

DSEC/IT/ U23ITV42 / III YEAR / V SEM



**DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE**  
(AUTONOMOUS)

(Approved by AICTE & Affiliated to Anna University, Chennai)

Re-Accredited by NAAC with 'A' Grade

Accredited by NBA for AERO, BME, CSE, ECE, EEE, IT & MECH.

PERAMBALUR-621212, TAMILNADU, INDIA.

Website: www.dsengg.ac.in



**COURSE PLAN 2025-2026**

<b>Name of the Faculty</b>				
<b>Designation/Department</b>	AP/IT			
<b>Course Code/Name</b>	U23ITV42/INTERNETWORKING WITH TCP/IP			
<b>Year/Section/Department</b>	III/A&C			
<b>Credits Details</b>	L:3	T:0	P:0	C:3
<b>Total Contact Hours Required</b>	45			

**Syllabus:**

<b>UNIT I INTRODUCTION</b>	<b>No.of Periods 9</b>
Internetworking concepts and architectural model- classful Internet address – CIDR-Subnetting and Supernetting –ARP- RARP- IP – IP Routing –ICMP – Ipv6	
<b>UNIT II TCP</b>	<b>No.of Periods 9</b>
Services – header – connection establishment and termination- interactive data flow- bulk data flow-timeout and retransmission – persist timer – keep alive timer- futures and performance	
<b>UNIT III IP IMPLEMENTATION</b>	<b>No.of Periods 9</b>
IP global software organization – routing table- routing algorithms-fragmentation and reassembly-error processing (ICMP) –Multicast Processing (IGMP)	
<b>UNIT IV TCP IMPLEMENTATION I</b>	<b>No.of Periods 9</b>
Data structure and input processing – transmission control blocks- segment format- comparison- finite state machine Implementation -Output processing- mutual exclusion-computing the TCP data length.	
<b>UNIT V TCP IMPLEMENTATION II</b>	<b>No.of Periods 9</b>
Timers-events and messages- timer process- deleting and inserting timer event- flow control and adaptive retransmission-congestion avoidance and control – urgent data processing and push function.	

**Objective:**

1. To learn IP addressing, routing, and protocols.
2. To understand TCP services, header, and connection management.
3. To study IP routing and error processing.
4. To explore TCP data structures and segment formatting.
5. To learn about TCP timers, flow control, and congestion management.

**Text Book:**

1. Douglas E Comer, "Internetworking with TCP/IP Principles, Protocols and Architecture", Vol 1 and 2, VI th Edition, 2014.
2. W. Richard Stevens "TCP/IP Illustrated" Vol 1, II Edition. 2011.

**Reference Book:**

1. Forouzan, "TCP/IP Protocol Suite" Fourth Edition, Tata MC Graw Hill, 2014.
2. Andrew S. Tanenbaum, David J. Wetherall, and Nick Feamster "Computer Networks" VI th Edition Pearson Education 2021 .
3. Larry L. Peterson, Bruce S. Davie, Computer Networks: A Systems Approach, Fifth Edition, Morgan Kaufmann Publishers Inc., 2012.

**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.techtarget.com/searchnetworking/definition/Transport-layer>

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

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

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**Course Plan:**

SN o	Topic	Reference Detail	Page Number	Mode of teaching	Number of Periods Required	Cumulati ve Period
<b>UNIT I</b> <span style="float: right;"><b>9</b></span>						
1	Internetworking concepts and architectural model	T1	1-3	BB	1	1
2	Classful Internet address	T1	8-10	BB	1	2
3	CIDR	R1	5	BB/PPT	1	3
4	Subnetting and Supernetting	R1	6	BB	1	4
5	ARP	T1	16-17	BB	1	5
6	RARP	R1	45-46	BB	1	6
7	IP	R1	60-62	BB	1	7
8	IP Routing	T1	35-36	BB	1	8
9	ICMP,IPV6	R1	90-93	BB	1	9
<b>Outcome of Unit I:</b>						
<ul style="list-style-type: none"> <li>• <b>CO1:</b> Understand internetworking concepts, TCP/IP architecture, and IP addressing schemes</li> </ul>						
<b>UNIT II</b> <span style="float: right;"><b>9</b></span>						
10	Services	R1	156	BB	1	10
11	Header	W1	-	PPT	1	11
12	Connection establishment and termination	R1	201-205	BB/PPT	1	12
13	Interactive data flow	R2	101-104	BB	1	13
14	Bulk data flow	R1	214-215	BB	1	14
15	Timeout and retransmission	R2	135	BB	1	15
16	Persist timer	R1	218	BB	1	16
17	Keepalive timer	T2	5	BB	1	17
18	Futures and performance	T2	25	BB	1	18
<b>Outcome of Unit II:</b>						
<ul style="list-style-type: none"> <li>• <b>CO2:</b> Analyze TCP services, headers, and connection management mechanisms</li> </ul>						
<b>UNIT III</b> <span style="float: right;"><b>CONTROL FLOW AND FUNCTIONS</b></span> <span style="float: right;"><b>9</b></span>						
19	IP global software organization	T1	200-202	BB/PPT	1	19
20	IP Concepts And Objectives	T1	203	BB/PPT	1	20
21	Routing table	T1	222-223	BB	1	21
22	Routing algorithms	T1	245-246	BB	1	22
23	Static Routing	T1	193-195	BB	1	23

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24	Dynamic routing	T2	205-206	BB	1	24
25	Fragmentation and reassembly	T1	301-305	BB	1	25
26	Fragmentation Control Fields	T1	306-308	BB	1	26
27	Error processing (ICMP)	R2	195	BB	1	27

**Outcome of Unit III:**

- **CO3:** Describe TCP services, header formats, connection establishment and termination, and data flow mechanisms.

**UNIT IV**

**9**

28	Data structure and input processing	R1	140	BB	1	28
29	transmission control blocks	R1	160	BB	1	29
30	segment format	T1	140	PPT	1	30
31	Comparison	R1	162	BB	1	31
32	finite state machine implementation	R1	159	BB	1	32
33	Output processing	R1	125	BB	1	33
34	mutual exclusion	R1	163	BB	1	34
35	computing the TCP data length	R1	133	BB	1	35
36	TCP header format	T1	315	BB	1	36

**Outcome of Unit IV:**

- **CO4:** Explain IP routing algorithms, fragmentation, and ICMP error processing

**UNIT – V**

**9**

37	Timers	T2	248	BB	1	37
38	Events And Messages	R1	465-467	BB	1	38
39	Timer Process	R1	468-469	PPT	1	39
40	Deleting And Inserting Timer Event	T2	255	BB	1	40
41	Flow Control And Adaptive Retransmission	T2	264-265	BB	1	41
42	Adaptive retransmission techniques	T1	266-268		1	42
43	Congestion Avoidance And Control	T1	487	BB	1	43
44	Urgent Data Processing And Push Function.	W3	-	BB	1	44
45	Push flag and Urg flag	W3	-	BB	1	45

**Outcome of Unit V:**

- **CO5:** Apply TCP data structures, FSMs, and segment processing techniques

- **CO6:** Evaluate TCP timers, flow control, and congestion control mechanisms

### Course Outcome Vs Program Outcome Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	-	-	-	-	-	-	-	2	2	3	1
CO2	3	3	2	1	-	-	-	-	-	-	2	2	3	1
CO3	3	3	2	-	-	-	-	-	-	-	2	-	3	1
CO4	3	3	3	2	1	-	-	-	-	-	1	-	3	2
CO5	3	3	3	2	2	-	-	-	-	-	1	-	2	2
CO6	3	3	-	2	2	-	-	-	-	-	1	-	2	2
AVG	3	2.83	2.2	1.75	1.66	-	-	-	-	-	1.5	2	2.66	1.5

[Levels of correlation: 3 (High), 2 (Medium), 1(Low)]

### Content beyond Syllabus:

1. QUIC Protocol
2. Modern Transport Layer Evolution

### Assignment:

Web portal	Assignment	Components	Topic Number with Topic / Unit Details	Relevance to CO
	--	Assessment – I (60)	Unit I and II	CO1 & CO2
Web portal 1	1	Assignment Handwritten (20)	1. Internetworking concepts and architectural model 2. Classful Internet address 3. ICMP	CO1

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Web portal	Assignment	Components	Topic Number with Topic / Unit Details	Relevance to CO
	2	Poster / PPT Presentation (20)	1. Interactive data flow 2. Bulk data flow	CO2
Web portal 2	--	Assessment – II (60)	Unit III and IV	CO3 & CO4
	3	Seminar (20)	1. Routing algorithms 2. Error processing (ICMP)	CO3
	4	Case Study Report/ Mini Project/Model Making (20)	1. Data structure and Input processing 2. Finite state machine implementation	CO4
Web portal 3	--	Model Exam (75)	Unit I to V	CO1 to CO6
	5	MCQ (15)	Unit I to V	CO1 to CO6
	--	Course Attendance (10)	--	--

**Submission Details:**

Phase 1 (Before AT 1)	Phase 2 (Before AT 2)	Phase 3 (Before Model Exam)
Assignment 1 & 2	Assignment 3 & 4	Assignment 5

**PLAN OF ASSESSMENT TEST –DISTRIBUTION OF MARKS:**

TEST	CO- MARK WISE DISTRIBUTION						BLOOM'S LEVEL MARK WISE DISTRIBUTION					
	CO1	CO2	CO3	CO4	CO5	CO6	BTL1	BTL2	BTL3	BTL4	BTL5	BTL6
AT-1	30	30	-	-	-	-						
	-	-	30	30	-	-						
AT-2	30	30	-	-	-	-						
	-	-	30	30	-	-						

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<b>MODEL</b>	<b>CO1</b>	<b>CO2</b>	<b>CO3</b>	<b>CO4</b>	<b>CO5</b>	<b>CO6</b>	<b>BTL1</b>	<b>BTL2</b>	<b>BTL3</b>	<b>BTL4</b>	<b>BTL5</b>	<b>BTL6</b>
	20	20	20	20	10	10						

**Google Classroom Code : omx3n7ep**

**Google Classroom Name : Internetworking with TCP/IP**

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