JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTHAPURAMU COLLEGE OF ENGINEERING (AUTONOMOUS):: PULIVENDULA

Course Code	:	13A05601		
Course Title	:	**Computer Networks**		
Course Structure	:	Lectures	Tutorials	Practicals	Credits
		3	1	0	3
Course Coordinator	:	Smt. B. Muni Lavanya		
Team of Instructors	:	Mr. G. Murali		

I.   Course Overview

The main Objective of this Course Computer Networks is about how the Communication will happen between the client and server (computers) in the network.

Computer Networks focuses on explaining layers functionality, how the Internet works, ranging from how bits are modulated on wires and in wireless to application-level protocols like HTTP. It also explains the principles of how to design networks and network protocols.

II. Prerequisite(s):

Level	Credits	Periods / Week	Prerequisites
UG	3	4	Data Communications

III. Assessment:

FORMATIVE ASSESMENT	
Mid Semester Test I for 20 Marks in first 2 units is conducted at 8 the end of 9th week. Mid Semester Test II for 20 Marks in last three units is conducted at the end of the course work. Average of two tests is taken as final	20 Marks
Mid semester Test Multiple Choice Test in first two and half Units is conducted for 10 Marks Mid semester Test Multiple Choice Test in second two and half Units is conducted for 10 Marks Average of two tests is taken as final	10 Marks
Total (Formative)	30 Marks
SUMMATIVE ASSESMENT	
End Semester Examination in all units is conducted for 70 Marks	70 marks
Grand Total	100 Marks

IV. Course objectives:

1. Study the evolution of computer networks and future direction
2. Study the concepts of computer networks from layered perspective
3. Study the issues open for research in computer networks

V. Course Outcomes:

1. Use appropriate transmission media to connect to a computer network and Internet
2. Work on the open issues for their project
3. Start using the Internet effectively.
4. Able to design new protocols for computer network

VI. Program outcomes:

a   An ability to apply knowledge of computing, mathematical foundations, algorithmic principles, and computer science and engineering theory in the modeling and design of computer-based systems to real-world problems (fundamental engineering analysis skills)

b   An ability to design and conduct experiments, as well as to analyze and interpret data (information retrieval skills)

c   An ability to design , implement, and evaluate a computer-based system, process, component, or program to meet desired needs, within realistic constraints such as economic, environmental, social, political, health and safety, manufacturability, and sustainability (Creative Skills)

d   An ability to function effectively on multi-disciplinary teams (team work)

e   An ability to analyze a problem, identify, formulate and use the appropriate computing and engineering requirements for obtaining its solution (engineering problem solving skills)

f   An understanding of professional, ethical, legal, security and social issues and responsibilities (professional integrity)

g   An ability to communicate effectively both in writing and orally (speaking / writing skills)

h   The broad education necessary to analyze the local and global impact of computing and engineering solutions on individuals, organizations, and society (engineering impact assessment skills)

i   Recognition of the need for, and an ability to engage in continuing professional development and life-long learning (continuing education awareness)

j   A Knowledge of contemporary issues (social awareness)

k   An ability to use current techniques, skills, and tools necessary for computing and engineering practice (practical engineering analysis skills)

l   An ability to apply design and development principles in the construction of software and hardware systems of varying complexity (software hardware interface)

m   An ability to recognize the importance of professional development by pursuing postgraduate studies or face competitive examinations that offer challenging and rewarding careers in computing (successful career and immediate employment).

VII. Syllabus:

B.Tech. III Year –I Sem(C.S.E)   **L T P C**
                                                                     3 1 0 3

COMPUTER NETWORKS

UNIT -I

Data Communications, Network, Business and Home applications of Computer Network, Internet history, Standards and Administration, Network hardware, Network Software: Protocol Hierarchies- Design Issues for the Layers- Connection-Oriented Versus Connectionless Service, Reference Models. Data and Signals, Periodic Analog Signals, Digital Signals, Transmission Impairment, Data rate Limits, Performance, Circuit-Switched Networks, Packet Switching, Guided Transmission Media.

UNIT -II

Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols, The Channel Allocation Problem, Multiple Access Protocols, Ethernet.

UNIT -III

Data Link Layer Switching, Routing algorithms: The Optimality Principle-Shortest path Algorithm-Flooding-Distance Vector Routing-Link State Routing-Hierarchical Routing-Broadcast Routing-Multicast Routing-Anycast Routing, Congestion Control Algorithms.

UNIT -IV

Internetworking, The Network Layer in the Internet: The IP Version 4 Protocol- IP Addresses- IP Version 6- Internet Control Protocols- Label Switching and MPLS-OSPF-BGP, Elements of Transport Protocols, Congestion Control: Desirable bandwidth Allocation-Regulating the Sending Rate.

UNIT -V

The Internet Transport Protocols: UDP, The Internet Transport Protocols: TCP, World Wide Web and HTTP, FTP, Electronic Mail, TELNET, Secure Shell (SSH), Domain Name System (DNS)

VIII. List of Text Books / References / Websites / Journals / Others

TEXT BOOKS:

1. Andrew S. Tanenbaum, David J.Wetherall, "**Computer Networks**", Pearson Education, 5th ed., ISBN 978-81-317-8757-1
2. Behrouz A. Forouzan, "**Data Communications and Networking**", McGraw Hill Education, 5th ed., ISBN 978-1-25-906475-3.

REFERENCES:

1. Douglas E. Comer**, "Internetworking with TCP/IP – Principles, protocols, and architecture-Volume 1**", 5th ed., PHI
2. Peterson, Davie,"**Computer Networks**", 5th ed., Elsevier.
3. Chawan- Hwa Wu, Irwin,"**Introduction to Computer Networks and Cyber Security**", CRC Publications.
Computer Networks and Internets with Internet Applications, Comer

IX. Course Plan:

The course plan is meant as a guideline. There may probably be changes.

Lecture No.	Date of the Lecture	Course Learning Outcomes	Topics to be covered	Reference
Unit – I				
1-2	2.7.19	Importance of Data Communications and to know categories of networks.	Data Communications, Networks.	**T2:1**:1.2,1.3 **T2:2**:2.1,2.2,2.3,2.4,2.5 **R2:1**:1.1-1.2;**R3**:1.4
3-4	3.7.19, 8.7.19	Internet is supporting in business communications and daily activities.	Business and Home applications of Computer Network. Internet history, Standards and Administration, Network hardware.	**T1:1**:1.1.1,1.1.2 **T2:1**:1.4,1.5 **T1:1**:1.2, **R1:1**:1.4,**R2:1**:1.3
5,6	9.7.19	Learn Network Software and its categories, TCP/IP models, Reference models.	Network Software: Protocol Hierarchies- Design Issues for the Layers- Connection-Oriented Versus Connectionless Service, Reference Models.	**T1:1**:1.3.1,1.3.2, 1.3.3, **T1:1**:1.4;**R3**:1.7
7,8	10.7.19, 15.7.19	Learn Physical layer signal processing	Data and Signals, Periodic Analog Signals, Digital Signals, Transmission Impairment.	**T2:4**:4.1,4.2,4.3,4.6 **R3**:6.1.2
9,10	16.7.19		Data rate Limits, Performance.	**T2:7**:7.3,7.4 **R2:1**:1.5
11-14	17.7.19, 22.7.19, 23.7.19	Learn the guided, unguided media,Mobile telephone System.	Guided Transmission Media, Circuit-Switched Networks, Packet Switching.	**T1:2**:2.5.5,2.2 **R1:2**:2.2; **R3**:1.5
Unit – II				
15-18	24.7.19, 29.7.19 30.7.19	Basic Functionalities of DLL, Illustrate the purpose of error detection and correction techniques.	Data Link Layer Design Issues, Error Detection and Correction(Cyclic codes, Checksum, Forward error correction)	**T1:3**:3.1,**3:**3.2.1-3.2.2 **R2:2**:2.4.1-2.4.3
19-20	31.7.19, 5.8.19	Design the service delivery mechanism.	Elementary Data Link Protocols, Sliding Window Protocols	**T1:3**:3.3.1,3.2,3.3, **T1:3**:3.4.1,4.2,4.3
21-24	6.8.19, 7.8.19, 13.8.19	Understand the working concepts of the channelization and devices.	The Channel Allocation Problem, Multiple Access Protocols	**T1:4**:4.1,4.2 **R2:2**:2.6.2
25-26	13.8.19, 14.8.19	Types of Ethernets in detail.	Ethernet.	**T1:4**:4.3 **R1:2**:2.4.1-2.4.3
Unit – III				
27-28	19.8.19, 26.8.19	Learn Network layer, Understand various routing algorithms and analyze the shortest path between any two	Data Link Layer Switching. Routing algorithms: The Optimality Principle-	**T1:4**:4.7, **T1:5**:5.2.1

			stations.	
29,30	27.8.19		Shortest path Algorithm-Flooding.	**T1:5:**5.2.2-5.2.3
31,32	28.8.19, 3.9.19		Distance Vector Routing-Link State Routing-Hierarchical Routing	**T1:5:**5.2.4-5.2.6
33,34	3.9.19, 4.1.19		Broadcast Routing-Multicast Routing-Anycast Routing	**T1:5:**5.2.7-5.2.8 **R2:4:**4.2;**R3**:10
35,36	9.9.19, 11.9.19	Understand the mechanisms to handle congestion scenarios on networks.	Congestion Control Algorithms	**T1:5:**5.3
Unit – IV

37-40	11.9.19, 16.9.19, 17.9.19,	Learn the Importance of Internetworking and Comparisons between popular internet protocols IPV4 and IPV6.	Internetworking, The Network Layer in the Internet: The IP Version 4 Protocol- IP Addresses- IP Version 6.	**T1:5:**5.5.1-5.5.7, **T1:5:**5.6.1-6.2 **R1:4:**4.1 **R2:3**:3.2.1,**4:**4.1.3:**R3**:10.9
41,42	18.9.19, 23.9.19	Understand various address related protocols.	Internet Control Protocols- Label Switching and MPLS-OSPF-BGP	**T1:5:**5.6.1-6.5 **R2:3**:3.3.3,**R2:3:**4.0.2;**R3**:12
43-46	24.9.19, 25.9.19, 30.9.19	Learn how transport Layer protocol provides process-process delivery and evaluate the recovery of crashed data packets.	Elements of Transport Protocols	**T1:6:**6.2
47-48	1.10.18	Learn the congestion occurrence areas with Illustrations.	Congestion Control: Desirable bandwidth Allocation-Regulating the Sending Rate.	**T1:10:**1-7
Unit-V

49-52	9.10.19, 14.10.19, 15.10.19	Describe the practical use of UDP and TCP protocols, Explain three way handshaking procedure in TCP.	The Internet Transport Protocols: UDP, The Internet Transport Protocols: TCP	**T1:6:**6.4-6.5,T2:24.6 **R1:11**:1-11.7,12:12.1-12.5,12.11;**R3**:14
53-56	16.10.19, 21.10.19, 22.10.19	Know the purpose of FTP for file transfer and access remote system through remote login.	World Wide Web and HTTP, FTP, Electronic Mail.	**T2:25:**25.10,25.9,25.5 **T1:7:**7.3.1-3.4,7:7.2 **R2:9**:9.1.1-9.1.2;**R3**:1
57-58	23.10.19	Learn shell and Domain Name Space in detail.	TELNET, Secure Shell (SSH), Domain Name System (DNS).	**T2:25:**25.4;**R3**:2

X. Mapping course outcomes leading to the achievement of the program outcomes:

Course Outcomes	Program Outcomes												
	A	b	**c**	**D**	**e**	f	g	h	i	j	k	l	**M**

	A	B	C	D	E	F	G	H	I	J	K	L	M
1		H	S	S			H	S	S				S
2	S				S								
3	H	H			S	S	S	H	H				H
4							S	S			S		

S = Supportive   **H = Highly Related**

Justification of Course syllabus covering Course Outcomes:

By covering the syllabus a student can understand the designing of algorithm and flowcharts. Student is able to develop applications using C Program Constructs.

Justification of CO's –PO's Mapping Table:

By mapping CO-1 to the PO's B, C, D, G, H, I, M which are related to the course CO1: The student is able to Effectively Communicate.

By mapping CO-2 to the PO's A, E, which are related to the course CO2: The student is able to do efficient programs

By mapping CO-3 to the PO's A, B, E, F, G, H, I & M which are related to the course CO3: The student is able to Analyze, design and document computer network specifications to meet client needs, get the job.

By mapping CO-4 to the PO's G, H, & K which are related to the course CO4: The student is able to create new protocols to send or receive data effectively.