COURSE INSTRUCTOR NAME: Mrs.Prathima Y ACADEMIC YEAR:2023-24

SUBJECT NAME: Computer Networks

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SEM START DATE AND END DATE: 21-8-23 T0 23-12-23

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HOD

1. DEPARTMENT VISION & MISSION

Vision:

To produce globally competent and industry-ready graduates in Computer Science & Engineering by imparting quality education with the know-how of cutting-edge technology and holistic personality.

Mission:

1. To offer high-quality education in Computer Science & Engineering in order to build core competence for the graduates by laying a solid foundation in Applied Mathematics and program framework with a focus on concept building.
2. The department promotes excellence in teaching, research, and collaborative activities to prepare graduates for a professional career or higher studies.
3. Creating an intellectual environment for developing logical skills and problem-solving strategies, thus developing, an able and proficient computer engineer to compete in the current global scenario.

2. LIST OF PEOs, POs AND PSOs

2.1 Program Educational Objectives (PEO):

PEO 1: Excel in professional career and higher education by acquiring knowledge of mathematical computing and engineering principles.
PEO 2: To provide an intellectual environment for analyzing and designing computing systems for technical needs.
PEO 3: Exhibit professionalism to adapt current trends using lifelong learning with legal and ethical responsibilities.
PEO 4: To produce responsible graduates with effective communication skills and multidisciplinary practices to serve society and preserve the environment.

2.2. Program Outcomes (POs):

Engineering Graduates will be able to satisfy these NBA graduate attributes:

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

2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **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.

5. **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.

6. **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.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **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.

11. **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 multidisciplinary environments.

12. **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.

2.3 Program Specific Outcomes (PSOs):

PSO1: Professional Skills and Foundations of Software development: Ability to analyze, design and develop applications by adopting the dynamic nature of Software developments.
PSO2: Applications of Computing and Research Ability: Ability to use knowledge in cutting edge technologies in identifying research gaps and to render solutions with innovative ideas.

3. List of Course Outcomes

S. No	Course Outcomes
CO1	**Explain** the basic concepts and Models of OSI and TCP\IP and transmission media and physical layer.**[Understanding]**
CO2	**Apply** knowledge of Computer Network Concepts to solve problems in Error Control and Access control mechanisms.**[Applying]**
CO3	**Illustrate** data link layer protocols like elementary data link protocols ,sliding window protocols.**[Understanding]**
CO4	**Analyze** the routing and congestion control mechanisms.**[Analyzing]**
CO5	Design and **implementing** user interface applications for peer to peer communication.[**Applying]**

REVISED Bloom's Taxonomy Action Verbs

Definitions	I. Remembering	II. Understanding	III. Applying	IV. Analyzing	V. Evaluating	VI. Creating
Bloom's Definition	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Verbs	• Choose • Define • Find • How • Label • List • Match • Name • Omit • Recall • Relate • Select • Show • Spell • Tell • What • When • Where • Which • Who • Why	• Classify • Compare • Contrast • Demonstrate • Explain • Extend • Illustrate • Infer • Interpret • Outline • Relate • Rephrase • Show • Summarize • Translate	• Apply • Build • Choose • Construct • Develop • Experiment with • Identify • Interview • Make use of • Model • Organize • Plan • Select • Solve • Utilize	• Analyze • Assume • Categorize • Classify • Compare • Conclusion • Contrast • Discover • Dissect • Distinguish • Divide • Examine • Function • Inference • Inspect • List • Motive • Relationships • Simplify • Survey • Take part in • Test for • Theme	• Agree • Appraise • Assess • Award • Choose • Compare • Conclude • Criteria • Criticize • Decide • Deduct • Defend • Determine • Disprove • Estimate • Evaluate • Explain • Importance • Influence • Interpret • Judge • Justify • Mark • Measure • Opinion • Perceive • Prioritize • Prove • Rate • Recommend • Rule on • Select • Support • Value	• Adapt • Build • Change • Choose • Combine • Compile • Compose • Construct • Create • Delete • Design • Develop • Discuss • Elaborate • Estimate • Formulate • Happen • Imagine • Improve • Invent • Make up • Maximize • Minimize • Modify • Original • Originate • Plan • Predict • Propose • Solution • Solve • Suppose • Test • Theory

Anderson, L. W., & Krathwohl, D. R. (2001). A taxonomy for learning, teaching, and assessing, Abridged Edition. Boston, MA: Allyn and Bacon.

Action Words for Bloom's Taxonomy					
Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Create**
define	explain	solve	analyze	reframe	design
identify	describe	apply	compare	criticize	compose
describe	interpret	illustrate	classify	evaluate	create
label	paraphrase	modify	contrast	order	plan
list	summarize	use	distinguish	appraise	combine
name	classify	calculate	infer	judge	formulate
state	compare	change	separate	support	invent
match	differentiate	choose	explain	compare	hypothesize
recognize	discuss	demonstrate	select	decide	substitute
select	distinguish	discover	categorize	discriminate	write
examine	extend	experiment	connect	recommend	compile
locate	predict	relate	differentiate	summarize	construct
memorize	associate	show	discriminate	assess	develop
quote	contrast	sketch	divide	choose	generalize
recall	convert	complete	order	convince	integrate
reproduce	demonstrate	construct	point out	defend	modify
tabulate	estimate	dramatize	prioritize	estimate	organize
tell	express	interpret	subdivide	find errors	prepare
copy	identify	manipulate	survey	grade	produce
discover	indicate	paint	advertise	measure	rearrange
duplicate	infer	prepare	appraise	predict	rewrite
enumerate	relate	produce	break down	rank	role-play
listen	restate	report	calculate	score	adapt
observe	select	teach	conclude	select	anticipate
omit	translate	act	correlate	test	arrange
read	ask	administer	criticize	argue	assemble
recite	cite	articulate	deduce	conclude	choose
record	discover	chart	devise	consider	collaborate
repeat	generalize	collect	diagram	critique	collect
retell	give examples	compute	dissect	debate	devise
visualize	group	determine	estimate	distinguish	express
	illustrate	develop	evaluate	editorialize	facilitate
	judge	employ	experiment	justify	imagine
	observe	establish	focus	persuade	infer
	order	examine	illustrate	rate	intervene
	report	explain	organize	weigh	justify
	represent	interview	outline		make
	research	judge	plan		manage
	review	list	question		negotiate
	rewrite	operate	test		originate
	show	practice			propose
	trace	predict			reorganize
	transform	record			report
		schedule			revise
		simulate			schematize
		transfer			simulate
		write			solve
					speculate
					structure
					support
					test
					validate

4. Syllabus Copy

UNIT – I

Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet. **Physical Layer**: Guided Transmission media: twisted pairs, coaxial cable, fiber optics, Wireless transmission.

UNIT - II

Data link layer: Design issues, framing, Error detection and correction.

Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an error-free channel, A simplex stop and wait protocol for noisy channel.

Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat, Example data link protocols.

Medium Access sub layer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols. Wireless LANs, Data link layer switching.

UNIT - III

Network Layer: Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of Service, Internetworking, The Network layer in the internet.

UNIT – IV

Transport Layer: Transport Services, Elements of Transport protocols, Connection management, TCP and UDP protocols.

UNIT - V

Application Layer –Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streaming audio and video.

TEXT BOOK: 1. Computer Networks -- Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI R18 B.TECHCSE III YEAR

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks-S. Keshav,
2. 2 nd Edition, Pearson Education 2. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH

5.INDIVIDUAL TIME TABLE(PRATHIMA Y)

WL=17

	I(9:10-10:10)	II(10:10-11:00)	III(11:00-11:50)	IV(11:50-12:40)		V(1:20-2:20)	VI(2:20-3:10)	VII(3:10-4:00)
MON			III-B CN			III-D CN		
TUE								
WED	III-D CN		III-B CN			III-D CN		
THU				III-D CN				III-B CN
FRI	III-D CN		III-B CN			III-A CN LAB		
SAT	III-A CN LAB					III-D CN		III-B CN

6. 6. SESSION PLAN/LESSON PLAN

S.NO	Topic (CMREC syllabus)	Sub-Topic	NO. OF LECTURES REQUIRED	Planned Date	Conducted Date	Suggested Books	Teaching Method
1	Network hardware, Network software	Introduction Computer Network	L1	23/08/2023	23/08/2023	T1	M1, M15
2		Basics of CN	L2	24/08/2023	24/08/2023	T1	M1,M15
3		UniT- 1 N/W Hardware	L3	25/08/2023	25/08/2023	T1	M1
4		N/W Software	L4, L5	26/08/2023 28/08/2023	26/08/2023 28/08/2023	T1	M1
5		The OSI Model	L6	31/08/2023	31/08/2023	T1	M4, M5,M12
6		The OSI Model	L7	01/09/2023	01/09/2023	T1	M4, M5, M12
7		The OSI Model	L8	02/09/2023	02/09/2023	T1	M4, M5, M12
8		TCP/IP Reference models	L9	04/09/2023	04/09/2023	T1	M4, M5, M12
9		ARPANET, Internet.	L10	07/09/2023	07/09/2023	T1	M1
10	Physical Layer	Guided Transmission twisted pairs, coaxial cable, fiber optics,	L11	08/09/2023	08/09/2023	T1	M4, M12
11		Wireless Transmission	L12	09/09/2023	09/09/2023	T1	M1
12		Test	L13	11/09/2023	11/09/2023		UNIT-I Classes Required -12
13	DATA LINK LAYER	Unit - 2 Design Issues of Data Link Layer, Framing	L14	14/09/2023	14/09/2023	T1	M1, M4
14		Error – Detection and Correction	L15, L16	15/09/2023 16/09/2023	15/09/2023 16/09/2023	T1	M1, M4, M14
15		Elementary data link protocols: simplex protocol	L17	18/09/2023	18/09/2023	T1	M1, M4
16		A simplex stop and wait protocol for an	L18	21/09/2023	21/09/2023	T1	M1, M4

		error-free channel					
17		**A simplex stop and wait protocol for an error-free channel**	**L19**	**22/09/2023**	**22/09/2023**	**T1**	**M1, M4**
18		A simplex stop and wait protocol for noisy channel	**L20**	**23/09/2023**	**23/09/2023**	**T1**	**M1, M4**
19		**Sliding Window protocols: A one-bit sliding window protocol**	**L21**	**25/09/2023**	**25/09/2023**	**T1**	**M1, M4**
18		**A protocol using Go-Back-N, A protocol using Selective Repeat, Example data link protocols**	**L22, L23, L24**	**29/09/2023** **30/09/2023** **05/10/2023**	**29/09/2023** **30/09/2023** **05/10/2023**	**T2**	**M1, M4,M5, M12**
19	**Medium Access sub layer**	**Medium Access sub layer: The channel allocation problem, Iultiple access protocols**	**L25**	**06/10/2023**	**06/10/2023**	**T1**	**M1, M4**
20		**ALOHA, Carrier Sense multiple access protocols, collision free protocols. Wireless LANs, Data link layer switching**	**L26,L27**	**07/10/2023** **09/10/2023**	**07/10/2023** **09/10/2023**	**T1**	**M1, M4,M5**
22		**Test**	**L28**	**12/10/2023**	**12/10/2023**		**UNIT-II Classes Required -14**
23		**Unit- 3 Design issues**	**L29**	**13/10/2023**	**13/10/2023**	**T1**	**M1, M4**
24		**Routing algorithms: shortest path routing, Flooding**	**L30, L31**	**14/10/2023** **30/10/2023**	**14/10/2023** **30/10/2023**	**T1**	**M3,M4, M12,M14**
25	**Network Layer**	**Hierarchical routing, Broadcast**	**L32, L33**	**02/11/2023** **03/11/2023**	**02/11/2023** **03/11/2023**	**T1**	**M3,M4, M12,M14**
26		**Multicast**	**L34,L35**	**04/11/2023** **06/11/2023**	**04/11/2023** **06/11/2023**	**T1**	**M3,M4, M12,M14**
27		**distance vector routing, Congestion Control Algorithms**	**L36,L37**	**09/11/2023** **10/11/2023**	**09/11/2023** **10/11/2023**	**T1**	**M3,M4, M12,M14**

28		**Quality of Service, Internetworking**	**L38,L39**	**11/11/2023** **13/11/2023**	**11/11/2023** **13/11/2023**	**T1**	**M3,M4, M12,M14**
29		**The Network layer in the internet.**	**L40,L41**	**16/11/2023** **17/11/2023**	**16/11/2023** **17/11/2023**	**T1**	**M3,M4, M12,M14**
30		**Test**	**L42**	**18/11/2023**	**18/11/2023**		**UNIT-III Classes Required -13**
31	**Transport Layer**	**Transport Services, Examples**	**L43**	**20/11/2023**	**20/11/2023**	**T1**	**M1,M4**
32		**Elements of Transport protocols**	**L44,L45**	**23/11/2023** **24/11/2023**	**23/11/2023** **24/11/2023**	**T1**	**M1,M4**
33		**Connection management**	**L46**	**25/11/2023**	**25/11/2023**	**T1**	**M1,M4**
34		**TCP and UDP protocols.**	**L47,L48,L49**	**27/11/2023** **30/11/2023** **01/12/2023**	**27/11/2023** **30/11/2023** **01/12/2023**	**T1**	**M1,M4, M5,M12**
35		**Test**	**L50**	**02/12/2023**	**02/12/2023**		**UNIT-IV Classes Required -8**
36	**Application Layer**	**Domain name space**	**L51**	**04/12/2023**	**04/12/2023**	**T1**	**M1,M4, M5,M12**
37		**DNS in internet**	**L52**	**07/12/2023**	**07/12/2023**	**T1**	**M1,M4,**
38		**SMTP**	**L53**	**08/12/2023**	**08/12/2023**	**T1**	**M1,M4,**
39		**Electronic mail**	**L54**	**09/12/2023**	**09/12/2023**	**T1**	**M1,M4, M5**
40		**WWW**	**L55**	**11/12/2023**	**11/12/2023**	**T1**	**M1,M4,**
41		**HTTP**	**L56**	**14/12/2023**	**14/12/2023**	**T1**	**M1,M4,**
42		**SNMP, Streaming Audio and video.**	**L57,58**	**15/12/2023** **16/12/2023**	**15/12/2023** **16/12/2023**	**T1**	**M1,M4, M14**
43		**Test**	**L59**	**18/12/2023**	**18/12/2023**		**UNIT-V Classes Required -08**
44		**Revision**	**L60**	**21/12/2023**	**21/12/2023**		

METHODS OF TEACHING:

M1 : Lecture Method	M11 : Tutorial
M2 : Demo Method	M12 : Assignment
M3 : Guest Lecture	M13 : Industry Visit
M4 : Presentation /PPT	M14 : Project Based Learning
M5: Mind Map	M15: Mnemonics
M6: ATL Lab	M16: Laboratory Improvements for future Trends
M7: Group Learning	M17: Collaborative Learning
M8: One Minute Paper	M18: Think Pair Share
M9: Case Study	M19: NPTEL Video Lectures
M10 Flipped Classes	M20: Innovative Assignments

NOTE:

1. Any Subject in a Semester is suppose to be completed in 55 to 65 periods.
2. Each Period is of 50 minutes.
3. Each unit duration & completion should be mentioned in the Remarks Coloumn.
4. List of Suggested books can be marked with Codes like T1, T2, R1, R2 etc.

7. SESSION EXECUTION LOG

Unit. NO	TOPIC	SCHEDULED DATE	COMPLETED DATE	REMARKS
I	Introduction to Networks -/ Physical Layer	23/08/2023	11/09/2023	COMPLETED
II	Data Link Layer	15/09/2023	09/10/2023	COMPLETED
III	Network Layer	13/10/2023	17/11/2023	COMPLETED
IV	Transport Layer	20/11/2023	01/12/2023	COMPLETED
V	Application Layer	04/12/2023	16/12/2023	COMPLETED

8. Lecture Notes (Hand Written)

Attached document

9. Assignment Questions along with sample Assignments Scripts

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Department of Computer Science & Engineering

Subject: Computer Networks

Assignment -1

A.Y. 2023-24

1a. Draw the layered architecture of the OSI reference model and write the services provided by each layer of the model. (CO1)

b. With a neat sketch, explain TCP/IP reference model. (CO1)

2a. Discuss about the various transmission media available at the physical layer. (CO1)

b. What are the different types of error detection methods? Explain the CRC error detection technique using generator polynomial x4 +x3 +1 and data 11100011. (CO1)

3a. Give a detail note on the ALOHA protocols. And give its disadvantages (CO2)

b. Define collision. Explain collision free protocols. Mention advantage of each protocol. (CO2)

4a. Explain the flow diagram of CSMA, CSMA/CD, CSMA/CA (CO2)

b. Explain about protocols for noisy channels. (CO2)

5a. Discuss Design issues of Network layer. (CO3)

b. Explain shortest path routing Algorithm (CO3)

Department of Computer Science & Engineering

Subject: Computer Networks

Assignment -II

A.Y. 2023-24

1a. Elucidate Distance Vector Routing Algorithm with example. (CO3)

b. Explain congestion control algorithms. (CO3)

2a. Discuss the network layer in the Internet. (CO3)

b. Discuss Quality of service in Network layer (CO3)

3a. Explain TCP and UDP Protocols with Header format. (CO4)

b. Explain Elements of Transport protocols (CO4)

4. Write short notes on the following: (CO5)

(a) MIME

(b) Audio compression

(c) DNS

(d) Voice over IP HTTP

(e) FTP

(f) WWW

5. Explain Electronic mail. (CO5)

10. MID EXAM QUESTION PAPER ALONG SAMPLE ANSWER SCRIPTS

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III.B.TECH-I-SEM-I MID EXAMINATIONS, Date:1/11/2023 Time: 10:00 AM TO 11:30 AM

Subject: CN Branch: CSE Marks: 25 M

Note: Question paper contains two parts, Part - A and Part - B.

Part-A is compulsory which carries 10 marks. Answer all questions in part-A.

Part-B consists of (21/2) units. Answer any one full question from each unit. Each question carries 5 marks and may have a, b, c sub questions.

PART-A 5*2=10

1. 1. Define bit stuffing and character stuffing. **(CO1)**
2. Write the advantages of optical fiber over twisted-pair and coaxial cables. **(CO1)**
3. List out the design issues of data link layer. **(CO2)**
4. What is the remainder obtained by dividing x^7+x^5+1 by the generator x^3+1? **(CO2)**
5. What are the functions of Network layer? **(CO3)**

PART-B 3X5=15

6. Draw the layered architecture of the OSI reference model and write the services provided by each layer of the model. **(CO1)**

OR

7. Discuss about the wired transmission media at the physical layer. **(CO1)**

8. Explain about ALOHA Protocols **(CO2)**

OR

9. What are the different types of error detection methods? Explain the CRC error detection technique using generator polynomial x4 +x3 +1 and data 11100011. **(CO1)**

10. Discuss Design issues of Network layer. **(CO3)**

OR

11. Explain shortest path routing Algorithm **(CO3)**

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IV.B.TECH-I-SEM-I MID EXAMINATIONS, Date:28/12/2023 Time: 10:00 AM TO 11:30 AM

Subject: CN **Branch: CSE** **Marks: 25 M**

Note: Question paper contains two parts, Part - A and Part - B.

Part-A is compulsory which carries 10 marks. Answer all questions in part-A.

Part-B consists of (21/2) units. Answer any one full question from each unit. Each question carries 5 marks and may have a, b, c sub questions.

II - MID QUESTION PAPER

PART-A **5X2=10**

1. Explain briefly about flooding.**(CO3)**
2. What are the disadvantages of IPv4.**(CO3)**
3. What are the functions of ICMP? **(CO4)**
4. Explain the differences between POP3 and IMAP. **(CO5)**
5. Write a short note on WWW. **(CO5)**

PART-B **3X5=15**

6. Elucidate Distance Vector Routing Algorithm with example.**(CO3)**

OR

7. Explain congestion control algorithms**.(CO3)**
8. Explain the various fields of the TCP header with the help of a neat diagram. **(CO4)**

OR

9. Explain Elements of Transport Protocols**.(CO4)**
10. Describe DNS with diagrams and real-time examples.**(CO5)**

OR

11. Write short notes on the following: **(CO5)**
    (a) MIME
    (b) Audio compression
    (c) HTTP
    (d) Voice over IP

11. Scheme of Evaluation

MID –I

S.NO		THEORY	MARKS	TOTAL
1	a	bit stuffing and character stuffing	1+1	2
2	a	optical fibre over twisted-pair and coaxial cables	1+1	2
3	a	design issues of data link layer	2	2
4	a	remainder obtained by dividing x^7+x^5+1 by the generator x^3+1	2	2
5	a	functions of Network layer	2	2
6	a	OSI Diagram,	2	5
		Functionalities of OSI layers	3	
7	a	wired transmission media at the physical layer.	5	5
8	a	ALOHA Protocols	5	5
9	a	different types of error detection methods	2	5
		CRC error detection technique using generator polynomial x4 +x3 +1 and data 11100011.	3	
10	a	design issues of network layer with examples.	5	5
11	a	shortest path routing Algorithm	5	5

MID-II

S.NO		THEORY	MARKS	TOTAL
1	a	flooding.	2	2
2	a	disadvantages of IPv4	2	2
3	a	functions of ICMP	2	2
4	a	differences between POP3 and IMAP	2	2
5	a	short note on WWW	2	2
6	a	Distance vector routing algorithm With example	5	5
7	a	congestion control algorithms**.**	5	5
8	a	various fields of the TCP header	3	5
		diagram	2	
9	a	Elements of Transport Protocol	5	5
10	a	DNS with diagrams	3	5
		real-time examples	2	
10	a	the functions of user agent, message transfer agent and message access agent	3	5
		Diagrams	2	
11	a	MIME	1	5
	b	Audio compression	1	
	c	HTTP	2	
	d	Voice over IP	1	

12.Mapping of COs and Pos with PSOs

Course Outcomes	**Relationship of Course Outcomes (CO) to Program Outcomes (PO)**													
CO/PO	P O1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	-	-	-			
CO2		3	3	2	-	-	-	-	-	-	-	-	2	
CO3	-	3	3	2	-	-	-	-	-	-	-	-	2	-
CO4	-	3	3	3	-	-	-	-	-	-	-	-	-	2
CO5	-	-	3	3	3	-	-	-	-	-	-	2		3

13.Cos,POs,PSOs JUSTIFICATION

List of Course Outcomes

S. No	Course Outcomes
CO1	**Explain** the basic concepts and Models of OSI and TCP\IP and transmission media and physical layer.**[Understanding]**
CO2	**Apply** knowledge of Computer Network Concepts to solve problems in Error Control and Access control mechanisms.**[Applying]**
CO3	**Illustrate** data link layer protocols like elementary data link protocols ,sliding window protocols.**[Understanding]**
CO4	**Analyze** the routing and congestion control mechanisms.**[Analyzing]**
CO5	Design and **implementing** user interface applications for peer to peer communication.[**Applying]**

JUSTIFICATION

CO1: Explain the basic concepts and Models of OSI and TCP\IP and transmission media and physical layer
Correlated with PO1 moderately: The knowledge of strong basics of mathematical and engineering principles help students to demonstrate the principles of application layer protocols.
Correlated with PO2 moderately: : Analysis of application layer protocols help students to understand the existing system. Life long learning required to bring in the new developments in the upcoming applications

CO2: Apply knowledge of Computer Network Concepts to solve problems in Error Control and Access control mechanisms.
Correlated with PO2 moderately: Analysis skills required are mandatory whenever deciding the relevant protocol that should be configured for any application
Correlated with PO3 moderately: It helps students to come up with design strategies and arriving at solutions for the complex problems.
Correlated with PO4 moderately: It is an An ability to design and conduct experiments, as well as to analyze and interpret data.
Correlated with PSO1 moderately: The knowledge of strong basics of mathematical principles and computer architecture will help the students to apply and identify functionalities of different transport layer protocols.

CO3: Illustrate data link layer protocols like elementary data link protocols ,sliding window protocols.

Correlated with PO2 moderately: Analysis skills required are mandatory whenever deciding the relevant protocol that should be configured for any application and also for debugging complex problems.
Correlated with PO3 moderately: It helps students to come up with design strategies of any modifications required and induces life long learning.
Correlated with PO4 moderately: It is an An ability to design and conduct experiments, as well as to analyze and interpret data.
Correlated with PSO1 moderately: The knowledge of strong basics of mathematical principles and computer architecture will help the students to identify andapply functionalities of different network layer protocols.

CO4: Analyze the routing and congestion control mechanisms
Correlated with PO2 moderately: Applies the knowledge in identifying the appropriate end to end protocol for reliable communication. .
Correlated with PO3 moderately: Studies about the various routing techniques helps the students to fix up the shortest path routes for packets in the network
Correlated with PO4 moderately:Understanding the various end to end protocols helps in analyzing and interpreting the quality of networks.
Correlated with PSO2 moderately: Mobile networks are used in various domains and hence students will gain an . students will gain skills to function as members of multi-disciplinary teams.
CO5: Design and **implementing** user interface applications for peer to peer communication
Correlated with PO3 moderately: An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.
Correlated with PO4 moderately: An ability to design and conduct experiments, as well as to analyze and interpret data.
Correlated with PO5 High: An ability to use current techniques, skills, and modern tools necessary for computing practice.
Correlated with PO12 moderately: Slightly mapped as the students can use multimedia network applications such as VoIP, you tube.
Correlated with PSO2 moderately: The knowledge of mathematical principles and basics of computer science will help the students to understand the concepts of CDNs.

14.Attainment of COs,POs AND PSOs (Excel sheet)

AFTER RESULT

15. Previous Question Papers

University Question Papers/ Question Bank

UNIT-I

1. With neat diagram explain in detail about different layers of OSI Reference Model

2. Compare and contrast OSI reference model and TCP/IP reference model.

3. What is the need for layered architecture? Explain the features of various protocols used in TCP/IP reference model.

4. What are the layers in OSI-Model? Explain each layer in detail?

5. Briefly explain about guided and unguided media? and differentiate between optical fiber and coax cables?

6. write a short notes on the following.

i.Coaxial cables

ii.Twisted pairs

iii. Fibre optics

iv.wireless transmission

7.. with neat diagram explain the concept of TCP / IP reference model in detail

8. Explain different network software issues.

9. Define computer network. Explain the different Types of Network Hardware.

UNIT-II

1. a) What is pure ALOHA and slotted ALOHA? Mention the advantages of slotted ALOHA?

b. Explain about the design issues of a data link layer

2. Briefly explain ALOHA, CSMA, CSMA/CD and CSMA/CA protocols and Compare its performance.

b. What is the check summed frame transmitted if the message is 1101011011 and the generator polynomial is x 4 + x + 1 using CRC

3. a) Briefly explain about elementary data link protocols and sliding window protocols?

b) Define framing. Write a short notes on Bit stuffing and Character Stuffing

4. Write a short notes on Multiple Access Protocols

5. Describe the channel allocation problem. what are the different channel allocation problems.explain?

6. 8.a. Explain the following.

i.Go-Back- N ARQ protocol using Selective Repeat

ii. simpex protocol and simple stop and wait protocol.

b.write a short notes on the following.

i.carrier sense multiple access Protocol(CSMA)

ii. carrier sense multiple access Protocol with collision detection(CSMA/CD)

iii.Random Acess Protocols(Polling and Token Passing).

9.Explain in detail about collision free Protocols.

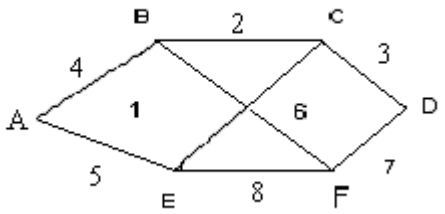
10.Explain with neat diagram about sliding window protocol.

UNIT-III

1. a) Explain Dijkstra's shortest path algorithm.

b) Consider graph given figure 5b. Compute the shortest path from A to D.

Figure 5b



2. a) How hierarchical routing reduces the size of routing table.

b) What is reverse path forwarding? How it helps in broadcasting.

c) What are the services provided by network layer to transport layer.

3. What are the steps involved in congestion control? Explain.

4. a) Define congestion. What are the reasons for congestion?

b) How congestion control is different from flow control?

5. a) How leaky bucket algorithm helps in traffic shaping?

b) Explain the working of token bucket algorithm.

6. Explain about Distance vector routing? And count infinity problem in Distance vector routing?

UNIT-IV

1. a) Define Routing. Explain in detail about static Routing Algorithms.
b) Explain about Distance Vector routing with an example. Explain the Optimality Principle with a suitable example

2.Explain about Hierarchial Routing in detail?

3.Explain the difference between adaptive and Non adaptive Routing algorithms.

4. Explain in detail about Dijkstra's shortest path Routing Algorithm With an example

5.write a short notes on the following .

a.Multicasting

b.Broadcasting

c. flooding

6.Explain in detail about Leafy Bucket Congestion Control algorithm in Network Layer.

7.explain the different Quality of Service measures in Network Layer.

8. Explain internetworking in Network Layer.

9.Describe in detail about the network Layer in the Internet.

10.Describe the Design issues of Network Layer.

UNIT-V

1. a) What are the Services and application of TCP? Compare TCP and UDP Protocol.

b) What is Congestion? Explain the causes and effects of congestion.

2. Explain about congestion control in TCP? Explain Two Congestion control mechanisms?

3. Explain about connection establishment and connection release process in TCP?

4. Draw the TCP Segment Header format? And explain each field in TCP Segment Header?

5. Briefly explain about Elements of Transport Protocol?

6 a) Give DNS Message types and its header format.

b) Explain File Transfer Protocol.

7. Explain the terms

i)Name space ii) Domain name space

iii) Dynamic Domain Name System

iv) DNS Messages

8. a) Explain SNMP in detail.

b) Explain the process of transferring a mail message.

9. a) Explain how DNS is used in the Internet.

b) Explain the services of an user agent of electronic mail

10. Explain name – address and address – name resolution process.

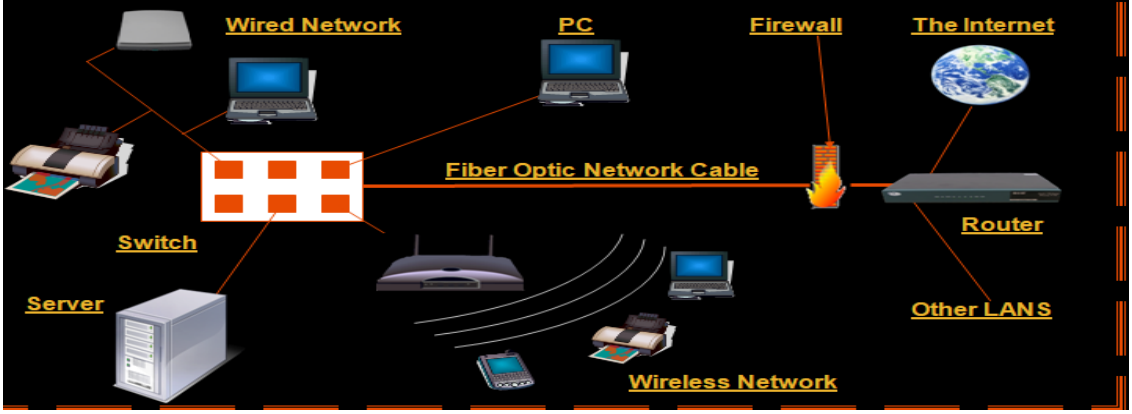
16. Power Point Presentations (PPTs)

The Computer Network

- A **computer network** is a group of computers/devices(Nodes) that use a set of common communication protocols over digital interconnections for the purpose of sharing resources located on or provided by the network nodes.
- The nodes of a computer network may include personal computers, servers, networking hardware, or other specialised or general-purpose hosts.
- The interconnections between nodes are formed from a broad spectrum of telecommunication network technologies, based on physically wired, optical, and wireless technologies.
- A communication protocol is a set of rules for exchanging information over a network.

The Network Diagram

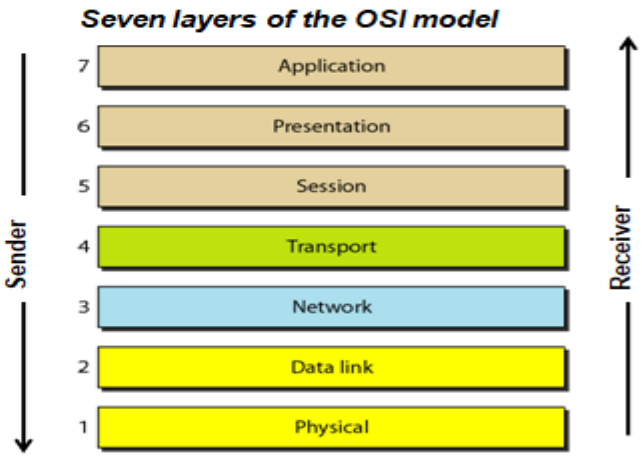
(Click on the Words Below and Learn More About Each Component)



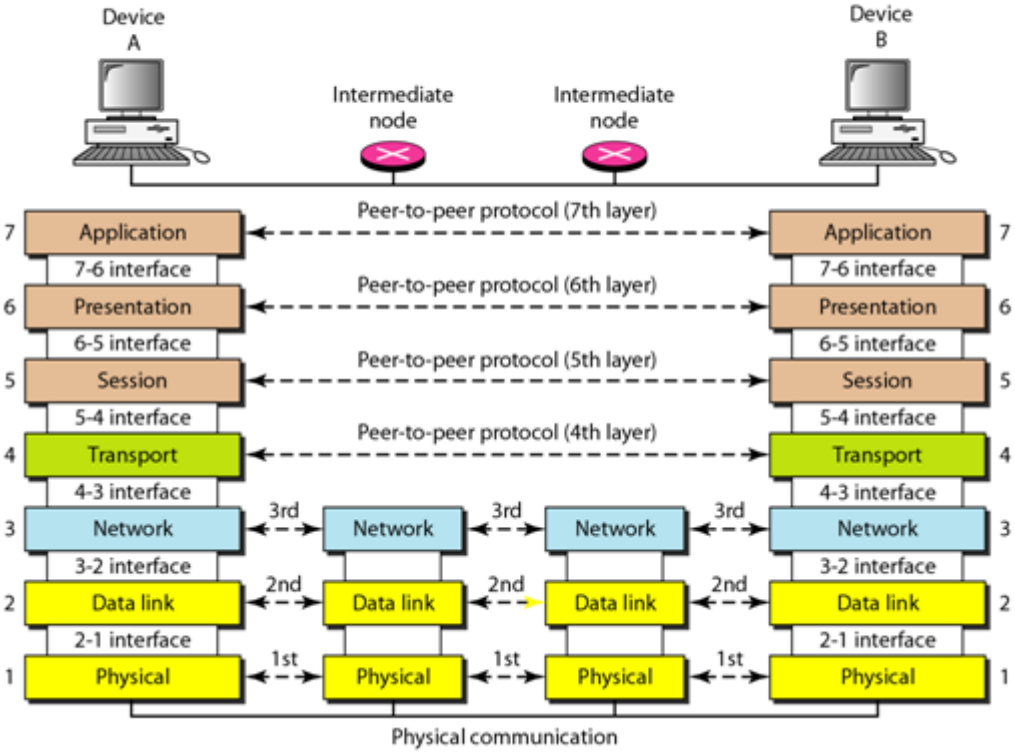
Layered Architecture

- A layered model
- Each layer performs a subset of the required communication functions
- Each layer relies on the next lower layer to perform more primitive functions
- Each layer provides services to the next higher layer
- Changes in one layer should not require changes in other layers
- The processes on each machine at a given layer are called peer-to-peer process

Layers
Layer 7. Application
Layer 6. Presentation
Layer 5. Session
Layer 4. Transport
Layer 3. Network
Layer 2. Data Link
Layer 1. Physical



The interaction between layers in the OSI model



17. Innovative Teaching method if any(Attached Innovative Assignment)

QUESTIONS

INNOVATIVE ASSIGNMENT QUESTIONS

A.Y:2023-24 (III-I SEM)

1. Power point Presentation on TCP/IP layers with real time example.
2. Demonstrate congestion control on TCP /IP protocol using wireshark tool.
3. Installation of NS simulator and explain its Networking commands.

The objectives of these assignments are:

a. To cover basic concepts of networking

b. To understand how networking protocols work

c. To understand basic Linux installation and setting up of the operating environment

d. To study LAN setup and understand basic Networking Commands

4. Study of Research paper on Computer Networks Domain and its application in realtime world.
5. Implement a concept “cycle of bridges with the network segments.

18. References (Textbook/Websites/Journals)

Textbook

TEXT BOOK: 1. Computer Networks -- Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI R18 B.TECHCSE III YEAR

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks-S. Keshav,
2. 2nd Edition, Pearson Education 2. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH

Websites or URLs e- Resources

1) http://www.sis.pitt.edu/~icucart/networking_basics/4LayersofTCPIPModel.html

2) http://pic.dhe.ibm.com

3) faculty.ist.psu.edu/giles/IST220/vghs/Ch5.ppt

4) http://www.jkinfoline.com

5) www.cs.science.cmu.ac.th/person/ekkarat/datacomm/ch18.ppt

6) http://cs.uccs.edu/~cs522/F99rout.PDF

7)www.csi.ucd.ie/staff/jmurphy/networks/csd8_4-datalink_2.pdf

8) http://www.cs.virginia.edu

9) https://www.princeton.edu

10) Compnetworking.about.com

11) http://nptel.iitk.ac.in/

12) www.core.org.cn