network connections 2.5 Malicious Code 2.6 Programming Bugs 2.7 Cyber crime and Cyber terrorism	**8**

3. Security in Network	1. State various private Network 2. State reasons behind Network Vulnerability. 3. Describe types of firewall. 4. State the various types of Network security 5. Differentiate between Different firewalls. 6. Determine the type of network from the given diagram. 7. Determine the type of firewall from the given features of firewall.	3.1 Network Concepts - The Network , Media , Protocols 3.2 Types of Networks Threats in Network Reasons behind Network Vulnerability. Categories of Attack 3.3 Firewalls : Define Firewall, Design of Firewall, Types of Firewalls , Personal Firewalls, Comparison of Firewalls 3.4 Intrusion Detection System - Types of IDs, Goals for Intrusion Detection System , IDs strengths and Limitations 3.5 IP security - Overview , Architecture, IPSec configurations, IPSec security	**8**
4. Introduction to Directory Services and Remote Network Access	1. Define various terms related to Networking 2. Describe overview of Directory Services 3. List the features of Windows NT domain 4. Classify PSTN, DSL and VPN. 5. Describe various duties of Network Administrator. 6. Describe various duties of Network Engineer. 7. Describe various roles played by Network Architecture.	4.1 Network Related Jobs – Network Administrator, Network Engineer 4.2 Network Architecture / Designer 4.3 Directory Services - Define Directory Services, Definition of Novell Directory 4.4 Windows NT domains, Microsoft's Active Directory 4.5 Active Directory Architecture – Object Types, Object Naming 4.6 Globally unique identifiers User Principle Names 4.7 Public Switched Telephone Network, Integrated Services Digital Network 4.8 Digital Subscriber Line 4.9 Virtual Private Network – VPN Protocols, Types of VPNs, VPN Clients, SSL VPNs	**8**
5. Designing Network	1. Describe various terms related to Network services 2. Write the steps for installation and configuration of server – client based network 3. Write the steps for configuring the settings for creating the Domain controller 4. Design the Network referring to given	5.1 Designing Network – Accessing Network Needs, Applications, Users 5.2 Network Services, Security and Safety 5.3 Meeting Network Needs – Choosing Network Type, Choosing Network Structure 5.4 Choosing Servers 5.5 Installing and Configuring Windows 2003 Server - Preparing for Installation	**9**

	requirements. 5. Write the steps for creating the bootable disk.	5.6 Creating windows 2003 server boot disk, Installing windows 2003 server 5.7 Configuring server/ client 5.8 Adding the DHCP and WINS roles, Adding file server and print server 5.9 Adding Web based Administration	
6. Administering Windows 2003 Server (The Basics)	1. List various steps for creating user accounts in windows 2003 server and its related features 2. Describe the Encryption service 3. Illustrate the various security issue 4. State the steps for installing local and network printer 5. Write the steps to take the backup from Windows 2003 server. 6. Troubleshoot the different problems while connecting the printer to computer.	6.1 Working With User Accounts - Adding a User, Modifying User Account 6.2 Deleting or Disabling a User Account 6.3 Working With Windows 2003 Security Groups – Creating Group 6.4 Public Key Encryption Services 6.5 Working with Shares – Understanding Share Security 6.6 Creating Shares, Mapping Drives 6.7 Administering Printer Shares – Setting up Network Printer 6.8 Working with Windows 2003 Backup – Using Windows 2003 Servers, Backup Software 6.9 Understand Network Printing Concepts 6.10 Locally connected print devices : Setting up local print devices 6.11 Shared print devices, Sharing Locally Attached Print Devices 6.12 Windows Network Printing, Add Print Wizard	**9**
		Total Hrs.	**48**

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1.	Install Linux server and analyze networking features of Linux	Security Alerts	**04**
2.	Install and configure DNS on Linux		**04**
3.	Perform access control work on Linux	Security in Network	**04**
4.	Configuration of Firewalls on Linux		**04**
5.	Install Windows 2003 Server and note its important features	Administering Windows 2003 Server	**04**
6.	Write the steps for Creating AD Object and perform it on Windows 2003	Designing Network	**02**
7.	Create New users in Windows 2003 server and assign different privileges to them		**02**
8.	Create Windows 2003 Server Boot Disk required for the installation	Administering Windows 2003 Server	**04**
9.	Install Active Directory in windows 2003 server platform		**04**
10.	Write the steps required for the installation of a Local printer in Windows 2003 server environment, and also test this installation from the another PC		**02**
11.	Write the steps required for the installation of a Network printer in Windows 2003 server environment, and also test this installation from the another PC		**04**
12.	Install Hardware Firewall and configure it for its optimum utilization	Security Alerts	**04**
13.	Install UTM (Unified Threat Management) and configure it for its optimum utilization		**04**
14.	Identify the performance of cryptography work on Windows for encryption		**04**
15.	Prepare a report on Latest Networking Technology in use.	-	**12**
		Skill Assessment	**02**
		Total	**64**

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Introduction to Security	02(02)	08(04)	00(00)	**10(06)**
02	Security Alerts	04(04)	08(04)	00(00)	**12(08)**
03	Security in Network	00(02)	04(04)	06(00)	**10(06)**
04	Introduction to Directory Services and Remote Network Access	04(00)	10(06)	00(00)	**14(06)**
05	Designing Network	02(04)	04(04)	06(00)	**12(08)**
06	Administering Windows 2003 Server	08(00)	04(00)	00(06)	**12(06)**
	Total	**20(12)**	**38(22)**	**12 (06)**	**70 (40)**

R – Remember U – Understand A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	4	R	2	5	R	2	6	R	2	4	R	2	1	R	2	**5/7**
	3	R	2																
02	1	U	4	2	U	4	3	U	4	5	U	4	2	R	4				**3/5**
03	1	U	4	2	U	4	4	U	4	5	U	4	3	U	4				**3/5**
04	2	R	4	5	U	4	6	U	4	1	U	4	2	U	4				**3/5**
05	3	A	6	4	U	6	6	A	6										**2/3**
06	5	A	6	6	R	6	4	U	6										**2/3**

T= Unit/Topic Number L= Level of Question M= Marks

R-Remember U-Understand A-Analyze/ Apply

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	**CA** (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	**70**	**28**	Theory Answer Sheets	1, 2, 3
				Total	**100**	**40**		
Direct Assessment Practical	**CA** (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	**25**	**10**		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	**50**	**20**	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ SCHEME OF PRACTICAL EVALUATION

Sr. No.	Description	Max. Marks
1	Explain the concept given in problem definition on answer sheet.	10
2	Installation/configuration of given problem definition	20
3	Viva Voce	20
	TOTAL	**50**

❖ MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	3	-	-	-	-	3	3	3
2	-	3	-	-	3	-	-	-	-	3	3	3
3	-	3	-	-	3	-	-	-	-	3	3	3
4	-	3	3	3	3	-	-	3	3	3	3	3
5	-	3	3	3	3	-	-	3	3	3	3	3
6	-	3	3	3	3	-	-	3	3	3	3	3

❖ REFERENCE & TEXT BOOKS:

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Upgrading and Troubleshooting Networks	Craig Zacker, Osborne/McGraw-Hill, 2nd Edition, 2000	13: 978-0072122565
2.	Networking : A beginner's guide	Bruce Hallberg, Mc Graw Hill Education Inc., 6th Edition, 2015	13-978-93-5134-472-8
3.	Computer Network	Andrew S. Tanenbaum & David J Wetherall, Pearson Educational Inc., 5th Edition, 2011	13:978-93-325-1874-2
4.	Cryptography & Network Security	William Stallings, Pearson Educational Inc., 6th Edition, 2014	13: 9780133354690
5.	Networking Essentials	Mark A Sportack, Sams Publishing; 1st Edition, 2006	13: 978-0672312106
6.	Local Area Networks	Gerd Keiser, 2nd edition, Tata Mc Graw Hill, 2002	10:0-07-052904-3

❖ **E-References :**

- http://nptel.ac.in/courses/106105081/37
  accessed on 02nd September 2016
- http://www.juniper.net/techpubs/en_US/junos15.1/information-products/pathway-pages/network-management/network-management.pdf
  accessed on 02nd September 2016
- https://www.researchgate.net/publication/221538483_Computer_network_management_Theory_and_practice
  accessed on 02nd September 2016
- http://www.usi.edu/business/aforough/Chapter%2020.pdf
  accessed on 02nd September 2016
- http://www.thebabbgroup.com/docs/Week%206%20Network%20Administration.ppt
  accessed on 02nd September 2016
- http://staffweb.itsligo.ie/staff/pflynn/Server%20Management%201/Lecture%2012%20-%20Introduction%20to%20Network%20Administration.ppt
  accessed on 02nd September 2016

❖ **LIST OF MAJOR EQUIPMENTS / INSTRUMENTS WITH SPECIFICATION**

1. Network Lab with all PC connected in LAN or WIFI
2. Computers with Core2Duo and above
3. 24 port Switches, Wi-Fi Modems, Router, Firewall, UTM
4. Troubleshooting kit for Network

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1	Mrs. A. R. Mahajan	Head, Information Technology	Government Polytechnic, Nagpur.
2.	Mr. S. P. Lambhade	Head of Department in Computer Engineering	Govt. Polytechnic, Nagpur
3.	Lekhraj D. Vilhekar	Lecturer in Information Technology	Government Polytechnic, Nagpur.
4.	Mrs. V. A. Raje	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
5.	Miss. I. G. Lokhande	Lecturer in Information Technology	Government Polytechnic, Nagpur.
6.	Shri. Atul Upadhyay	CEO	Vista Computers , Ram Nagar, Nagpur
7.	Shri. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri, Nagpur
8.	Shri. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur

(Member Secretary PBOS) **(Chairman PBOS)**