

**DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE**

**(AUTONOMOUS)**  
 (Approved by AICTE & Affiliated to Anna University, Chennai)  
 Accredited with 'A' Grade by NAAC, Accredited by TCS  
 Accredited by NBA with BME, ECE & EEE  
**PERAMBALUR - 621 212, Tamil Nadu.**  
 website : [www.dsengg.ac.in](http://www.dsengg.ac.in)

**COURSE PLAN (2024-2025)**

<b>Course Code/Name</b>	<b>U23AIT4 / COMPUTER NETWORKS</b>			
<b>Year/Section/Department</b>	<b>II/AI DS</b>			
<b>Credits Details</b>	<b>L:3</b>	<b>T:0</b>	<b>P:0</b>	<b>C:3</b>
<b>Total Contact Hours Required</b>	<b>45</b>			

**Syllabus:**

<b>UNIT I INTRODUCTION AND PHYSICAL LAYER</b>	<b>No. of Periods 9</b>
Networks – Network Types – Protocol Layering – TCP/IP Protocol suite – OSI Model – Physical Layer: Performance – Transmission media – Switching – Circuit-switched Networks – Packet Switching.	
<b>UNIT II DATA-LINK LAYER &amp; MEDIA ACCESS</b>	<b>No. of Periods 9</b>
Introduction – Link-Layer Addressing – DLC Services – Data-Link Layer Protocols – HDLC – PPP - Media Access Control - Wired LANs: Ethernet - Wireless LANs – Introduction – IEEE 802.11, Bluetooth – Connecting Devices.	
<b>UNIT III NETWORK LAYER</b>	<b>No. of Periods 9</b>
Network Layer Services – Packet switching – Performance – IPV4 Addresses – Forwarding of IP Packets - Network Layer Protocols: IP, ICMP v4 – Unicast Routing Algorithms – Protocols – Multicasting Basics – IPV6 Addressing – IPV6 Protocol.	
<b>UNIT IV TRANSPORT LAYER</b>	<b>No. of Periods 9</b>
Introduction – Transport Layer Protocols – Services – Port Numbers – User Datagram Protocol – Transmission Control Protocol – SCTP.	
<b>UNIT V APPLICATION LAYER</b>	<b>No. of Periods 9</b>
WWW and HTTP – FTP – Email –Telnet –SSH – DNS – SNMP.	

**Objective:**

- ❖ To understand the protocol layering and physical level communication.
- ❖ To analyze the performance of a network.
- ❖ To understand the various components required to build different networks.
- ❖ To learn the functions of network layer and the various routing protocols.
- ❖ To familiarize the functions and protocols of the Transport layer.

**Text Book:**

T1: Behrouz A. Forouzan, Data Communications and Networking, Fifth Edition TMH, 2013.  
T2: "Computer Networks" , By Pearson (5th Edition) by Tanenbaum, January 2013

**Reference Book:**

- R1. Larry L. Peterson, Bruce S. Davie, Computer Networks: A Systems Approach, Fifth Edition, Morgan Kaufmann Publishers Inc., 2012.
- R2. William Stallings, Data and Computer Communications, Tenth Edition, Pearson Education, 2013.
- R3. Nader F. Mir, Computer and Communication Networks, Second Edition, Prentice Hall, 2014.
- R4. Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, Computer Networks: An Open Source Approach, McGraw Hill Publisher, 2011.
- R5. James F. Kurose, Keith W. Ross, Computer Networking, A Top-Down Approach Featuring the Internet, Sixth Edition, Pearson Education, 2013.

**Website:**

W1: [https://www.tutorialspoint.com/data\\_communication\\_computer\\_network/](https://www.tutorialspoint.com/data_communication_computer_network/)  
W2: <https://www.slideshare.net/shafaan/chapter-1-introduction-to-data-communication-and-networks>  
W3: [https://www.cse.wustl.edu/~jain/cse473-05/ftp/i\\_2int.pdf](https://www.cse.wustl.edu/~jain/cse473-05/ftp/i_2int.pdf)  
W4: <https://ecomputernotes.com/computernetworkingnotes/communication-networks/what-is-data-communication>

**Online Mode of Study (if Any):**

- ❖ <http://www.tcpipguide.com>
- ❖ <http://www.ietf.org/rfc.html>
- ❖ <https://nptel.ac.in/course.html>

**Course Plan:**

Topic Number	Topic	Reference Detail	Page Number	Mode of teaching	Number of Periods Required	Cumulative Period
<b>UNIT – I INTRODUCTION AND PHYSICAL LAYER</b>						<b>9</b>
1	Networks	T1	7-12	BB	1	1
2	Network Types	T1	13-19	BB	1	2
3	Protocol Layering	T1	32-35	BB	1	3
4	TCP/IP Protocol suite	T1	35-44	BB	1	4
5	OSI Model	T1	44-46	BB	1	5
6	Physical Layer: Performance	T1	84-88	BB	1	6
7	Transmission media	T1	186-203	PPT	1	7
8	Switching – Circuit switched Networks	T1	209-213	BB	1	8
9	Packet Switching.	T1	213-222	BB	1	9
<b>Outcome of Unit I:</b>						
<ul style="list-style-type: none"> <li>● Explain the basic concepts of networking.</li> <li>● Describe about the switching and types of switching</li> </ul>						
<b>UNIT – II DATA-LINK LAYER &amp; MEDIA ACCESS</b>						<b>9</b>
10	Introduction	T1	238-242	BB	1	10
11	Link-Layer Addressing	T1	242-252	BB	1	11
12	DLC Services	T1	294-299	BB	1	12
13	Data-Link Layer Protocols	T1	299-304	BB	1	13
14	HDLC, PPP	T1	304-319	BB	1	14
	Media Access Control		325-341	BB	1	15

15		T1				
16	Wired LANs: Ethernet	T1	361-383	PPT	1	16
17	Wireless LANs Introduction – IEEE 802.11	T1	439-450	BB	1	17
18	Bluetooth – Connecting Devices	T1	451-457	BB	1	18
<b>Outcome of Unit II:</b>						
<ul style="list-style-type: none"> <li>• Explain the link layer addressing and protocols.</li> <li>• Describe about the wireless LAN and connecting devices.</li> </ul>						
<b>UNIT – III</b>		<b>NETWORK LAYER</b>				<b>9</b>
19	Network Layer Services	T1	512-516	BB	1	19
20	Packet switching, Performance	T1	516-522	BB	1	20
21	IPV4 Addresses	T1	528-546	BB	1	21
22	Forwarding of IP Packets	T1	546-555	PPT	1	22
23	Network Layer Protocols: IP	T1	562-574	BB	1	23
24	ICMP v4	T1	574-581	BB	1	24
25	Unicast Routing Algorithms protocols	T1	611-631	PPT	1	25
26	Multicasting Basics	T1	643-660	BB	1	26
27	IPV6 Addressing , IPV6 Protocol	T1	666-678	BB	1	27
<b>Outcome of Unit III:</b>						
<ul style="list-style-type: none"> <li>• Explain the network layering services</li> <li>• Describe about IPV4 and IPV6</li> </ul>						
<b>UNIT – IV</b>		<b>TRANSPORT LAYER</b>				<b>9</b>
28	Introduction	T1	692-706	BB	1	28
29	Transport Layer protocols	T1	707-726	BB	1	29
30	Transport Layer protocols	T1	707-726	BB	1	30
31	Services	T1	736-737	BB	1	31
32	Port Numbers	T1	736-737	BB	1	32
33	User Datagram Protocol	T1	737-741	BB	1	34
34	Transmission Control Protocol	T1	743-777	BB	1	35
35	SCTP	T1	791-801	PPT	1	36

36	SCTP	T1	791-801	PPT	1	36
<b>Outcome of Unit IV:</b>						
<ul style="list-style-type: none"> <li>• Explain the use of TCP and UDP</li> <li>• Describe about the services of TCP and UDP</li> </ul>						
<b>UNIT – V</b>		<b>APPLICATION LAYER</b>				<b>9</b>
37	WWW	T1	872-876	BB	1	37
38	HTTP	T1	876-887	PPT	1	38
39	FTP	T1	887-891	BB	1	39
40	FTP	T1	887-891	BB	1	40
41	Email	T1	891-904	BB	1	41
42	Telnet	T1	904-905	BB	1	42
43	SSH	T1	907-908	BB	1	43
44	DNS	T1	910-921	BB	1	44
45	SNMP.	T1	934-944	PPT	1	45
<b>Outcome of Unit V:</b>						
<ul style="list-style-type: none"> <li>• Explain the various protocols available in networks and its usage.</li> <li>• Describe about domain name space and its hierarchy.</li> </ul>						

**Course Outcome:**

At the end of course, Students should be able to do:

**CO 1:** Understand the basic layers and its functions in computer networks.

**CO 2:** Evaluate the performance of a network.

**CO 3:** Understand the basics of how data flows from one node to another.

**CO 4:** Analyze and design routing algorithms.

**CO 5:** Design protocols for various functions in the network.

**Course Outcome Vs Program Outcome Mapping:**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	0	0	0	0	1	0	0	0	0	0	0
CO 2	0	2	0	0	0	0	1	1	0	0	0	0
CO 3	0	0	2	0	0	0	0	0	0	0	0	0
CO 4	0	0	0	2	0	0	0	0	0	0	0	0
CO 5	0	0	0	0	0	0	0	2	2	0	0	0

**Content beyond Syllabus:**

- ❖ Implementation/ simulation of the protocols
- ❖ FDDI

❖ Error Correction and Detection
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**Assignment:**

Batch Details	Register Number	Total Number	Mode of Assignment MCQ/Seminar/ PPT	Topics
<b>Batch 1</b>	810423243001	40	<b>Written</b>	1. ISO OSI model with neat diagram
	-			2. Circuit and packet switching in detail
	810423243040			3. link layer addressing
<b>Batch 2</b>	810423243041	40	<b>Seminar</b>	1. Transmission media
	-			2. TCP/IP protocol suite
	810423243080			3. DLC services
<b>Batch 3</b>	810421243081	47	<b>PPT</b>	1. HDLC
	-			2. Data link layer Protocols
	810423243123,			3. Media access control.
	810423243301			
-				
	810423243304			

**Assignment: 2**

<b>Batch 1</b>	810423243001	40	<b>Seminar</b>	1. IPV4 addresses
	-			2. ICMP v4
	810423243040			3. IPV6 Protocol.
<b>Batch 2</b>	810423243041	40	<b>PPT</b>	1. Forwarding of IP Packets.
	-			2. Network layer services.
	810423243080			3. Packet switching Performance.
<b>Batch 3</b>	810421243081	47	<b>Written</b>	1. Unicast routing algorithms protocol.
	-			2. IPV6 addressing in detail
	810423243123,			
	810423243301			3. Multicasting.
-				
	810423243304			

<b>Assignment: 3</b>					
<b>Batch 1</b>	810423243001	40	<b>PPT</b>	1. UDP.	
	-			2. TCP.	
	810423243040			3. SCTP.	
<b>Batch 2</b>	810423243041	40	<b>Written</b>	1. Transport layer protocols with example	
	-			2. Services and port numbers of transport layer protocols	
	810423243080			3. Explain E-mail services.	
<b>Batch 3</b>	810421243081	47	<b>Seminar</b>	1. World wide web.	
	-			2. HTTP.	
	810423243123,			3. FTP. 4. Telnet	
	810423243301				
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810423243304					
SIM 1	Questions of Anna University with Year mentioned (12Q+12Q+ 12Q) <b>Annexure – I attached</b>				
SIM 2					
SIM 3					

**Submission Details:**

<b>Phase 1(Before AT 1)</b>		<b>Phase 2 (Before AT 2)</b>		<b>Phase 3 (Before AT 3)</b>	
<b>Assignment 1</b>	<b>SIM 1</b>	<b>Assignment 2</b>	<b>SIM 2</b>	<b>Assignment 3</b>	<b>SIM 3</b>

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**VERIFIED BY**

**APPROVED BY**

**PRINCIPAL**

**ANNEXURE – I**

**SIM - 1 QUESTIONS**

1. Explain in detail, the OSI-ISO reference model of a computer with neat diagram. ((M-11)(N-12)(N-11)
2. Explain the TCP/IP reference model with neat sketch (M-13)
3. Explain the different types of switching networks and list out its advantages and disadvantages. (N-12)
4. Explain the four basic network topologies and explain with its relevant features (N-10)
5. Differentiate guided media from unguided media.
6. How is cable TV used for data transfer? Explain detail.(M-11)(M-15)
7. What are the different types of transmission media available? Explain the various standards of guided and unguided media (N-14 MCA)
8. Explain the functioning of Wireless LANs in detail (N-10)
9. List out the types of Ethernet. Explain in detail standard Ethernet and fast Ethernet in detail (N-12)(N-11)
10. Explain the architecture and layers of ATM. (N-12)
11. Explain the flow and error control mechanisms in data link control. (N-11)
12. Explain the stop and wait protocol with a neat diagram ,Write short notes on Bluetooth technology.(M-13) (N-11)

**SIM - 2 QUESTIONS**

1. Explain the architecture of a frame relay network with a neat sketch.(M-13)
2. Explain the random access protocols in data link layer.(N15)
3. Explain the flow and error control mechanisms in data link control. (N-11)
4. Explain piconet and scatter net with diagrams(M-13)
5. Write short notes on the following: BOOTP. (N-12)(N-11)
6. Explain the different classes of IP addressing. (M-12)
7. Explain in detail the IPV6 addressing schemes, notation, representation and address space in detail. (N-10)
8. Explain in detail the ICMP message format and error reporting in detail. (M-13)
9. Define bridge. Explain the features and types of bridges. (N-11)
10. Draw the IPV4 header format and explain the various components and its role in that format. (M-12)
11. Explain in detail any one routing algorithm , Explain in detail the role of ARP and RARP. (M-14) (M-15)
12. Explain the segment formats for TCP and UDP. (N-12)

**SIM - 3 QUESTIONS**

1. How is connection established and released in TCP? Explain with neat sketch(M-13) (M-12)
2. Explain the congestion control mechanism and transmission control protocol with neat sketches. (N-11) (N-12) (M-12)
3. Explain in detail, the TCP congestion avoidance algorithm, Explain the default timer mechanism followed in TCP. (N-11) (M-13)
4. Explain the leaky bucket and token bucket algorithm with flow charts, Explain in detail the techniques to improve QOS. (N-11)
5. Explain in detail the user datagram protocol (UDP) in detail, Explain in detail, the transmission control protocol . (N-12) (N-13)
6. Explain the following characteristics. Reliability,Delay,Jitter,Bandwidth . (M-14)
7. Explain in detail, DNS and its frame format , Explain the SMTP. List out its uses, state strengths and weakness. (N-11) (N-10) (M-12) (N-12)
8. What is the role of the local name server and the authoritative name server in DNS? What is the resource record maintained in each of them. (N-10)
9. Explain in detail, the HTTP and FTP with neat sketches. (N-11) (N-12) (N-13)
10. Explain the concept of cryptography, the symmetric key and public key algorithms. (N-12) (N-13)
11. Draw the architecture of WWW and explain in detail the various blocks. (M-13)
12. Explain the private key cryptosystem with an example, Explain the RSA algorithm with an example. (M-14) (M-15)