GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	**:**	**DIPLOMA IN INFORMATION TECHNOLOGY**
LEVEL NAME	**:**	**PROFESSIONAL COURSES**
COURSE CODE	**:**	**IT407E**
COURSE TITLE	**:**	**INTERNETWORKING WITH TCP/IP**
PREREQUISITE	**:**	**NIL**
TEACHING SCHEME	**:**	**TH: 03 TU: 00 PR: 00 (1 CREDIT = 1 CLOCK HR.)**
TOTAL CREDITS	**:**	**03 (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)**
TH. TEE	**:**	**03 HRs**
PR. TEE	**:**	**NIL**
PT.	**:**	**01 HR**

❖ RATIONALE:

In today's Information Technology industry Computer Network has become an essential part of computer system. Hence it is necessary for the students to make use of Computer Networks and understand concept of TCP/IP Protocol Suite. In recent years, the rapid increase of mobile computing devices like personal digital assistants (PDA), personal computers and laptops has driven a revolutionary change in the computing world. Internet services have grown rapidly and millions of people are using these services in their day to day life. The proliferation of mobile computing devices with improved processing capabilities allows mobile users to connect to the global Internet. The impact of this phenomenal growth changes the modality of communicating and increases its challenges. This course will help students to acquire knowledge about TCP/IP, their requirement, protocols, Architecture, Applications and Utilities.

❖ COURSE OUTCOMES :

After completing this course students will be able to –

1. Configure different versions of Ethernet and their operations
2. Perform IP addressing and sub-netting
3. Perform the operation of protocols - such as IP, TCP, UDP and application layer protocols
4. Implement TCP/IP protocol Architecture
5. Determine TCP/IP Applications and its Utilities
6. Troubleshoot small office networks

❖ **COURSE DETAILS :**

A. THEORY :

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	HOURS
1. Introduction to Network Protocols	1. Define / explain various terms related to TCP / IP 2. Describe overview of types of protocols 3. Explain comparative features of TCP/IP and OSI model 4. Analyze TCP/IP and OSI model	1.1 What is TCP/IP Protocol Suite:-IP, ARP, RARP, ICMP, IGMP, UDP, TCP, SCTP 1.2 What is IPX/SPX 1.3 Apple Talk 1.4 TCP/IP 1.5 Comparing Features of TCP/IP model and OSI Model 1.6 Sub-netting and Super-netting	**08**
2. Introduction to TCP/IP Suite	1. Define and Explain the Architecture of TCP/IP 2. Describe the TCP/IP DoD model & protocol suit 3. Enlist TCP/IP protocols 4. Difference between TCP and UDP 5. Describe the Flow control and Multiplexing in TCP/IP 6. Explain the applications of ICMP 7. Describe the BOOTP and DHCP 8. Interpret the ICMP, ARP and RARP	2.1 TCP/IP Architecture 2.2 TCP/IP DoD model 2.3 Block diagram of TCP/IP protocol suite 2.4 Different protocols in TCP/IP 2.5 TCP- connection oriented services 2.6 Flow control 2.7 Multiplexing 2.8 UDP- Connectionless services 2.9 Internet Control Message Protocol (ICMP) 2.10 Bootstrap Protocol – BOOTP 2.11 DHCP 2.12 IP – ICMP, ARP and RARP	**10**
3. TCP/IP Addresses	1. Define and Explain Unicast IP 2. Describe the Multicast IP and multicast streaming 3. Describe the Broadcast IP 4. Discuss the difference between Multicasting and Multiple unicasting 5. Enlist TCP/IP port numbers 6. Reconstruct the TCP/IP Port numbers	3.1 Unicast IP 3.2 Multicast IP and multicast streaming 3.3 Broadcast IP 3.4 Multicasting verses Multiple unicasting 3.5 TCP/IP Port numbers	**04**

Units	Specific Learning Outcomes (Cognitive Domain)	Topics and subtopics	HOURS
4. TCP/IP Applications and Utilities	1. Define and Explain related terms 2. Describe ping, ipconfig and NTP 3. Configure the BOOTP, DHCP, WINS, DNS, NAT and SNMP 4. Install IPv6 and ICMPv6 and comparison thereof. 5. Analyze IPv6 protocol for the IP	4.1 FTP, TFTP, TELNET,SMTP, POP3, IMAP, HTTP, HTTPS 4.2 Ping, ipconfig, NTP 4.3 BOOTP, DHCP, WINS,DNS, NAT, SNMP 4.4 Next Generation IPv6 & ICMPv6 4.5 Comparison between IPv6 and ICMPv6	**08**
5. IP Addresses	1. Define IP Address 2. Enlist and explain the classes of IP addressing 3. Describe Reserved IP addresses, network and host component 4. Define Subnet mask assignment 5. Define and configure sub-netting, class C sub-netting and classless addressing 6. Explain the structure of IPv6 Addresses 7. Define Address space 8. Analyze Class C sub-netting and Classless addressing	5.1 Introduction to IP Address 5.2 IP Address Classes 5.3 Reserved IP addresses 5.4 Differentiating network and host component 5.5 Subnet mask assignment 5.6 Introduction to sub-netting 5.7 Class C sub-netting 5.8 Classless addressing 5.9 IPv6 Addresses - Structure 5.10 Address space	**08**
6. Troubleshooting TCP/IP related problems	1. List and execute the commands and utilities used for troubleshooting 2. Describe the application of nslookup and dig 3. Troubleshoot problems based on Remote access 4. Illustrate the problems Based on Troubleshooting TCP/IP	6.1 Commands and Utilities used for troubleshooting 6.2 NSlookup 6.3 DIG (domain information groper) 6.4 Troubleshooting TCP/IP:- 1.Local Host Cannot Access Remote Host 2. Routing not functioning Properly on New Interface 3. Host connection Fail Using Certain Applications	**10**
		Total	**48**

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
NIL			

❖ **SPECIFICATION TABLE FOR THEORY PAPER :**

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
1.	Introduction To Network Protocols	02(00)	08(00)	00(06)	**10(06)**
2.	Introduction To TCP/IP Suite	02(02)	08(00)	06(06)	**16(08)**
3.	TCP/IP Addresses	02(00)	04(04)	00(00)	**06(04)**
4.	TCP/IP Applications And Utilities	02(04)	04(04)	06(00)	**12(08)**
5.	IP Addresses	02(00)	04(08)	06(00)	**12(08)**
6.	Troubleshooting TCP/IP Related Problems	04(02)	04(04)	06(00)	**14(06)**
Total		**14(08)**	**32(20)**	**24(12)**	**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	2	R	2	3	R	2	4	R	2	5	R	2	2	R	2	**5/7**
	6	R	2																
02	1	U	4	1	U	4	2	U	4	3	U	4	4	R	4				**3/5**
03	2	U	4	3	U	4	4	U	4	4	U	4	5	U	4				**3/5**
04	6	R	4	5	U	4	6	U	4	5	U	4	6	U	4				**3/5**
05	2	A	6	4	A	6	1	A	6										**2/3**
06	5	A	6	6	A	6	2	A	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, 4,5,6
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3, 4,5,6
	TEE (Term End Examination)	End Exam	Students	End Of the Course	**70**	**28**	Theory Answer Sheets	1, 2, 3, 4,5,6
				Total	**100**	**40**		
Direct Assessment Practical	**CA** (Continuous Assessment)	Skill Assessment	Students	Continuous	--	--	--	--
		Journal Writing		Continuous	--	--	--	--
				TOTAL	--	--		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	--	--	--	--
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:

S.N.	Description	Max. Marks
NIL		

❖ 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	-	-	-	-	1	-	-	-	3	3
2	-	3	-	-	-	-	-	-	2	2	3	3
3	-	3	-	-	-	-	-	-	2	2	3	3
4	-	3	-	-	-	-	-	2	2	2	3	3
5	-	3	-	-	-	-	-	2	2	2	3	3
6	-	3	-	-	-	-		2	2	2	3	3

❖ REFERENCE & TEXT BOOKS:

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	Inside TCP/IP	Matthew Flint Arnet, Second edition, New Riders Publishing, 1995	13: 978-1562057145
2.	TCP/IP Protocol Suite	Behrouz A. Forouzan,l Fourth Edition, TataMcGraw Hill, 2010`	13:978-0-07-070652-1
3.	Computer Network	Andrew S. Tanenbaum & David J Wetherall, Fifth edition, 2013	13:978-81-317-8757-1
4.	Computer N/T- Protocols, Standards & Interfaces	Uyless Black, Second edition, Prentice Hall Inc., 2002	10:81-203-1041-1
5.	Networking A beginners guide	Bruce Hallberg, Sixth edition, Tata McGraw Hill, 2008	13:978-93-5143-472-8
6.	TCP/IP Illustrated Volume 2	Gary R Wright & W Richard Stevens, Fourth edition, Pearson education (Singapore) , 1996	10:0-201-63346-9
7.	TCP/IP Illustrated Volume 3	W. Richard Stevens, Third edition, Pearson education (Singapore), 2001	10:81-7803-340-X

❖ E-REFERENCE:

- www.opsschool.org/en/latest/networking_101.htm
  accessed on 12th Sept 2016
- https://www.redbooks.ibm.com/redbooks/pdfs/gg243376.pdf
  accessed on 12th Sept 2016
- https://www.amazon.co.uk/Internetworking-TCP-IP-v-1/dp/0131876716
  accessed on 12th Sept 2016
- w3schools.sinsixx.com/tcpip/default.asp.htm
  accessed on 12th Sept 2016

❖ LIST OF MAJOR EQUIPMENTS / INSTRUMENTS WITH SPECIFICATION

1. Network Lab with all PC connected in LAN
2. Computers with Core2Duo and above with pre-installed windows 8.1
3. Network Lab via Cable or WIFI
4. 24 port Switches, Wifi Modems, Router
5. Troubleshooting kit for Netwo

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

S.N.	Name	Designation	Institute / Industry
1.	Dr. A. R. Mahajan	Head of Department in Information Technology	Govt. Polytechnic, Nagpur
2.	Mr. S. P. Lambhade	Head of Department in Computer Engineering	Govt. Polytechnic, Nagpur
3.	Mr. M. A. Rahman	Lecturer in Computer Engineering	Govt. Polytechnic, Nagpur
4.	Mr. Manoj Jethwa	Head of Department in Computer Technology	Shri Datta Meghe Polytechnic, Nagpur
5.	Mr. N. V. Chaudhari	Asstt. Prof.- Computer Science and Engineering	DBACER, Wanadongri, Nagpur
6.	Mr. Atul Upadhaya	Chief Executive Officer	Vista Computers, Ramnagar, Nagpur

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