

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

COURSE CURRICULUM

COURSE TITLE: NETWORKING SYSTEM & COMMUNICATION (COURSE CODE: 3362005)

1. RATIONALE

In industries, it is required to interlink various departmental activities like designing, planning, manufacturing etc. For all such activities, they need to establish networking amongst computer of same and different departments so that data may be sent from one computer to another. For this purpose mechatronics engineers must possess the knowledge of network and networking of computers. The engineers should be able to create network of computer and communicate the data from one system to another system. This course has been therefore introduced to develop these skills in the students.

2. COMPETENCY

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

- **Establish, operate and maintain computer network systems for efficient communication.**

3. COURSE OUTCOMES

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

- i. Select required components for networking.
- ii. Apply the requisite topology and protocols.
- iii. Configure server and workstation for internet applications.
- iv. Establish the electronic communication system.
- v. Maintain the electronic communication system

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 CONTENT DETAILS

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit – I Network Overview and Components	1a. Describe Network Devices and Connector 1b. Differentiate types of network 1c. Explain various tools to install Network	1.1 Networking System: Network Hardware and Software 1.2 Types of Network: LAN,MAN,WAN 1.3 OSI model and it's seven layers 1.4 Twisted Pair, Co-axial cable and Fiber Optic Cable 1.5 Wireless Transmission Media like Infrared, Radio and Microwaves and Bluetooth. 1.6 Repeater, Bridges, Router and gateway 1.7 NIC card with suitable connectors
Unit – II Topology and Protocols	2a. Compare Peer to Peer and Client-Server Architecture 2b. Describe various topologies used for network 2c. Select topologies as per requirement 2d. Explain various protocols 2e. Apply Protocols on specific Layer.	2.1 Peer to Peer and Client-Server Architecture. 2.2 Topologies: BUS, STAR, RING, MESH, TREE and HYBRID 2.3 Protocols: TCP/IP, IPX/SPX, SMTP, POP3,UDP, FTP, HTTP.
Unit – III Server and Work station for Internet Applications	3a. Explain network commands for installation of server 3b. Explain Network Services and its features 3c. Explain types of internet connection 3d. Develop a network diagram for a given internet connection as per requirement	3.1 Network Commands 3.2 E-MAIL, TELNET, W. W. Wand FILE Transfer. 3.3 PC Dial Up and LAN Dial Up 3.4 Dedicated Leased Line.
Unit – IV Electronic Communicati on	4a. Describe communications and its types 4b. Explain types of communication channels 4c. Differentiate communication channels with the help of diagram	4.1 Use of Communication. 4.2 Structured and Types of Communication 4.3 Data Communication 4.4 Types of Channels 4.5 Electromagnetic Waves 4.6 Frequency and Wavelength 4.7 Electromagnetic Spectrum 4.8 Band width

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit – V Computers and Communication system	5a. Explain code and formats used for communication systems 5b. Explain Synchronous and Asynchronous communication systems 5c. Explain Serial and Parallel communication systems 5d. Maintain network system using different types of communication systems 5e. Describe major and minor fault diagnosis in networking system.	5.1 Issue Data Communication system 5.2 Code and its Format 5.3 Synchronous and Asynchronous 5.4 Serial and Parallel Communication 5.5 Faults in networking system.

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	Overview and Component	8	5	4	3	12
II	Topology and Protocols	10	5	7	6	18
III	Server and Work station for Internet	8	3	4	5	12
IV	Electronic Communication	8	3	7	4	14
V	Computer and Communication System	8	0	7	7	14
	Total	42	16	29	25	70

Legends: R = Remember, U = Understand, A= Apply and above Level (Bloom's revised 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)	Approx. Hours required
1	I	Identify and Select Various Network devices, Connectors, Cables	6
2	II	Troubleshoot Computer System for Network	2
3	III	Troubleshoot Work Station for Remote Booting	2
4	IV	Install Active and Passive HUB	4
5	V	Install internet Dial up Connection and It's software	6
6	VI	Configure and demonstrate internet services	2
7	VII	Troubleshoot network with Routers, Repeaters and Bridge	2
8	VIII	Data Transfer Using MODEM	2
9	IX	Demonstrate ISDN	2
Total Load			28

8. SUGGESTED STUDENT ACTIVITIES

S. No.	Activity
1	Prepare journals based on practical performed in laboratory.
2	Collect detail of all network devices.
3	Create network of two or more devices.
4	Visit any office and study the type of network they are using and list out regular problem which they are facing.

9. SPECIAL INSTRUCTIONAL STRATEGIES (if any).

S. No.	Unit No.	Unit Name	Strategies
1	I	Introducing the network devices	Physically show the devices and its working
2	II	Topology and protocols	Charts, demonstration, video etc
3	III	Create network	Physically show the demonstration for n/w creation
4	IV	Configure server	Prepare server and set its protocol
5	V	Data Communication	Demonstration

10. SUGGESTED LEARNING RESOURCES

A) Books

S. No.	Author	Title of Book	Publication
1.	Tanenbaum, Andrew S ; Wetherall, David J	Computer Networks	PHI Learning, New Delhi, 5th edition
2.	Forouzan, Behrouz A.	TCP/IP Protocol Suite	Mc-Graw Hill, New Delhi, 4th edition
3.	Forouzan, Behrouz A.	Data Communication and Networking	Mc-Graw Hill, New Delhi, 4th edition
4.	Stallings, William	Cryptography and Network Security	PHI Learning, New Delhi, 6th edition

B) Major Equipment/ Instrument with Broad Specifications

S. No.	Resource with brief specification.
1	Network Cable , RJ 45 Connectors, Clamping Tool
2	Network Switches (8 port, 16 port) , HUB
3	Repeater, bridge, stabilizer, UPS, NIC Card, MODEM, Etc...
4	Computer system with latest configuration.

C) Software/Learning Websites.

- en.wikipedia.org/wiki/Computer_network
- <http://networkwire.org/>
- <http://compnetworking.about.com/od/networkprotocols/g/protocols.htm>
- http://en.wikipedia.org/wiki/Network_topology
- http://en.wikipedia.org/wiki/Communications_systems

11. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics.

- **Prof. Bhaskar N. Patel**, Head of Computer Department, B.S.Patel Polytechnic, Kherva, Gujarat , India
- **Prof. Ankit P. Modi**, Lecturer at B. S. Patel Polytechnic, Kherva, Gujarat, India.

Coordinator and Faculty Members from NITTTR Bhopal

- **Dr. V. Somkuwar**, Associate Professor, Department of Mechanical Engineering.
- **Dr. Joshua Earnest**, Professor, Department of Electrical and Electronics Engineering.