

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT
COURSE CURRICULUM

Course Title: Computer Networking
(Code: 3340702)

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

1. RATIONALE

Computer Networks is the future of computer technology. It is the base through which global connectivity can be achieved. This course is aimed towards teaching basics of computer networks and provides knowledge about hardware and software requirements of computer networks. The emphasis of the course is towards the various components and software required to make a network operational.

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:

- Define types of networks.
- Define types of network architecture.
- Differentiate between distributed and centralized computing (e.g., desktop, network server, virtual server, cloud networking).
- Describe standard network LAN topologies.
- Describe variations of standard topologies (e.g., extended star, mesh, star bus, star ring).
- Describe the role of the Network Interface Card (NIC) network adapter.
- Describe various types of network adapters.
- Describe the functions of networking hardware (e.g., adapter, hub, router, switch, bridge, access point).

3. Course Outcomes:

Describe various protocols, models in networks.
Design, implement and analyze simple computer networks.
Identify, formulate and solve network engineering problems.
Explain operations of TCP, HTTP, and DNS.
Knowledge of contemporary issues in computer networks.

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	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	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 1.2 Usage of Computer Networks 1.3 Standard Organizations and Protocols 1.4 Line Configuration 1.5 Topology 1.6 Categories of network Based on scope Based on Connection 1.7 Different types of servers
Unit – II The Reference Model	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 un guided 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 IV Network devices	4 a. Explain use of various Network devices. 4 b. Differentiate Layer 2 and	4.1 Repeaters 4.2 Hubs 4.3 Switches

Unit	Major Learning Outcomes	Topics and Sub-topics
	Layer 3 Switches. 4 c. State the use of Network Management Software.	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. Define subnet and list the usage of subnet masking. 5 d. Explain DNS, Email and FTP.	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

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	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

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	Install & Test Internet.	02
Total			28

8. SUGGESTED LIST OF STUDENT ACTIVITIES

Identify type of Network in your Institute.

Prepare a design of Network in your Institute

Visit your Institute server room and various places where Racks and servers installed.

Identify various Network components in server room.

Visit any ISP in your area.

Prepare Charts of Network Topologies.

Seminars.

9. SPECIAL INSTRUCTIONAL STRATEGIES (if any)

10. SUGGESTED LEARNING RESOURCES

A) List of Books

S. No.	Title of Book	Author	Publication
1.	Computer Networks	Andrew S Tannebaum & David J Wetherall	Pearson, 2012
2.	Computer Networks	Bhushan Trivedi	Oxford University Press, 2013
3.	Data Communication & Networking,	Forouzen	TMH
4.	Data & Computer Communication,	Williams Stallings	PHI
5.	Networks for Computer Scientists and Engineers	Youlu Zheng & Shakil Akhtar	Oxford University Press, 2012

B) List of Major Equipment/ Instrument with Broad Specifications

Network Cable Cat 5/Cat 6.
Crimping Tool
Cable Tester
Layer 2 Switch
Wireless Access point and Wireless router
Impacting Tool
Network cable connectors
Network Trainer Kit

C) List of Software/Learning Websites

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

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

1. Prof. K.N.Raval ,H.O.D Computer Department, R. C. Technical Institute, Ahmedabad
2. Prof. M.P. Mehta ,Sr. Lecturer Computer Engineering Department, K. D. Polytechnic, Patan
3. Prof. Sunil R.Solanki ,Lecturer Government Polytechnic ,Dahod
4. Prof. Sachin D. Shah ,Lecturer Computer Department, R. C. Technical Institute, Ahmedabad

Coordinator and Faculty Members from NITTTR Bhopal

1. Prof. (Mrs.) Susan S. Mathew
2. Dr. Joshua Earnest