

# GUJARAT TECHNOLOGICAL UNIVERSITY

## INFORMATION AND COMMUNICATION TECHNOLOGY

### ADVANCE NETWORKING PROTOCOLS

**SUBJECT CODE:** 2163205

B.E. 6<sup>th</sup> SEMESTER

**Type of course:** Advance Computer Networking

**Prerequisite:** Fundamental of basic computer topologies, types of networks, basic networking protocols

**Rationale:** The modern computer networks including the different routing protocol with high speed data rate and efficient throughput. Understanding the concepts of traffic engineering and multimedia services on Internet.

#### Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P		Theory Marks			Practical Marks			
			ESE (E)	PA (M)		ESE (V)		PA (I)		
				PA	ALA	ESE	OEP			
4	0	2	6	70	20	10	20	10	20	150

#### Content:

Sr. No.	Content	Total Hrs	% Weightage
1	<b>Optical Networking :</b> Introduction to Optical Networking, SONET / SDH Standard, DWDM	02	5
2	<b>ATM: The WAN Protocol :</b> Introducing ATM Technology, Introducing Faces of ATM, Explaining the basic concepts of ATM Networking, Exploring the B-ISDN reference model, Explaining the Physical Layer, Explaining the ATM Layer, Explaining the ATM Adaptation Layer, Exploring ATM Physical interface, Choosing an Appropriate ATM Public Service	06	15
3	<b>Packet Switching Protocols :</b> Introduction to Packet Switching, Introduction to Virtual Circuit Packet Switching, Introduction to X.25, Introducing switched multimegabit data service	04	10
4	<b>Protocols and Interfaces in Upper Layers of TCP/IP :</b> Introducing TCP/IP suite, Explaining Network Layer Protocols, Explaining Transport Layer Protocol, Explaining Application Layer Protocol	04	10
5	<b>Routing in the Internet :</b> Introduction to Intra-domain and inter-domain routings, Unicast Routing Protocols, Multicast Routing Protocols	06	15

6	<b>Other Routing Techniques</b> : Introduction to traffic Engineering, IP over ATM, Multiprotocol Label Switching, Storage Area Network	06	10
7	<b>Network Management and Services</b> :Introduction to Network Management, Standard Network Management Protocol	04	10
8	<b>Traffic Engineering Basics</b> : Introduction to traffic Engineering, Requirement Definition for Traffic Engineering, Traffic Sizing, Traffic Characteristics, Protocols, Time and Delay Consideration, Connectivity, Availability, Reliability, and Maintainability, Throughput Calculation	07	5
9	<b>Multimedia over Internet</b> : Introduction to Multimedia Services, Explaining Transmission of Multimedia over the Internet, Explaining IP Multicasting, Explaining VOIP	05	10
10	<b>Bluetooth</b> : Bluetooth Architecture, Bluetooth Applications, The Bluetooth Protocol Stack, The Bluetooth Frame Structure	06	10

**Suggested Specification table with Marks (Theory):**

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
12	20	24	6	4	4

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create 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.

**Reference Books:**

1. Advance Computer Network, By Dayan and Ambawade, Dr. Deven shah, Prof. Mahendra Mehra, Wiley India
2. High-Speed Networks and Internets, Performance and Quality of Service, Second Edition, William Stallings, Pearson
3. TCP/IP Protocol Suite by Behrouz A. Forouzan
4. Computer Networks, Andrew Tanenbaum, 5th Edition, Pearson Education.

**Course Outcome:**

- After learning the course the students should be able to:

- Identify the computer network topologies and its features.
- Understand routing algorithms and routing techniques.

**List of Experiments:**

1. Introduction to SONET / SDH networks.
2. To study about IPV4 addresses.
3. Installation of Linux (MANDRIVA / OPEN SUSE 10 GNOME Tool).
4. Introduction and installation of Network Simulator (NS-2.30).
5. To study about simple TCL example in NS2.
6. Calculate & plot the graph of throughput for simple.tcl by using NS2 (AWK script).
7. To study about TCP Flavors and their comparison in NS2.
8. To create wireless topology for Five nodes using NS2.
9. To create wired cum wireless topology using NS2.
10. Introduction to Bluetooth.

**Design based Problems (DP)/Open Ended Problem:**

1. Router installation and study of specifications and Router configuration of campus/institute
2. Prepare the presentation and report on different network.
3. Learning of Linux commands for network

**Major Equipment:**

1. Linux based computer system
2. Network simulator software

**List of Open Source Software/learning website:**

1. [www.isi.edu/nsnam/ns](http://www.isi.edu/nsnam/ns)
2. <https://www.wireshark.org>

**ACTIVE LEARNING ASSIGNMENTS:** Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.