EVALUATION METHOD TO BE USED:

Category of Course	Continuous Assessment	Mid – Semester Assessment	End Semester
Theory Integrated with Practical	**15(T) + 25 (P)**	**20**	**40**

CO - PO Mapping:

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

CS 6111 COMPUTER NETWORKS

CS 6111 COMPUTER NETWORKS	L	T	P	EL	CREDITS
	3	0	4	3	6

OBJECTIVES

- To understand the division of network functionality into layers
- To familiarize the functions and protocols of each layer of the TCP/IP protocol suite
- To visualize the end-to-end flow of information
- To understand the components required to build different types of networks
- To learn concepts related to network addressing and routing

MODULE I :	L	T	P	EL
	3	0	8	3

Building a network - Network edge and core – Layered Architecture – ISO/OSI Model – Internet Architecture (TCP/IP) - Performance Metrics – Introduction to Sockets.

SUGGESTED ACTIVITIES :

- Performance Metrics – In class
- EL - Socket Programming
- Practical – Socket Programming

SUGGESTED EVALUATION METHODS:

- Problems on Performance Metrics

MODULE II :	L	T	P	EL
	4	0	8	3

Application Layer protocols – HTTP- FTP – Email – DNS

SUGGESTED ACTIVITIES :

- EL - HTTP/DNS format using Wireshark
- Practical – Implementation of HTTP, Web Caching, FTP using socket programming

SUGGESTED EVALUATION METHODS:

- Assignment problems
- Quiz on Wireshark

MODULE III :	L	T	P	EL
	3	0	4	3
Transport Layer: End to End Protocols – Connectionless Transport: User Datagram Protocol – UDP Applications.				
SUGGESTED ACTIVITIES : • EL - Wireshark for UDP, TCP packet formats • Practical – Socket Programming on UDP**,** Implementation of DNS using UDP				
SUGGESTED EVALUATION METHODS: • Quiz on UDP applications				

MODULE IV :	L	T	P	EL
	6	0	4	3
Connection Oriented Transport: Transmission Control Protocol – Flow Control - Retransmission strategies - Transport layer for Real Time Applications - Congestion Control				
SUGGESTED ACTIVITIES : • EL – Transport layer for Real Time Applications • Analysis in Class – Flow Control • Practical – Flow Control				
SUGGESTED EVALUATION METHODS: • Assignment problems • Quiz on Real time transport protocols				

MODULE V :	L	T	P	EL
	3	0	4	2
Network Layer: Introduction- Internet Protocol – IPV4 - IP Addressing				
SUGGESTED ACTIVITIES : • EL- IPV6 • Practical – Basic network construction using simulator				
SUGGESTED EVALUATION METHODS: • Assignment Problems • Quizzes				

MODULE VI	L	T	P	EL
	3	0	0	3
Subnetting – Variable Length Subnet Mask (VLSM) - Classless Inter Domain Routing (CIDR) - DHCP – ICMP				
SUGGESTED ACTIVITIES : • In class – Problems on Subnetting, • EL – Problems on CIDR				
SUGGESTED EVALUATION METHODS: • Assignment Problems				

MODULE VII:	L	T	P	EL
	3	0	8	4
Routing Principles – Distance Vector Routing – Link State Routing – RIP – OSPF – SDN Control Plane				
SUGGESTED ACTIVITIES :				

- In Class – Problems in Distance Vector Routing , Link State Routing
- EL - RIP, OSPF
- Practical – Performance analysis of different network topologies and routing protocols using suitable simulator

SUGGESTED EVALUATION METHODS:

- Assignment problems

MODULE VIII:	**L**	**T**	**P**	**EL**
	3	**0**	**0**	**3**

BGP- Introduction to Quality of Services (QoS). Data Link Layer: Link Layer – Framing – Addressing – Error Detection/ Correction

SUGGESTED ACTIVITIES

- In class: Error Detection and Correction
  EL – Problems on QoS

SUGGESTED EVALUATION METHODS:

- Assignment problems
- Quizzes

MODULE IX:	**L**	**T**	**P**	**EL**
	6	**0**	**0**	**3**

Medium Access Control – Address Resolution Protocol (ARP) – Network Address Translation (NAT) - Ethernet Basics - CSMA/CD - Virtual LAN – Wireless LAN (802.11) – WAN Technologies

SUGGESTED ACTIVITIES :

- EL – RARP

SUGGESTED EVALUATION METHODS:

- Quizzes

MODULE X:	**L**	**T**	**P**	**EL**
	5	**0**	**4**	**3**

Physical layer: signals - Bandwidth and data rate - Encoding - Multiplexing - Transmission media - Networking devices: Hubs, Bridges, Switches, Routers, Gateways.

SUGGESTED ACTIVITIES :

- In class – Encoding techniques problems
- EL – Recent developments in transmission media
- Practical – Topology setup using Hubs, Switches and Bridges using simulator.

SUGGESTED EVALUATION METHODS:

- Quizzes

OUTCOMES:

Upon completion of the course, the students will be able to:

- Highlight the significance of the functions of each layer in the network
- Identify the devices and protocols to design a network and implement it
- Build network applications using the right set of protocols and estimate their performance
- Trace packet flows and interpret packet formats

- Apply addressing principles such as subnetting and VLSM for efficient routing
- Explain media access and communication techniques

TEXT BOOKS:

1. James F. Kurose, Keith W. Ross, “Computer Networking: A Top-Down Approach”, Seventh Edition, Pearson Education, 2016.
2. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A Systems Approach”, Fifth Edition, Morgan Kaufmann Publishers Inc., 2011.

REFERENCES:

1. William Stallings, “Data and Computer Communications”, Eighth Edition, Pearson Education, 2011.
2. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, " Computer Networks: An Open Source Approach", 1st Edition, McGraw Hill, 2011.

EVALUATION METHOD

Category of Course	Continuous Assessment	Mid – Semester Assessment	End Semester
Theory Integrated with Practical	**15(T) + 25 (P)**	**20**	**40**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓	✓									
CO2	✓	✓	✓	✓	✓				✓			✓
CO3	✓	✓	✓	✓	✓				✓		✓	✓
CO4	✓	✓	✓		✓				✓			✓
CO5	✓	✓	✓	✓								✓
CO6	✓	✓	✓	✓								✓