SEMESTER S7

COMPUTER NETWORKS

Course Code	PEMRT751	CIE Marks	40
Teaching Hours/Week (L: T:P: R)	3:0:0:0	ESE Marks	60
Credits	3	Exam Hours	2 Hrs. 30 Min.
Prerequisites (if any)	None/ (Course code)	Course Type	Theory

Course Objectives:

1. Provide students with the knowledge to explain the roles and functions of various network protocols and to understand the OSI (Open Systems Interconnection) and TCP/IP models, along with their respective layers.

SYLLABUS

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Module No.	Syllabus Description	Contact Hours
1	Introduction – Uses of computer networks, Network hardware, Network software. Reference models – The OSI reference model, The TCP/IP reference model, Comparison of OSI and TCP/IP reference models. Physical Layer – Modes of communication, Physical topologies, Signal encoding, Repeaters and hub, Transmission media overview. Performance indicators – Bandwidth, Throughput, Latency, Queuing time, Bandwidth–Delay product.	9
2	Data link layer - Data link layer design issues, Error detection and correction, Sliding window protocols, High-Level Data Link Control(HDLC)protocol. Medium Access Control (MAC) sublayer –Channel allocation problem, Multiple access protocols, Ethernet, Wireless LANs - 802.11, Bridges & switches - Bridges from 802.x to 802.y, Repeaters, Hubs, Bridges, Switches, Routers and Gateways.	9
3	Network layer design issues. Routing algorithms - The Optimality Principle, Shortest path routing, Flooding, Distance Vector Routing, Link State	9

	Routing, Multicast routing, Routing for mobile hosts. Congestion control algorithms. Quality of Service (QoS) - requirements, Techniques for achieving good QoS.	
4	Transport service – Services provided to the upper layers, Transport service primitives. User Datagram Protocol (UDP). Transmission Control Protocol (TCP) – Overview of TCP, TCP segment header, Connection establishment &release, Connection management modeling, TCP retransmission policy, TCP congestion control. Application Layer –File Transfer Protocol (FTP), Domain Name System (DNS), Electronic mail, Multipurpose Internet Mail Extension (MIME), Simple Network Management Protocol (SNMP), World Wide Web(WWW) – Architectural overview.	**9**

Course Assessment Method
(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

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Attendance	Assignment/ Microproject	Internal Examination-1 (Written)	Internal Examination- 2 (Written)	Total
5	**15**	**10**	**10**	**40**

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

Course Outcomes (COs)

At the end of the course students should be able to:

Course Outcome		Bloom's Knowledge Level (KL)
CO1	Explain the features of computer networks, protocols, and network designmodels	**K2**
CO2	Describe the fundamental characteristics of the physical layer and identify the usage in network communication	**K2**
CO3	Explain the design issues of data link layer, link layer protocols, bridges and switches	**K2**
CO4	Illustrate wired LAN protocols (IEEE 802.3) and wireless LAN protocols (IEEE 802.11)	**K2**
CO5	Select appropriate routing algorithms, congestion control techniques, and Quality of Service requirements for a network	**K3**

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

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CO-PO Mapping Table (Mapping of Course Outcomes to Program Outcomes)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2										2
CO2	2	2	2									2
CO3	2	2	2									2
CO4	2	2	2									2
CO5	2	2	2	1								2

Note: *1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation*

Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Computer Networks	Andrew S. Tanenbaum	PHI (Prentice Hall India)	4th Edition, 2003
2	Data Communication and Networking	Behrouz A Forouzan	Tata McGraw Hill	4th Edition, 2006

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Computer Networks – A Systems Approach	Larry L Peterson and Bruce S Dave	Morgan Kaufmann	5th Edition, 2011
2	Computer Networking and the Internet	Fred Halsall	Addison-Wesley	5th Edition , 2005
3	Computer Networking: A Top-Down Approach	James F. Kurose, Keith W. Ross	Pearson	6th Edition, 2012
4	TCP/IP Illustrated, Volume 1: The Protocols	W. Richard Stevens	Addison-Wesley	2005

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Video Links (NPTEL, SWAYAM…)	
Module No.	**Link ID**
1	https://onlinecourses.nptel.ac.in/noc22_cs19/preview
2	https://nptel.ac.in/courses/106105082
3	https://onlinecourses.nptel.ac.in/noc22_ee61/preview
4	https://onlinecourses.swayam2.ac.in/cec21_cs04/preview