



ITM(SLS) BARODA UNIVERSITY, VADODARA

B.tech

Semester- IV
Subject Name: Computer Networking

Type of Course: Core

Pre-requisites: Basic Understanding of general working of Computers, Internet and basics of operating systems

Rationale: Understand the layered architecture and various protocols at each layer, issues and solutions at each layer, popular TCP/IP based client server applications like http, dns, email, etc.

Teaching and Examination Scheme:

Course Code	Course Title	Teaching Scheme					Examination Scheme		
		Contact Hours				Credit	Theory		Practical
		Lecture	Tutorial	Practical	Total		Internal	External	External
<code>	Computer Networking	3	0	2	5	4	60	40	50

Course Content:

Unit	Contents	Total Hrs
Unit-1	Introduction Uses of Computer Networks, Personal Area Network, Local Area Networks, Metropolitan Area Networks, Wide Area Networks, Internetworks, Network software, protocol hierarchies, Design issues for the layers, connection oriented vs. Connectionless service, service primitives, relationship of services in protocols, Reference Models, Open System Interconnection (OSI), TCP/IP Reference models	4
Unit-2	Physical Layer Guided Transmission Media, Magnetic Media, Twisted Pairs, Coaxial Cable, Power Lines, Fiber Optics, Wireless Transmission, Electromagnetic Spectrum, Radio Transmission, Microwave Transmission, Infrared Transmission	6

Unit-3	Data Link Layer Design issues, Error detection and correction: Single bit even parity method, CRC, checksum, Block Parity, Hamming Code. Elementary data link protocols: Utopian simplex protocol, a simplex stop and wait protocol for an error-free channel, a simplex stop and wait protocol for noisy channel. Sliding Window protocols	8
Unit-4	Medium Access Control Sublayer The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols (CSMA/CD and CSMA/CA), MAC issues in Wireless Networks (Hidden Station and Exposed Station Problem, RTS/CTS scheme), Wireless LAN (IEEE 802.11), Bluetooth, Data Link Layer Switching	6
Unit-5	Network Layer Design issues, Routing algorithms: Optimality principle, shortest path routing, Flooding, distance vector routing, Link State routing, Congestion Control Algorithms.	6
Unit-6	Transport Layer Transport Services, Elements of Transport Protocols, Connection establishment, connection release, Error control, flow control, congestion control, UDP and TCP protocols.	6
Unit-7	Application Layer Domain name system, need for DNS, DNS cache, DNS Query Resolution, Generic and Country specific domains, domains and sub-domains, Need for Hierarchical and Distributed DNS database, DNS resource records, Electronic Mail, Email message format, User Agent, Message Transfer Agent, Message Access agent, SMTP, POP3, IMAP protocols, Web Mail and Non Web mail, HTTP, Persistent and Non persistent HTTP, HTTP message format, Relationship between HTTP, HTML, URL, Web Server, static and dynamic web sites, concept of server side and client side scripting	6
	Total:	42

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
K1	K2	K3	K4	K5	K6
4	8	12	8	4	4

K₁ =>Remember K₂ =>Understand K₃ =>Apply K₄ =>Analyze K₅ =>Evaluate
K₆ =>Create

Books:

Text Books	T1: Computer Networks, Andrew S Tanenbaum & David Wetherall, 5 th edition, Pearson T2: TCP/IP Protocol Suite, Behrouz A Forouzan, Mcgraw Hill
References	R1: Computer Networking- A Top Down Approach, Kurose & Ross, Pearson R2: Computer Networks – A systems approach, Peterson & Davie R3: Computer Networks – A systems approach, Behrouz A Forouzan

Course Outcomes:

After undergoing this course, students will be able to	Marks % weightage
C01. Understand the need and working of layered architecture	15
C02. Understand the working of protocols at each layer.	15
C03. Capture Network Traffic and analyze it through WireShark Tool.	25
C04. Perform Network Diagnostics and Troubleshooting using inbuilt network related OS commands	15
C05. Create and host a static web-site on the Internet without coding, using free third party tools and free hosting tools.	15
C06. Perform Installation and Administration of Apache Web Server.	15

List of Experiments:

1. Study of different network devices in detail.
2. Study of different types of network cables and practically implement the

- cross-wired cable and straight through cable using clamping tool.
3. Study of basic network command and Network configuration commands
 4. Packet capture and header analysis by wire-shark (TCP,UDP,IP)
 5. Installation, Configuration and Operations of Apache Web Server
 6. Implement an Intranet based Static Web Site using Apache Web Server
 7. Host a static web site publicly on the Internet using Free Web Hosting

Mapping of Course outcome with Program Outcomes POs, Program Specific Outcomes PSOs, and Knowledge Levels (As per Blooms Taxonomy)

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	Knowledge Levels
C01	1	2	1	1	-	-	-	-	-	-	-	-	2	-	K2
C02	1	2	1	2	-	-	-	-	-	-	-	-	1	-	K2
C03	3	3	2	1	-	-	-	-	-	-	-	-	3	-	K3
C04	3	3	2	1	-	-	-	-	-	-	-	-	1	-	K5
C05	3	3	3	1	-	-	-	-	-	-	-	-	2	-	K6
C06	2	2	3	1	-	-	-	-	-	-	-	-	1	-	K3

High-3 Medium-2 Low-1

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C01. Understand the need and working of layered architecture
C02. Understand the working of protocols at each layer.
C03. Capture Network Traffic and analyze it through WireShark Tool.
C04. Perform Network Diagnostics and Troubleshooting using inbuilt network related OS commands
C05. Create and host a static web-site on the Internet without coding, using free third party tools and free hosting tools.
C06. Perform Installation and Administration of Apache Web Server.

List of e-Learning, Open Source Software/learning website / resources: Students must refer to following sites to enhance their learning ability.

- 1) Vlabs.iitb.ac.in
- 2) NPTEL tutorials

3) www.coursera.org

4) www.udacity.com

Course Assessment Methods:

DIRECT(75%)

1. Formative Exam(40%)

1. Continuous Evaluation Test I and II (Theory component)
2. Lab Experiments (Programs) Test/Viva; Lab Manual for each program implemented (Lab Component)

2. Summative Exam(60%)

1. End Semester Examination (Theory and lab components)

INDIRECT(25%) (Need to discuss)

1. Course-end survey