

**DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE****(AUTONOMOUS)**

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

Accredited with 'A' Grade by NAAC, Accredited by TCS

Accredited by NBA with BME, ECE &amp; EEE

**PERAMBALUR - 621 212. Tamil Nadu.**website : [www.dsengg.ac.in](http://www.dsengg.ac.in)**LABORATORY COURSE PLAN (2023-2024 EVEN SEM)****COURSE – INFORMATION:**

<b>LAB COURSE TITLE</b>	<b>COMPUTER NETWORKS LABORATORY</b>			
<b>LAB COURSE CODE</b>	<b>U23ITP42</b>			
<b>LAB COURSE STRUCTURE</b>	<b>LECTURE</b>	<b>TUTORIAL</b>	<b>PRACTICAL</b>	<b>CREDIT</b>
	0	0	4	2
<b>REGULATION</b>	<b>BRANCH</b>	<b>YEAR</b>	<b>SEMESTER</b>	<b>ACADEMIC YEAR</b>
<b>2020</b>	IT	II ( A & C)	IV	2023-2024
<b>COURSE INCHARGE</b>	<b>Mrs. A.SIVASANKARI</b>			

**SYLLABUS****COURSE OBJECTIVE:****The student should be made to:**

- ❖ To learn and use network commands.
- ❖ To learn socket programming.
- ❖ To implement and analyze various network protocols.
- ❖ To learn and use simulation tools.
- ❖ To use simulation tools to analyze the performance of various network protocols.

**LIST OF EXPERIMENTS**

1. Learn to use commands like tcpdump, netstat, ifconfig, nslookup and trace route. Capture ping and trace route PDUs using a network protocol analyzer and examine.
2. HTTP web client program to download a web page using TCP sockets.
3. Applications using TCP sockets: like
  - Echo client and echo server
  - Chat
  - File Transfer
4. Simulation of DNS using UDP sockets.
5. Code simulating ARP /RARP protocols.
6. Study of Network simulator (NS) and Simulation of Congestion Control Algorithms using NS.
7. Study of TCP/UDP performance using Simulation tool.
8. Simulation of Distance Vector/ Link State Routing algorithm.
9. Performance evaluation of Routing protocols using Simulation tool.
10. Simulation of error correction code (likeCRC).

**TOTAL: 60 PERIODS****TEXT/REFERENCE BOOKS:**

1. Herbert Schildt, Java: The Complete Reference, Tata McGraw Hill, 2011
2. Y. Daniel Liang, Introduction to Java Programming, Pearson, 2013
3. Abraham Silberschatz, Peter B Galvin, Greg Gagne, Operating System Concepts, Wiley India, 2015.
4. Computer Networks A Systems Approach-Larry L.Peterson and Bruce S.Davie,4<sup>th</sup> Edition Morgan Kaufman

**VIRTUAL LAB LINK:**

<a href="https://www.bits-pilani.ac.in/computer-networks-network-programming-lab">https://www.bits-pilani.ac.in/computer-networks-network-programming-lab</a>
<a href="https://www.nptelvideos.in/2012/11/computer-networks.html">https://www.nptelvideos.in/2012/11/computer-networks.html</a>
<a href="https://iiitbh.ac.in/cn-lab">https://iiitbh.ac.in/cn-lab</a>
<a href="https://www.tecmint.com/linux-network-configuration-and-troubleshooting-commands">https://www.tecmint.com/linux-network-configuration-and-troubleshooting-commands</a>
<a href="https://www.comptechdoc.org/os/linux/commands/linuxcrspfiles.html">https://www.comptechdoc.org/os/linux/commands/linuxcrspfiles.html</a>

EXP. NO.	NAME OF THE EXPERIMENTS	NO. OF PERIODS	CUMULATIVE PERIODS
<b>CYCLE I</b>			
1	Learn to use commands like tcpdump, netstat, ifconfig, nslookup and trace route.	4	4
2	Capture ping and trace route PDUs using a network protocol analyzer and examine.	4	8
3	HTTP web client program to download a web page using TCP sockets.	4	12
4	Applications using TCP sockets like: <ul style="list-style-type: none"> <li>• Echo client and echo server</li> <li>• Chat</li> <li>• File Transfer</li> </ul>	8	20
5	Simulation of DNS using UDP sockets.	4	24
6	Code simulating ARP /RARP protocols.	4	28
<b>CYCLE II</b>			
7	Study of Network simulator (NS) and Simulation of Congestion Control Algorithms using NS.	8	36
8	Study of TCP/UDP performance using Simulation tool.	4	40
9	Simulation of Distance Vector/ Link State Routing algorithm.	8	48
10	Performance evaluation of Routing protocols using Simulation tool.	4	52
11	Simulation of error correction code (like CRC).	8	60

## COURSE OUTCOME

**At the end of the course, the student should be able to:**

- CO1: Implement various protocols using TCP and UDP
- CO2: Compare the performance of different transport layer protocols
- CO3: Use simulation tools to analyze the performance of various network protocols
- CO4: Analyze various routing algorithms
- CO5: Implement error correction codes
- CO6: Explain Network simulator (NS) and Simulate Congestion Control Algorithms using NS.

## CO-PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO1	PSO2
CO1	3	1	2	0	2	0	0	0	0	0	0	0	2	2
CO2	1	1	2	0	2	0	0	0	0	0	0	0	2	2
CO3	2	2	1	0	2	0	0	0	0	0	0	0	2	2
CO3	1	2	1	0	1	0	0	0	0	0	0	0	2	2
CO4	2	2	1	0	1	0	0	0	0	0	0	0	2	2
CO5	2	1	2	0	2	0	0	0	0	0	0	0	2	2
CO6	2	1	1	0	2	0	0	0	0	0	0	0	2	2
AVG	2.16	1.57	1.43	0.00	1.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	2

## ADDITIONAL EXPERIMENTS

EXP. NO.	NAME OF THE EXPERIMENTS	Identified Resource link
1	Write a program for the simulation of Applets and GUI	<a href="https://www.geeksforgeeks.org/java-applet-basics/">https://www.geeksforgeeks.org/java-applet-basics/</a>
2	Write a program for the simulation of ns-3	<a href="https://www.nsnam.org/docs/tutorial/html/quick-start.html">https://www.nsnam.org/docs/tutorial/html/quick-start.html</a>
3	Write a program to implement a simple thread	<a href="http://www.nptelvideos.in/2012/11/computer-networks.html">http://www.nptelvideos.in/2012/11/computer-networks.html</a>
4	Implement Simple Mail Transfer Protocol.	<a href="https://www.tecmint.com/linux-network-configuration-and-troubleshooting-commands">https://www.tecmint.com/linux-network-configuration-and-troubleshooting-commands</a>
5	Implementation of Inter Process Communication using PIPE, Message Queue, Shared Memory.	<a href="http://www.comptechdoc.org/os/linux/commands/linuxcrsfiles.html">http://www.comptechdoc.org/os/linux/commands/linuxcrsfiles.html</a>

## MODEL LAB DETAILS

BATCH	REGISTER NO.	MODE OF LAB CONDUCT	DATE	TIMING
II IT-A (I & II)	810422205001- 810422205062 & 810422205301- 810422205304			
II IT-C (I & II)	810422205128- 810422205189 & 810422205309- 810422205311			

## LIST OF QUESTIONS

1. Write a UDP Minichat Client/Server Application to support multiple simultaneous Chat sessions Using multithreading.
2. Design and study the performance of STAR and Ring topology using simulator.
3. A simple UDP server program that waits for client's requests and then accepts the message (datagram) and the server program can manipulate client's messages/request and send a new message as a response.
4. Examine the throughput performance of sliding window with varying packet sizes, error rates and Round Trip Times.
5. Use simulator to analyses the performance of Routing Information Protocol(RIP), a routing protocol and observe how RIP is affected by link failures.
6. Write a UDP program to multicast messages to more than one other machine at the same time.
7. Write a program for the simulation of Domain Name System.
8. Write a program to get the IP or Doted decimal address of the system using RARP.
9. Write a program to simulate the calculation of traditional checksum.
10. Write a program to simulate the distance-vector algorithm
11. Write a program to simulate the link-state algorithm
12. Write a program to simulate the path-vector algorithm
13. Develop applications using UDP Sockets for DNS.
14. Develop applications using UDP Sockets for SNMP.
15. Develop applications using UDP Sockets for File Transfer.
16. Write and test a program to simulate CDMA.
17. Simulate error correction code (like CRC).
18. Write a program for the simulation of Domain Name System.
19. Write and test a program to simulate the flow diagram of CSMA/CA.
20. Implement and Configure the link state routing topology in VPN.

**VIVA QUESTIONS**

1. What are functions of different layers?
2. Differentiate between TCP/IP Layers and OSI Layers.
3. Why header is required?
4. What is the use of adding header and trailer to frames?
5. What is encapsulation?
6. Why fragmentation requires?
7. What is MTU?
8. Which layer imposes MTU?
9. Differentiate between flow control and congestion control.
10. Differentiate between Point-to-Point Connection and End-to-End connections.
11. What are protocols running in different layers?
12. What is Protocol Stack?
13. Differentiate between TCP and UDP.
14. Differentiate between Connectionless and connection oriented connection.
15. Why frame sorting is required? 16. What is meant by subnet?
17. What is meant by Gateway?
18. What is an IP address?
19. What is MAC address?
20. Why IP address is required when we have MAC address?
21. What is meant by port?
22. What is a socket?
23. What are the parameters of socket()?
24. Describe bind(), listen(), accept(),connect(), send() and recv().

**Prepared By**

(A.SIVASANKARI AP/IT)

**Verified By**

Ms.S.SARAVANAN  
(HOD/IT)

**Approved By  
PRINCIPAL**