

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT**COURSE CURRICULUM
COURSE TITLE: COMPUTER NETWORKS
(Code: 3340702)**

Diploma Programmes in which this course is offered	Semester in which offered
Computer Engineering	4 th Semester

1. RATIONALE

One of the major components of computer based information systems is computer networks. Through computer networks we can share hardware, Software, Processing, Data and Applications besides getting global connectivity for internet based communication and services.

For diploma students it is important to understand the function of computer networks and obtain requisite knowledge about hardware and software requirements of networks and acquire skills to establish a network using necessary hardware & software tools and configure various services over it. The objectives of this course are to make students learn the technology of establishing, commissioning (making operational) and maintaining computer networks.

2. COMPETENCY

The course content should be taught and implemented with the aim to develop different types of skills so that students are able to acquire following competency:

Use Software and hardware technology to establish, Commission (make operational) and maintain computer networks.

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.

- i. Describe various protocols, models in networks.
- ii. Explain operations of TCP, HTTP, and DNS.
- iii. Illustrate use of Subnets, Ipv4 and Ipv6 in computer networks.
- iv. Design simple computer networks.
- v. Establish and Commission simple computer networks
- vi. Identify and solve network operational problems.

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	PA	ESE	PA	150
3	0	2	5	70	30	20	30	

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

5. COURSE DETAILS

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit – I Basics of Computer Network	1 a. List the applications of Computer Networks. 1 b. Differentiate various line configurations. 1 c. Design a computer network considering particular topology. 1 d. Categories computer network based on scope and connection 1 e. Explain use of various types of servers.	1.1 Definition & history of networks 1.2 Usage of Computer Networks 1.3 Standard Organizations and Protocols 1.4 Line Configuration 1.5 Network Topology 1.6 Categories of network Based on scope Based on Connection 1.7 Applications and features of different types of servers: File server, Print Server, Mail Server, Web Server, Proxy Server
Unit – II The Reference Model for network communication	2 a. List all layers of OSI and TCP/IP. 2 b. Explain functions of each layer. 2 c. Differentiate between connection oriented and connectionless approach 2 d. Compare OSI and TCP/IP Model.	2.1 OSI model & function of each Layer 2.2 TCP/ IP model 2.3 Connection oriented v/s Connectionless approach 2.4 Comparison of OSI & TCP/IP Models
Unit – III Transmission Media	3 a. List guided and unguided transmission media. 3 b. Select appropriate transmission media for a given network.	3.1 Types of Transmission Media 3.2 Guided Media: Twisted Pair, Coaxial Cable, Fiber 3.3 Un Guided Media : Electromagnetic spectrum, Radio Transmission, Microwave Transmission, Infrared Transmission, Satellite Communication

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit IV Network devices	4 a. Explain use of various Network devices. 4 b. Differentiate Layer 2 and Layer 3 Switches. 4 c. State the use of Network Management Software.	4.1 Repeaters 4.2 Hubs 4.3 Switches 4.4 Routers 4.5 Access Points 4.6 Gateways 4.7 Bridges 4.8 Difference between Layer 2 and Layer 3 Switches. 4.9 Introduction of Network Management software
Unit V IP Protocol and Network Applications	5 a. Explain IP v4 and IP v6 protocol. 5 b. Select appropriate class for given network size. 5 c. Illustrate subnet and usage of subnet masking. 5 d. Explain DNS, Email and FTP, HTTP.	5.1 IP Protocol – IP v4, IP v6. 5.2 Addressing Schemes 5.3 Subnet & masking 5.4 DNS 5.5 Email 5.6 FTP 5.7 HTTP

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	Basics of Computer Network	8	5	5	4	14
II	The Reference Model for network communication	9	5	5	4	14
III	Transmission Media	8	4	4	6	14
IV	Network devices	8	4	4	6	14
V	IP Protocol and Network Applications	9	3	5	6	14
	Total	42	21	23	26	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 skills (**outcomes in psychomotor and affective domain**) so that students are able to acquire the competencies/programme outcomes. 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 certain outcomes in affective domain which would in turn lead to development of **Course Outcomes** related to affective domain. Thus over all development of **Programme Outcomes** (as given in a common list at the beginning of curriculum document for this programme) would be assured.

Faculty should refer to that common list and should ensure that students also acquire outcomes in affective domain which are required for overall achievement of Programme Outcomes/Course Outcomes.

S. No.	Unit No.	Practical/Exercises (Outcomes in Psychomotor Domain)	Hrs. required
1	I	Install & Test Network Interface Card.	02
2	III	Prepare and Test Straight UTP Cable.	02
3	III	Prepare and Test Cross UTP Cable.	02
4	I & III	Develop a small Network. (Hands on Training.)	04
5	IV	Install Windows 2003/Windows 2008 Network operating System	02
6	I	Install & Configure File Server.	02
7	I	Install & Configure Print Server	02
8	I	Install & Configure Mail Server	02
9	I	Install & Configure Proxy Server	02
10	I	Install & Configure Web Server	02
11	I	Install & Test Router, Repeater and Bridge.	02
12	IV	Install a small wireless network using access points.	02
13	V	Set, Configure & Test Internet.	02
Total			28

8. SUGGESTED LIST OF STUDENT ACTIVITIES

- i. Identify type of Network in your Institute.
- ii. Prepare a design of Network in your Institute
- iii. Visit your Institute server room and various places where Racks and servers installed, identify various Network components, collect information about installation of necessary hardware and software.
- iv. Visit any ISP in your area.
- v. Prepare Charts of Network Topologies.
- vi. Seminar presentations.

9. SPECIAL INSTRUCTIONAL STRATEGIES (if any)

Students should be exposed to layout of local area network installation in the institute and its technology and give an environment to establish, configure and trouble shoot a small network by giving hands on practice.

10. SUGGESTED LEARNING RESOURCES

A) List of Books

S.No.	Title of Book	Author	Publication
1.	Computer Networks	Andrew S Tannebaum	Pearson, 2012

		& David J Wetherall	
2.	Information Technology Today	S. Jaiswal	Galgotia Publications
3.	Computer Networks	Bhushan Trivedi	Oxford University Press, 2013
4.	Data Communication & Networking,	Forouzen	Tata McGraw Hill
5.	Data & Computer Communication,	Williams Stallings	Prentice Hall of India
6.	Networks for Computer Scientists and Engineers	Youlu Zheng & Shakil Akhtar	Oxford University Press, 2012

B) List of Software/Learning Websites

- i. <http://nptel.iitm.ac.in/courses.php?disciplineId=106>
- ii. <http://www.edrawsoft.com>
- iii. Network Simulator Tool: GNS3 v0.8.5, NetSimK

C) List of Major Equipment/ Instrument with Broad Specifications

- i. Computer systems
- ii. Network Cable Cat 5/Cat 6.
- iii. Crimping Tool
- iv. UTP Cable Tester
- v. Layer 2 Switch
- vi. Wireless Access point and Wireless router
- vii. Impacting Tool
- viii. Network cable connectors
- ix. Network Trainer Kit

11. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics

- **Prof. K. N. Raval**, H.O.D Computer Department, R. C. Technical Institute Ahmedabad,
- **Prof. Manisha P Mehta**, Sr. Lecturer in Computer Technology, K. D. Polytechnic, Patan.
- **Prof. Sunil R. Solanki**, Lecturer in Computer Engineering, Govt. Polytechnic Dahod.
- **Prof. Sachin D. Shah**, Lecturer in Computer Engineering, R. C. Technical Institute, Ahmedabad.

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- **Dr. R. K. Kapoor**, Associate Professor Dept. of Computer Engineering and Applications, NITTTR, Bhopal
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