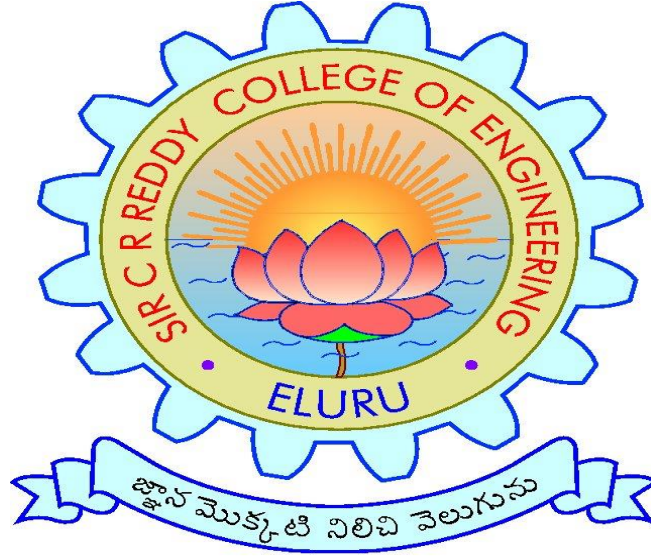**SIR C.R.REDDY COLLEGE OF ENGINEERING, ELURU**
DEPARTMENT OF INFORMATION TECHNOLOGY
COURSE HANDOUT

SUBJECT: COMPUTER NETWORKS
CLASS: III/IV B.Tech., I SEMESTER, A.Y.2022-23
INSTRUCTOR: Smt. B.Lalitha Bhavani

Course Handout Index

S.No	Description
1	College Vision & Mission
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COLLEGE VISION

To emerge as a premier institution in the field of technical education and research in the state and as a home for holistic development of the students and contribute to the advancement of society and the region.

COLLEGE MISSION

To provide high quality technical education through a creative balance of academic and industry oriented learning; to create an inspiring environment of scholarship and research; to instill high levels of academic and professional discipline; and to establish standards that inculcate ethical and moral values that contribute to growth in career and development of society in general.

VISION OF THE DEPARTMENT

To be a premier Department in the region in the field of Information Technology through academic excellence and research that enable graduates to meet the challenges of industry and society

MISSION OF THE DEPARTMENT

- ❖ To Provide dynamic teaching-learning environment to make the students industry ready and advancement in career;
- ❖ To inculcate professional and leadership quality for better employability and entrepreneurship;
- ❖ To make high quality professional with moral and ethical values suitable for industry and society

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Solve real world problems through effective professional skills in Information Technology industry and academic research.

PEO2: Analyze and develop applications in Information Technology domain and adapt to changing technology trends with continuous learning.

PEO3: Practice the profession in society with ethical and moral values.

PROGRAM OUTCOMES (POs)

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using the first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/Development of Solutions: Design solutions for complex engineering problems and system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, society, and environmental considerations.

PO4: Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the professional engineering solutions in society and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the

engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.

PO12: Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Design and develop software in the area of relevance under realistic constraints.

PSO2: Adapt new and fast emerging technologies in the field of Information Technology.

Directorate of Academic Planning
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
KAKINADA-533003, Andhra Pradesh, INDIA
(Established by AP Government Act No. 30 of 2008)

Lr. No. DAP/AC/III Year /B. Tech/B. Pharmacy/2022   Date 14.07.2022

Dr. KVSG Murali Krishna,
M.E. Ph.D.,
Director, Academic Planning
JNTUK, Kakinada

To
All the Principals of Affiliated Colleges,
JNTUK. Kakinada.

Academic Calendar for III Year - B. Tech/B. Pharmacy for the AY 2022-23
(2020-21 Admitted Batch)

I SEMESTER			
Description	From	To	Weeks
Community Service Project	15.07.2022	30.07.2022	2W
I Unit of Instruction	01.08.2022	24.09.2022	8W
I Mid Examinations	26.09.2022	01.10.2022	1W
II Unit of Instructions	03.10.2022	26.11.2022	8W
II Mid Examinations	28.11.2022	03.12.2022	1W
Preparation & Practicals	05.12.2022	10.12.2022	1W
End Examinations	12.12.2022	25.12.2022	2W

* As per the APSCHE Guidelines Out of the Total 180 hours of Community Service Project leading to 4 Credits, two weeks will be offline and remaining project work can be done during the III-I semester weekends and holidays.

Director,   14.7.22
Academics & Planning, JNTUK
Director
Academic Planning
JNTUK Kakinada

Copy to the Secretary to the Hon'ble Vice Chancellor, JNTUK
Copy to Rector, Registrar, JNTUK
Copy to Director Academic Audit, JNTUK
Copy to Director of Evaluation, JNTUK

Department Academic Calendar

Department of Information Technology
III/IV B.Tech Academic Calendar for 2022-23

2022-23	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M
Jul 22						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Aug 22		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
Sep 22				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30				
Oct 22							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Nov 22			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30					
Dec 22					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
Jan 23	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31						
Feb 23			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28							
Mar 23			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
Apr 23						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
May 23		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
Jun 23			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30					

List of Holidays			Mid exams
July 10: Bakrid	Oct 9: Maulud Nabi	Mar 22 : Ugadhi	
Aug 9:Moharum	Oct 24 : Diwali	Mar 30: Srirama navami	End Examinations
Aug 15:Independence day	Dec 25 :Christmas	Apr 5: Babu Jagjivan Ram Jayanti	Commencement of Class work
Aug 31:Ganesh Chaturdi	Jan 14-16: sankranti	Apr 7: Good friday	Workshops
Oct 2: Gandhi jayanthi	Jan 26:Republic Day	Apr 14:Ambetkar Jayanthi	Department fest/Elite
Oct 5: Vijayadasami	Feb 18 :Sivaratri	Jun 29: Bakrid	HoD
	Mar 8 : holi		Department of IT

Course Description

This course provides an introduction to computer networks, with a special focus on the Internet architecture and protocols. Topics include layered network architectures, addressing, naming, forwarding, routing, communication reliability, the client-server model, web and email protocols.

Course Objectives

The main objectives of this course are given below:

1. To provide insight about networks, topologies, and the key concepts.
2. To gain comprehensive knowledge about the layered communication architectures (OSI and TCP/IP) and its functionalities.
3. To understand the principles, key protocols, design issues, and significance of each layers in ISO and TCP/IP.
4. To know the basic concepts of network services and various network applications.

Course Outcomes

Students are able to

CO No's	COs	Level
CO1	**Understand** the concepts and functionalities of various layers of OSI reference, TCP/IP Models, Internet working, media access control different transmission media and switching network.	L2
CO2	**Apply** the concepts of Data link Layer, Network layer and application layer	L3
CO3	**Analyze** the concepts of various layers of OSI like network layer, TCP/IP Models, internet working, functions and protocols like HDLC, and PPP.	L4
CO4	**Compare and Classify** medium access control protocols like ALOHA,CSMA,CSMA/CD,CSMA/CA, polling, token passing, FDMA,TDMA,CDMA PROTOCOLS	L4

S.No	Unit	Description	Teaching Aids	CO
1.		**Network Types:** LAN, MAN, WAN	BB	CO1
2.		Network Topologies	PPT	CO1
3.		Reference models- The OSI	BB	CO1
4.	**I**	Reference Model- the TCP/IP	BB	CO1
5.		A Comparison of the OSI and TCP/IP Reference Models, OSI Vs TCP/IP	PPT	CO3
6.		Lack of OSI models success, Internet History	BB	CO1
7.		Physical Layer –Introduction to Guided Media- Twisted-pair cable	PPT	CO1
8.		Coaxial cable and Fiber optic cable	PPT	CO1
9.		**unguided media:** Wireless-Radio waves	BB	CO1
10.		Microwaves ,infrared	PPT	CO1
11.		**Data link layer:** Design issues	BB	CO1
12.		**Framing:** fixed size framing, variable size framing	PPT	CO1
13.		flow control, error control	BB/PPT	CO1

14.		error detection and correction codes	BB/PPT	CO2
15.		CRC	BB	CO2
16.		**Checksum:** idea, one's complement internet checksum, services provided to Network Layer	BB	CO1
17.		**Elementary Data Link Layer protocols:** simplex protocol, Simplex stop and wait	BB	CO1
18.	**II**	Simplex protocol for Noisy Channel.	PPT	CO3
19.		**Sliding window protocol**: One bit, Go back N,	PPT	CO3
20.		Selective repeat-Stop and wait protocol,	BB	CO1
21.		Data link layer in HDLC: configuration and transfer modes	BB	CO3
22.		Frames, control field	BB	CO1
23.		**point to point protocol (PPP):** framing transition phase	BB	CO1
24.		Multiplexing, multi link PPP	PPT	CO3
25.		Media Access Control: Random Access: ALOHA	BB	CO4
26.		Carrier sense multiple access (CSMA)	BB	CO4
27.	**III**	CSMA with Collision Detection	BB	CO1
28.		CSMA with Collision Avoidance	BB	CO4
29.		**Controlled Access:** Reservation	BB/PPT	CO1
30.		Polling, Token Passing	BB	CO4
31.		**Channelization:** frequency division multiple Access(FDMA)	BB/PPT	CO1
32.		time division multiple access(TDMA), code division multiple access(CDMA).	PPT	CO4
33.		**Wired LANs:** Ethernet, Ethernet Protocol	BB	CO1
34.		Standard Ethernet	BB	CO3
35.		Fast Ethernet(100 Mbps), Gigabit Ethernet, 10 Gigabit Ethernet	PPT	CO4
36.		**The Network Layer Design Issues** – Store and Forward Packet Switching	BB	CO1
37.	**IV**	Services Provided to the Transport layer	BB/PPT	CO1
38.		Implementation of Connectionless Service	BB	CO2
39.		Implementation of Connection Oriented	BB	CO2

		Service		
40.		Comparison of Virtual Circuit and Datagram Networks	BB	CO3
41.		Routing Algorithms-The Optimality principle-Shortest path	BB	CO3
42.		Flooding, Distance vector, Link state	BB	CO2
43.		Hierarchical, Congestion Control algorithms, General principles of congestion control	BB	CO1
44.		Congestion prevention polices	BB/PPT	CO1
45.		Approaches to Congestion Control-Traffic Aware Routing.	BB	CO1
46.		Admission Control-Traffic Throttling-Load Shedding	BB	CO1
47.		Traffic Control Algorithm-Leaky bucket & Token bucket.	BB	CO3
48.		**Internet Working:** How networks differ-How networks can be connected- Tunnelling	BB	CO1
49.		internetwork routing-	BB/PPT	CO3
50.		Fragmentation	BB	CO1
51.		network layer in the internet – IP protocols-IP Version 4 protocol-IPV4 Header Format	BB/PPT	CO3
52.		IP addresses, Class full Addressing, CIDR	BB	CO1
53.		NAT-, Subnets-IP Version 6-The main IPV6 header, Transition from IPV4 to IPV6	BB	CO1
54.		Comparision of IPV4 & IPV6- Internet control protocols- ICMP-ARPDHCP	PPT	CO3
55.		The Transport Layer: Transport layer protocols: Introduction-services	BB	CO1
56.		port number-User data gram protocol- User datagram-UDP services-UDP applications	BB	CO1
57.		Transmission control protocol: TCP servicesTCP features-	BB	CO1
58.	V	Segment- A TCP connection- windows in TCP- flow control-Error control	BB	CO3
59.		Congestion control in TCP.	BB	CO1
60.		**Application Layer** –- World Wide Web: HTTP	BB/PPT	CO1
61.		Electronic mail-Architecture-	BB/PPT	CO1
62.		web based mail- email security- TELENET-local versus remote Logging-	BB/PPT	CO2
63.		Domain Name System: Name Space DNS in Internet , Resolution-Caching- Resource Records-	BB	CO2

64.		DNS messages- Registrars-security of DNS Name Servers,	BB	CO1
65.		SNMP	BB	CO1
	Total Classes		**65**	**10**

Text Books:
1. Computer Networks — Andrew S Tanenbaum, Fifth Edition. Pearson Education/PHI
2. Data Communications and Networks – Behrouz A. Forouzan, Fifth Edition TMH.
References Books:
1. Data Communications and Networks- Achut S Godbole, AtulKahate
2. Computer Networks, Mayank Dave, CENGAGE

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2		1											
CO2	2		2		1		1					1		
CO3		3	2	1								1		
CO4		2	2	1								1		

Evaluation Pattern

S. No	Components	Internal	External	Total
1	Theory	30	70	100
2	Engineering Graphics/Design/Drawing	30	70	100
3	Practical	15	35	50
4	Mini Project/Internship/Industrial Training/ Skill Development programmes/Research Project	-	50	50
5	Project Work	60	140	200

Marks Range Theory (Max – 100)	Marks Range Lab (Max – 50)	Level	Letter Grade	Grade Point
≥ 90	≥ 45	Outstanding	A+	10
≥80 to <89	≥40 to <44	Excellent	A	9
≥70 to <79	≥35 to <39	Very Good	B	8
≥60 to <69	≥30 to <34	Good	C	7
≥50 to <59	≥25 to <29	Fair	D	6
≥40 to <49	≥20 to <24	Satisfactory	E	5
<40	<20	Fail	F	0
-		Absent	AB	0

Day/Time	09.00-09.50	09.50-10.40	11.00-11.50	11.50-12.40	01.40-02.30	02.30-03.20	03.20-04.10	04.10-05.00
Mon	CN(B)		CN(A)			CN(A)		
Tue		CN(B)			CN LAB (A)			
Wed				CN(B)		CN(B)		
Thu	CN(A)	CN LAB (B)						
Fri		CN(A)		CN(B)				
Sat								

COMPUTER NETWORKS UNIT WISE Important Questions

UNIT-1

SHORT ANSWER QUESTIONS

1.Define Computer Networks?

2.What is WWW?

3.What is Internet?

4.What is PANs ,MANs, WANs and LANs?

5.Define congestion?

6.What is ARPANET?

7.List some internet standards?

8.List out the advantages of wireless transmission

LONG ANSWER QUESTIONS

1.Describe the uses of computer networks?

2.Illustrate network software concepts?

3. Illustrate network hardware concepts?

4.Explain in detail about network reference models?Mention your critique on those models.

5. Explain different examples of networks in the real world?

6.Explain about Guided Transmission Media
        (a) Twisted Pair
        (b) Coaxial Cable
        (c) Optical Fiber
7.Describe Terrestrial Microwave

8.Explain any two of wireless transmission media

UNIT-2

SHORT ANSWER QUESTIONS

1. What is ISDN?

2.What is flow control?

3.Explain half duplex and full duplex in Line configuration.

4.Define BAUD RATE,BIT RATE, and BANDWIDTH

LONG ANSWER QUESTIONS

1.Explain about Error Detection Technique Using Cyclic Redundancy Check(CRC)

2.Explain about INTRFACING

3.Explain Flow control techniques like Stop-and-wait Flow Control and
     Sliding window Flow Control

4.Explain about Error Control Techniques
5.Explain HDLC Protocol
6.Explain point-to-point protoco

UNIT-3

SHORT ANSWER QUESTIONS

1.What is MAC layer?

2.What is ALOHA?

3.what do you mean by carrier sense protocols?

4.what is CSMA?

5.what is reservation protocols?

6.what is FDDI and RPR?

7.what are the types of Ethernet?

8 .what is access points?

9.what Is Bluetooth?

LONG ANSWER QUESTIONS

? **1.**Describe in detail about channel allocation problem?

2.Explain the working of ALOHA?

3.Describe CSMA protocols?

4.Explain various collision free protocols?

5.Illustrate Ethernet?

6.Explain the wireless LANs/

7.Explain the Bluetooth ?

UNIT-4

SHORT ANSWER QUESTIONS

1.what is session routing?

2.Define static routing and adaptive routing?

3.what is flooding.

4.what do you mean by anycast routing?

5.what I s QOS?

6.what is jitter?

7.what is tunneling.

8.what is VPNs

9.what is NAT

LONG ANSWER QUESTIONS

1.Explain the design issues of network layer?

2.compare the virtual circuit and datagram network?

3.Explain dijikstras algorithm with example?

4.explain the distance vector routing algorithm?

5.Describe various approaches to congestion control

6.Explain various issues must be addressed to ensure QOS?

7.illustrate IPv4.

8.Describe the following in briefly

 i)IMCP   ii)ARP   iii)DHCP

9. Discuss transition from IPV4 to IPV6

UNIT-5

SHORT ANSWER QUESTIONS

1.what is portmapper?

2.what is silly window syndrome?

3.Describe DNS.

4.Explain SMTP and MIME.

5.Illustrate HTTP

6.Explain the working of FTP and TFTP

7.Expalin the BOOTP

8.Describe firewalls

LONG ANSWER QUESTIONS

1.Explain the elements of transport layer

2.Describe UDP services and its applications

3.Explain performance issues of transport layer.

4.Explain congestion control in TCP

5.Describe DNS in internet

6.write short note on:

  i) HTTP

  ii) TELNET

  iii) SNMP

7.Explain Electronic mail architecture

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