

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTHAPURAMU COLLEGE  
OF ENGINEERING (AUTONOMOUS):: PULIVENDULA  
B.Tech(CSE)**

Course Code	:	13A05601			
Course Title	:	Advanced Computer Networks			
Course Structure	:	Lectures	Tutorials	Practicals	Credits
		4	1	0	4
Course Coordinator	:	Sri D.Raghunath Kumar Babu Asst-professor(Adhoc)			
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.

Design and evaluate a wireless network in terms of cost, performance, privacy, security. To understand new trends and emerging technologies.

### II. Prerequisite(s):

Level	Credits	Periods / Week	Prerequisites
UG	3	4	Data Communications

### III. Assessment:

<b>FORMATIVE ASSESMENT</b>	
Mid Semester Test I for 20 Marks in first 2 units is conducted at 8 the end of 9 <sup>th</sup> week.	20 Marks
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	
Mid semester Test Multiple Choice Test in first two and half Units is conducted for 10 Marks	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	
Total ( Formative)	30 Marks
<b>SUMMATIVE ASSESMENT</b>	
End Semester Examination in all units is conducted for 70 Marks	70 marks
<b>Grand Total</b>	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 IV-I Sem(R17)

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### ADVANCED COMPUTER NETWORKS

#### Course Objectives:

1. To give the student ideas and insights on important design issues associated with computer networks.
2. This course aims to provide advanced background on relevant computer networking topics to have a comprehensive and deep knowledge in computer networks.

#### Course Outcomes:

1. Understanding of holistic approach to computer networking.
2. Ability to understand the computer networks and their applications.
3. Ability to design simulation concepts related to packet forwarding in networks.

#### UNIT-I

**Review of Computer Networks and the Internet:** What is the Internet, The Network core, Access Networks and Physical media, ISPs and Internet Back bones, Delay and Lossin Packet-Switched Networks, History of Computer Networking and the Internet.

**Foundation of Networking Protocols:** TCP/IP Model, Internet Protocols and Addressing, Equal-Sized Packets Model: ATM

#### UNIT-II

**Networking Devices:** Multiplexers, Modems and Internet Access Devices, Switching and Routing Devices, Devices in different layers, Router Structure.

**The Link Layer and Local Area Networks:** Link Layer: Introduction and Services, Error-Detection and Error-Correction techniques, Multiple Access Protocols, PPP : The Point-to-Point Protocol.

#### UNIT-III

**Routing and Internetworking:** Network–Layer Routing, Least-Cost-Path algorithms, Non-Least-Cost-Path algorithms, Intra domain Routing Protocols, Inter domain Routing Protocols, Congestion Control at Network Layer.

**Internet Protocol:** Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6.

**Multicasting Techniques and Protocols:** Basic Definitions and Techniques, Intra domain Multicast Protocols, Inter domain Multicast Protocols, Node-Level Multicast algorithms.

#### UNIT-IV

**Transport and End – to – End Protocols:** Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Mobile Transport Protocols, TCP Congestion Control.

**Application Layer:** Principles of Network Applications, The Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, Domain Name System (DNS), P2P File Sharing.

## **UNIT-V**

**Wireless Networks and Mobile IP:** Infra structure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standard, Cellular Networks, Mobile IP, Types of Wireless networks.

**Mobile Adhoc Networks:** Overview of Wireless Ad-Hoc Networks, Routing in Ad- Hoc Networks, Routing Protocols for Adhoc Networks.

### **TEXT BOOKS:**

1. Computer Networking: A Top-Down Approach Featuring the Internet, *James F. Kurose, Keith W. Ross*, Third Edition, Pearson Education, 2007.
2. Computer and Communication Networks, *Nader F. Mir*, Pearson Education, 2007.

### **REFERENCES :**

1. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition, Tata McGraw Hill, 2007.
2. An Engineering Approach to Computer Networking, S. Keshav, Pearson Education.
3. Computer Networks, Andrew S. Tanenbaum, Fourth Edition, Prentice Hall.
4. C. Sivaram Murthy, B.S. Manoj, "Ad hoc Wireless Networks – Architecture and Protocols", Second Edition, Pearson Education.

## IX. Course Plan:

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

Lecture No.	Dates	Course Learning Outcomes	Dates Topics to be covered	Reference
<b>UNIT-I</b>				
1-2	<b>04.07.19</b>	Basic knowledge of Internet: Get Context, Overview, feel of networking	<b>Review of Computer Networks and the Internet</b> :What is the Internet, The Network core	<b>T1:1:1.1,1.2,1.3 R1:1.2,1.3 R4:1:1.2,1.3</b>
3-4	<b>08.07.19</b>	How to connect Internet by using Physical Media	Access Networks and Physical media, ISPs and Internet Back bones	<b>T1:1:1.4,1.5 R4:1:1.6</b>
5-6	<b>11.07.19</b>	History of the Computer Network and Internet	Delay and Lossin Packet-Switched Networks, History of Computer Networking and the Internet.	<b>T1:1:1.6,1.8</b>
7-8	<b>15.07.19</b>	Usage of Internet Protocol	<b>Foundation of Networking Protocols:</b> TCP/IP Model, Internet Protocols and Addressing,.	<b>T2:2:2.1,2.2,2.3 R1:1.4</b>
9-10	<b>18.07.19</b>	Learn about Asynchronous transfer mode	Equal-Sized Packets Model: ATM	<b>T2:2:2.4</b>
<b>UNIT-II</b>				
11-12	<b>22.07.19</b>	Discussion about Network Devices	Multiplexers, Modems and Internet Access Devices, Switching and Routing Devices,	<b>T2:2:3.1,3.2,3.3</b>
13-14	<b>25.07.19</b>	Study about the Layers	Devices in different layers, Router Structure.	<b>T2:2:3.4</b>
15-18	<b>29.07.19 01.08.19</b>	Basic Functionalities of DLL, Illustrate the purpose of error detection and correction techniques.	<b>The Link Layer and Local Area Networks:</b> Link Layer: Introduction and Services, Error-Detection and Error-Correction techniques	<b>T1:5:5.1,5.2 T2:4:4.5 R1:10:10.1,10.2 R4:3:3.1,3.2</b>
19-22	<b>05.08.19 08.08.19</b>	Protocols of DLL	Multiple Access Protocols, PPP : The Point-to-Point Protocol.	<b>T1:5:5.3,5.4,5.5,5.6,5.7 T2:4:5.2,5.3 R4:4:4.1,4.2</b>
<b>UNIT-III</b>				
23-28	<b>12.08.19 19.08.19 26.08.19</b>	Learn Network layer, Understand various routing algorithms	<b>Routing and Internetworking:</b> Network–Layer Routing, Least-Cost-Path algorithms, Non-Least-Cost-Path algorithms	<b>T2:7:7.1,7.2,7.3 R4:5:5.2</b>
29-34	<b>29.08.19 02.09.19 05.09.19</b>	Routing Protocols of Network Layer	Intra domain Routing Protocols, Inter domain Routing Protocols, Congestion Control at Network Layer.	<b>T2:7:7.4,7.5,7.6 R4:5:5.3</b>
34-38	<b>09.09.19 12.09.19</b>	Learn the Importance of Internetworking and Comparisons between	<b>Internet Protocol:</b> Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6.	<b>T1:4:4.4.</b>

		popular internet protocols IPV4 and IPV6.		
38-42	<b>16.09.19</b> <b>19.09.19</b>	Multicasting Techniques and Protocols	Basic Definitions and Techniques, Intra domain Multicast Protocols, Inter domain Multicast Protocols.	<b>T1:4:4.5,4.6</b> <b>R1:22.4</b> <b>(<a href="https://flylib.com/books/en/2.959.1.59/1/">https://flylib.com/books/en/2.959.1.59/1/</a>)</b>
43-44	<b>23.09.19</b>	Learn about Multicast algorithms	Node-Level Multicast algorithms	<b>T1:4: 4.7</b>
<b>UNIT-IV</b>				
44-46	<b>26.09.19</b>	Introduction to Transport and End – to – End Protocols	Transport Layer, Transmission Control Protocol (TCP).	<b>T1:3: 3.1,3.2</b> <b>T2:8:8.1,8.2</b> <b>R4:6:6.3</b>
47-50	<b>30.09.19</b> <b>03.10.19</b>	Describe the practical use of UDP and TCP protocols, Explain three way handshaking procedure in TCP.	User Datagram Protocol (UDP), Mobile Transport Protocols, TCP Congestion Control.	<b>T1:3:</b> <b>3.3,3.4,3.5,3.6,3</b> <b>.7</b> <b>T2:8:8.3,8.4,8.5</b> <b>R4:6:6.4,6.5</b>
51-52	<b>07.10.19</b>	Know the purpose of FTP for file transfer and access remote system through remote login.	<b>Application Layer:</b> Principles of Network Applications, The Web and HTTP, File Transfer: FTP.	<b>T1:2:2.1,2.2,2.3</b> <b>T2:9:9.1,9.6,9.5</b>
53-54	<b>10.10.19</b>	Learn shell and Domain Name Space in detail.	Electronic Mail in the Internet, Domain Name System (DNS), P2P File Sharing.	<b>T1:2:2.4,2.5,2.6</b> <b>T2:9:9.4,9.2</b> <b>R4:7:7.1,7.2</b>
<b>UNIT-V</b>				
55-56	<b>14.10.19</b>	Importance of Wireless Communications and to know categories of networks.	<b>Wireless Networks and Mobile IP:</b> Infra structure of Wireless Networks.	<b>T1:6:6.1,6.2</b> <b>T2:6:6.1</b>
57-58	<b>17.10.19</b>	Internet is supporting in business communications and daily activities. Learn IEEE 802.11 Standards	Wireless LAN Technologies, IEEE 802.11 Wireless Standard	<b>T1:6:6.3</b> <b>T2:6:6.2,6.3</b> <b>R1:14:14.1,</b>
59-60	<b>21.10.19</b>	Understand the working concepts of the Cellular Networks.	Cellular Networks, Mobile IP, Types of Wireless networks.	<b>T1:6:6.4,6.6</b> <b>T2:6:6.4,6.5</b>
61	<b>24.10.19</b>	Describe the practical use of <b>Mobile Ad hoc Networks</b> and different routing protocols.	<b>Mobile Adhoc Networks:</b> Overview of Wireless Ad-Hoc Networks, Routing in Ad- Hoc Networks	<b>T2:19:19.1.19.2</b>
62	<b>24.10.19</b>	Different routing protocols	Routing Protocols for Adhoc Networks.	<b>T2:19:19.3</b>

**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
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.