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Note : Remove "Table of Content" before including in CP Book

17CSL57 : COMPUTER NETWORK LABORATORY

A. LABORATORY INFORMATION

1. Lab Overview

Degree:	B.E	Program:	CS
Year / Semester :	5	Academic Year:	2018-19
Course Title:	Computer Network Laboratory	Course Code:	17CSL57
Credit / L-T-P:	2/ 2-0-0	SEE Duration:	180 Minutes

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Total Contact Hours:	40 Hrs	SEE Marks:	80 Marks
CIA Marks:	20	Assignment	1 / Module
Course Plan Author:	Chandana L S	Sign	Dt :
Checked By:		Sign	Dt :

2. Lab Content

Unit	Title of the Experiments	Lab Hours	Concept	Blooms Level
1	Implement three nodes point – to – point network with duplex links between them.Set the queue size, vary the bandwidth and find the number of packets dropped. Implement transmission of ping messages/trace route over a network topology consisting of 6 nodes and find the number of packets dropped due to congestion.	8	Network Communication	L4 Analyze
2	Implement an Ethernet LAN using n nodes and set multiple traffic nodes and plot congestion window for different source / destination. Implement simple ESS and with transmitting nodes in wire-less LAN by simulation and determine the performance with respect to transmission of packets. Write a program for congestion control using leaky bucket algorithm	8	Congestion control	L4 Analyze

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3	Implement and study the performance of GSM on NS2/NS3 (Using MAC layer) or equivalent environment. Implement and study the performance of CDMA on NS2/NS3 (Using stack called Call net) or equivalent environment.	8	Wireless protocols	L4 Analyze
4	Write a program for error detecting code using CRC-CCITT (16- bits). Write a program to find the shortest path between vertices using bellman-ford algorithm. Write a program for simple RSA algorithm to encrypt and decrypt the data	8	Error detection / correction	L3 Apply
5	Using TCP/IP sockets, write a client – server program to make the client send the file name and to make the server send back the contents of the requested file if present.Implement the above program using as message queues or FIFOs as IPC channels. Write a program on datagram socket for client/ server to display the messages on client side, typed at the server side.	8	Client server communication	L4 Analyze

3. Lab Material

Unit	Details	Available
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1	Text books	
	James F Kurose and Keith W Ross, Computer Networking, A Top-Down Approach, Sixth edition, Pearson,2017 .	In Lib
2	Reference books	
		In dept
3	Others (Web, Video, Simulation, Notes etc.)	
	https://www.tutorialspoint.com/	Available
	vtuplanet.com/	

4. Lab Prerequisites:

-	-	Base Course:		-	-
SNo	Course Code	Course Name	Topic / Description	Sem	Remarks
1	17CSL57	COMPUTER NETWORK LABORATORY	Modify the topology and parameters set for the experiment and take multiple rounds of reading and analyze the results available in log files	5	

Note: If prerequisites are not taught earlier, GAP in curriculum needs to be addressed. Include in Remarks and implement in B.5.

5. General Instructions

SNo	Instructions	Remarks

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1	Students should come with thorough preparation for the experiment to be conducted.	
2	Students will not be permitted to attend the laboratory unless they bring the practical record fully completed in all respects pertaining to the experiment conducted in the previous class.	
3	Practical record should be neatly maintained.	
4	They should obtain the signature of the staff-in-charge in the observation book after completing each experiment.	
5	Theory regarding each experiment should be written in the practical record before procedure in your own words.	
6	Ask lab technician for assistance if you have any problem.	
7	Save your class work, assignments in system .	
8	Do not download or install software without the assistance of the laboratory technician.	
9	Do not alter the configuration of the system.	
10	Turnoff the systems after use.	

6. Lab Specific Instructions

SNo	Specific Instructions	Remarks
1	Start computer	
2	Open the terminal	
3	Write tcl program	
4	Write awk program	
5	Save the program with .tcl and .awk extension.	
6	Run the simulation program	
7	Run the awk file	

B. OBE PARAMETERS

1. Lab / Course Outcomes

#	COs	Teach. Hours	Concept	Instr Method	Assessment Method	Blooms' Level
1	Learn TCL script and	8	Network	Tutori	Slip Test	L4

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	Simulate the protocols		Communication	al		Analyze
2	Analyze the wired and wireless networks	8	Congestion control	Demonstrate	Assignment and Slip Test	L4 Analyze
3	Interpret the different technologies on NS2/NS3	8	Wireless protocols	Interpretation	Slip Test	L4 Analyze
4	Calculate the error detection and correction over the network	8	Error detection/correction	Illustrate	Slip Test	L3 Apply
5	Analyze the behaviour of client server computations	8	Client server communication	Demonstrate	Assignment	L4 Analyze
-	**Total**	40	-	-	-	-

Note: Identify a max of 2 Concepts per unit. Write 1 CO per concept.

2. Lab Applications

SNo	Application Area	CO	Level
1	Analyzes the different networking protocol used in application layer	CO1	L4
2	Able to analyze the protocols and services used in TCP and UDP	CO1	L4

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3	Acquires the knowledge of various types of concepts in Application layer	CO2	L4
4	Able to apply wireless networking in wireless network	CO2	L4
5	Compare Routers internet protocol in network layer	CO2	L4
6	Analyzes the concept of multimedia network	CO3	L4
7	Able to compare the routing algorithms for routing of packets.	CO4	L3
8	Able to analyze the security issue in network management	CO4	L4
9	Analyzes the delivery of data beteween end to end system	CO5	L4

Note: Write 1 or 2 applications per CO.

3. Articulation Matrix

(CO – PO MAPPING)

-	Course Outcomes					Program Outcomes								
#	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	Level
CS501PC.1	Learn TCL script and Simulate the protocols	1	2	3	-	5	-	-	-	-	-	-	12	L4 Analyze
CS501PC.2	Analyze the wired and wireless networks	1	-	3	-	5	-	-	-	-	-	-	12	L4 Analyze
CS501PC.3	Interpret the different technologies on NS2/NS3	1	2	3	-	5	-	-	-	-	-	-	12	L4 Analyze
CS501PC.4	Calculate the error	1	2	3	-	-	-	-	-	-	-	-	-	L3

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	detection and correction over the network													Apply
CS501PC.5	Analyze the behaviour of client server computations	-	2	-	-	-	-	-	-	-	10	-	-	L4 Analyze
CS501PC.	Average													

Note: Mention the mapping strength as 1, 2, or 3

4. Mapping Justification

Mapping		Mapping Level	Justification
CO	**PO**	-	-
CO1	PO1		Students will acquire knowledge network topologies and protocols
CO1	PO2		Studies about the analysis of different network protocols helps in the network designing.
CO1	PO3		Students will be able to understand how these LAN Configuaration and IP addressing is done in simulation mode of packet tracer tool
CO1	PO5		Static and dynamic routing protocols simulation will be familiarized by the students
CO1	PO12		Information for protocol evaluation gives lifelong learning in the design of the network
CO2	PO1		Students will be obtaining the basic knowledge of wireless networking concepts
CO2	PO3		To design a Xgraph the knowledge of wireless technologies is required
CO2	PO5		For simulation purpose the NS2 is used
CO2	PO12		The knowledge of wireless networking concept is required for life long learning in the concept of technological change
CO3	PO1		Students will be obtaining the basic knowledge of wireless networking concepts
CO3	PO2		Understand the implementation of GSM and CDMA in a network by creating a environment
CO3	PO3		To design a Xgraph the knowledge of wireless technologies is required
CO3	PO5		For simulation purpose the NS2 is used
CO3	PO12		The knowledge of wireless networking concept is required for life long learning in the concept of technological change
CO4	PO1		To solve a problem basic knowledge of routing algorithms is required
CO4	PO2		To analyze the complex problem the knowledge of routing protocols is required
CO4	PO3		To design a solution for a problem the baisc knowledge of the routing algorithms is required
CO5	PO2		The knowledge of networking components helps to understand the basic functionalities specially switch and router configuaration

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CO5	PO10		To communicate effectively for engineering activities the knowledge of client server computation is required

Note: Write justification for each CO-PO mapping.

5. Curricular Gap and Content

SNo	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1					
2					
3					

Note: Write Gap topics from A.4 and add others also.

6. Content Beyond Syllabus

SNo	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1					
2					
3					
4					
5					
6					
7					

Note: Anything not covered above is included here.

C. COURSE ASSESSMENT

1. Course Coverage

Unit	Title	Teaching Hours	No. of question in Exam							CO	Levels
			CIA-1	CIA-2	CIA-3	Asg-1	Asg-2	Asg-3	SEE		
1	Three node point to point network	03	1	-	-	-	-	-	1	CO1	L4
2	Transmission of Ping messages	03	1	-	-	-	-	-	1	CO2	L4
3	Ethernet Lan using n-	03	1	-	-	-	-	-	1	CO3	L4

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	nodes with multiple traffic											
4	Simple ESS with wireless Lan	03	1	-	-	-	-	-	1	CO3	L4	
5	Performance of GSM using MAC layer	03	1	-	-	-	-	-	1	CO3	L4	
6	Performance of CDMA	03	1	-	-	-	-	-	1	CO3	L4	
7	CRC-CCITT	03	1	-	-	-	-	-	1	CO4	L3	
8	Bellman-Ford Algorithm	03	-	1	-	-	-	-	1	CO5	L4	
9	Client server using TCP/IP sockets	03	-	1	-	-	-	-	1	CO2	L4	
10	Client-Server Communication	03	-	1	-	-	-	-	1	CO5	L4	
11	RSA Algorithm to Encrypt and Decrypt the Data	03	-	1	-	-	-	-	1	CO5	L4	
12	Congestion Control Using Leaky Bucket Algorithm	03	-	1	-	-	-	-	1	CO4	L3	
-	Total	40	7	8	5	5	5	5	20	-	-	

Note: Write CO based on the theory course.

2. Continuous Internal Assessment (CIA)

Evaluation	Weightage in Marks	CO	Levels
CIA Exam – 1	15	CO1, CO2,	L4,L4
CIA Exam – 2	15	CO3, CO4	L4, L3
CIA Exam – 3	15	CO5	L4
Assignment - 1	05	CO1, CO2,	L4,L4
Assignment - 2	05	CO3, CO4	L4, L3
Assignment - 3	05	CO5	L4
0			

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Seminar - 1	00		L4,L4
Seminar - 2	00		L4, L3
Seminar - 3	00		L4
Other Activities – define – Slip test		CO1 to CO5	L3, L4 . ..
Final CIA Marks	**20**	**-**	**-**

-

SNo	Description	Marks
1	Observation and Weekly Laboratory Activities	05 Marks
2	Record Writing	10 Marks for each Expt
3	Internal Exam Assessment	20 Marks
4	Internal Assessment	80 Marks
5	SEE	600 Marks
-	**Total**	**100 Marks**

D. EXPERIMENTS

Experiment 01 : Three node point to point network

-	Experiment No.:	1	Marks		Date Planned		Date Conducted	
1	Title	Three node point to point network						
2	Course Outcomes	Learn TCL script and Simulate the protocols						
3	Aim	Implement three nodes point – to – point network with duplex links between them. Set the queue size, vary the bandwidth and find the number of packets dropped.						
4	Material / Equipment	Lab Manual						

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	Required	
5	Theory, Formula, Principle, Concept	Basic structure of TCL script to writing the NS2 program

6	Procedure, Program, Activity, Algorithm, Pseudo Code	• Open gedit editor and type program. Program name should have the extension" .tcl "
		    [root@localhost ~]# gedit lab1.tcl
		• Save the program and close the file.
		• Open gedit editor and type awk program. Program name should have the
		• extension ".awk "
		    [root@localhost ~]# gedit lab1.awk
		• Save the program and close the file.
		• Run the simulation program
		    [root@localhost~]# ns lab1.tcl
		• Now press the play button in the simulation window and the simulation will begins.
		• After simulation is completed run awk file to see the output ,
		    [root@localhost~]# awk –f lab1.awk lab1.tr
		• To see the trace file contents open the file as ,
		    [root@localhost~]# gedit lab1.tr

7	Block, Circuit, Model Diagram, Reaction Equation,	• point to point network • - • -

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	Expected Graph	
8	Observation Table, Look-up Table, Output	• this is the first program in CN lab
9	Sample Calculations	• - • - • -
10	Graphs, Outputs	• - • -
11	Results & Analysis	• set the queue size • vary the bandwidth
12	Application Areas	Analyzes the different networking protocol used in application layer
13	Remarks	
14	Faculty Signature with Date	

Experiment 02 : Transmission of ping message

-	Experiment No.:	2	Marks		Date Planned		Date Conducted	
1	Title		Transmission of ping message					
2	Course Outcomes		Learn TCL script and Simulate the protocols					
3	Aim		Implement transmission of ping messages/trace route					

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		over a network topology consisting of 6 nodes and find the number of packets dropped due to congestion.
4	Material / Equipment Required	Lab Manual
5	Theory, Formula, Principle, Concept	To identify the packets dropped

6	Procedure, Program, Activity, Algorithm, Pseudo Code	- Open gedit editor and type program. Program name should have the extension" .tcl "
		    [root@localhost ~]# gedit lab2.tcl - Save the program and close the file. - Open gedit editor and type awk program. Program name should have the - extension ".awk "
		    [root@localhost ~]# gedit lab2.awk - Save the program and close the file. - Run the simulation program
		    [root@localhost~]# ns lab2.tcl - Now press the play button in the simulation window and the simulation will begins. - After simulation is completed run awk file to see the output ,
		    [root@localhost~]# awk –f lab2.awk lab1.tr - To see the trace file contents open the file as ,
		    [root@localhost~]# gedit lab2.tr

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7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph	• topology
8	Observation Table, Look-up Table, Output	• Number of packets dropped at the nodes are 12
9	Sample Calculations	
10	Graphs, Outputs	
11	Results & Analysis	
12	Application Areas	Acquires the knowledge of various types of concepts in Application layer
13	Remarks	
14	Faculty Signature with Date	

Experiment 03 : Ethernet LAN using N-nodes with multiple traffic

-	Experiment No.:	3	Marks		Date Planned		Date Conduc	

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							ted	

1	Title	Ethernet LAN using N-nodes with multiple traffic
2	Course Outcomes	Analyze the wired and wireless networks
3	Aim	Implement an Ethernet LAN using n nodes and set multiple traffic nodes and plot congestion window for different source / destination
4	Material / Equipment Required	Lab Manual
5	Theory, Formula, Principle, Concept	Plot congestion window

6	Procedure, Program, Activity, Algorithm, Pseudo Code	• Open gedit editor and type program. Program name should have the extension" .tcl "
		    [root@localhost ~]# gedit lab3.tcl
		• Save the program and close the file.
		• Open gedit editor and type awk program. Program name should have the
		• extension ".awk "
		    [root@localhost ~]# gedit lab3.awk
		• Save the program and close the file.
		• Run the simulation program
		    [root@localhost~]# ns lab3.tcl
		• Now press the play button in the simulation window and the simulation will begins.
		• After simulation is completed run awk file to see the output ,

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		[root@localhost~]# awk –f lab3.awk lab1.tr • To see the trace file contents open the file as , [root@localhost~]# gedit lab3.tr
7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph	• Topology and x-graph
8	Observation Table, Look-up Table, Output	• Plot congestion window for different source and destination
9	Sample Calculations	
10	Graphs, Outputs	
11	Results & Analysis	
12	Application Areas	Analyzes the delivery of data beteween end to end system
13	Remarks	
14	Faculty Signature with Date	

Experiment 04 : Simple ESS with wireless LAN

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-	Experiment No.:	4	Marks		Date Planned		Date Conducted	
1	Title	Simple ESS with wireless LAN						
2	Course Outcomes	Analyze the wired and wireless networks						
3	Aim	Implement simple ESS and with transmitting nodes in wire-less LAN by simulation and determine the performance with respect to transmission of packets.						
4	Material / Equipment Required	Lab Manual						
5	Theory, Formula, Principle, Concept	To identify the performance						
6	Procedure, Program, Activity, Algorithm, Pseudo Code	• Open gedit editor and type program. Program name should have the extension" .tcl " 　　[root@localhost ~]# gedit lab24.tcl • Save the program and close the file. • Open gedit editor and type awk program. Program name should have the • extension ".awk " 　　[root@localhost ~]# gedit lab4.awk • Save the program and close the file. • Run the simulation program 　　[root@localhost~]# ns lab4.tcl • Now press the play button in the simulation window and the simulation will begins.						

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		• After simulation is completed run awk file to see the output ,
		    [root@localhost~]# awk –f lab4.awk lab4.tr
		• To see the trace file contents open the file as ,
		    [root@localhost~]# gedit lab4.tr

7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph	• Topology
8	Observation Table, Look-up Table, Output	• Calculates the throughput
9	Sample Calculations	
10	Graphs, Outputs	
11	Results & Analysis	
12	Application Areas	Analyzes the concept of multimedia network
13	Remarks	
14	Faculty Signature with Date	

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Experiment 05 : Performance of using GSM for MAC layer

-	Experiment No.:	5	Marks		Date Planned		Date Conducted	
1	Title	Performance of using GSM for MAC layer						
2	Course Outcomes	Interpret the different technologies on NS2/NS3						
3	Aim	Implement and study the performance of GSM on NS2/NS3 (Using MAC layer) or equivalent environment.						
4	Material / Equipment Required	Lab Manual						
5	Theory, Formula, Principle, Concept	Performance of GSM						

6	Procedure, Program, Activity, Algorithm, Pseudo Code	• Open gedit editor and type program. Program name should have the extension " .tcl "
		   [root@localhost ~]# gedit lab5.tcl
		 • Save the program and close the file.
		 • Open gedit editor and type awk program. Program name should have the
		 • extension ".awk "
		   [root@localhost ~]# gedit lab5.awk
		 • Save the program and close the file.
		 • Run the simulation program
		   [root@localhost~]# ns lab5.tcl						

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		• Now press the play button in the simulation window and the simulation will begins.
		 • After simulation is completed run awk file to see the output ,
		   [root@localhost~]# awk –f lab5.awk lab5.tr
		 • To see the trace file contents open the file as ,
		   [root@localhost~]# gedit lab5.tr

7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph	• X graph
8	Observation Table, Look-up Table, Output	• X graph showing the performance
9	Sample Calculations	
10	Graphs, Outputs	
11	Results & Analysis	
12	Application Areas	Able to apply wireless networking in wireless network
13	Remarks	
14	Faculty	

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Experiment 06 : Performance of CDMA

-	Experiment No.:	6	Marks		Date Planned		Date Conducted	
1	Title		Performance of CDMA					
2	Course Outcomes		Interpret the different technologies on NS2/NS3					
3	Aim		Implement and study the performance of CDMA on NS2/NS3 (Using stack called Call net) or equivalent environment.					
4	Material / Equipment Required		Lab Manual					
5	Theory, Formula, Principle, Concept		Performance of CDMA					
6	Procedure, Program, Activity, Algorithm, Pseudo Code		- Open gedit editor and type program. Program name should have the extension " .tcl " [root@localhost ~]# gedit lab6.tcl ⇌Save the program and close the file. ⇌Open gedit editor and type awk program. Program name should have the - extension ".awk " [root@localhost ~]# gedit lab6.awk					

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		⇌ Save the program and close the file. ⇌ Run the simulation program [root@localhost~]# ns lab6.tcl ⇌ Now press the play button in the simulation window and the simulation will begins. ⇌ After simulation is completed run awk file to see the output , [root@localhost~]# awk –f lab6.awk lab6.tr ⇌ To see the trace file contents open the file as , [root@localhost~]# gedit lab6.tr
7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph	• X graph
8	Observation Table, Look-up Table, Output	• X graph showing the performance
9	Sample Calculations	
10	Graphs, Outputs	
11	Results & Analysis	
12	Application	Able to apply wireless networking in wireless network

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	Areas	
13	Remarks	
14	Faculty Signature with Date	

Experiment 07 : Error Detecting Code Using CRC-CCITT (16-bit)

-	Experiment No.:	7	Marks		Date Planned		Date Conducted	
1	Title	Error Detecting Code Using CRC-CCITT (16-bit)						
2	Course Outcomes	Calculate the error detection and correction over the network						
3	Aim	Write a Program for ERROR detecting code using CRC-CCITT (16bit).						
4	Material / Equipment Required	Lab Manual						
5	Theory, Formula, Principle, Concept	Performance of CDMA						
6	Procedure, Program, Activity, Algorithm, Pseudo Code	step 1: start[source code] step 2: create a class Crc step 3: code for CRC generation step 4: write a code for error detection step 5:end						
7	Block, Circuit,							

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	Model Diagram, Reaction Equation, Expected Graph	
8	Observation Table, Look-up Table, Output	Enter number of data bits: 1 0 1 1 0 0 1 enter the number of bits in divisor: 3 enter divisor bits: 1 0 1 dividend are:101100111 enter CRC code of 9bits:101100101 error thank you…...
9	Sample Calculations	
10	Graphs, Outputs	
11	Results & Analysis	
12	Application Areas	Compare Routers internet protocol in network layer
13	Remarks	
14	Faculty Signature with Date	

Experiment 08 : Bellman-ford Algorithm

-	**Experiment**	1	**Marks**		**Date**		**Date**	

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	No.:				**Planned**		**Conducted**	
1	Title	Bellman-ford Algorithm						
2	Course Outcomes	Calculate the error detection and correction over the network						
3	Aim	Write a program to find the shortest path between vertices using bellman-ford algorithm.						
4	Material / Equipment Required	Lab Manual						
5	Theory, Formula, Principle, Concept	Shortest path						
6	Procedure, Program, Activity, Algorithm, Pseudo Code	step 1: start[source code] step 2: create a class Bellman ford step 3: code for shortest path step 4: end						
7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph							
8	Observation	Enter number of vertices 4						

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		Table, Look-up Table, Output	enter the adjacency matrix 0 5 0 0 5 0 3 4 0 3 0 2 0 4 2 0 enter the source vertex 2 distance of source 2 to 1 is 5 distance of source 2 to 2 is 0 distance of source 2 to 3 is 3 distance of source 2 to 4 is 4
9	Sample Calculations		
10	Graphs, Outputs		
11	Results & Analysis		
12	Application Areas	Able to compare the routing algorithms for routing of packets.	
13	Remarks		
14	Faculty Signature with Date		

Experiment 09 : Client-server using TCP/IP sockets

-	Experiment No.:	9	Marks		Date Planned		Date Conducted	
1	Title		Client-server using TCP/IP sockets					

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2	Course Outcomes	Analyze the behaviour of client server computations
3	Aim	Using TCP/IP Sockets, write a client-server program to make client sending the file name and the server to send back the contents of the requested file if present. Implement the above program using as message queues or FIFOs as IPC channels.
4	Material / Equipment Required	Lab Manual
5	Theory, Formula, Principle, Concept	client server communication
6	Procedure, Program, Activity, Algorithm, Pseudo Code	step 1: start[source code] step 2: open TCP Client step 2: create a class client step 3: end step 4: open TCP server step 5:create class server step 6: end.
7	Block, Circuit, Model Diagram, Reaction Equation,	

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	Expected Graph	
8	Observation Table, Look-up Table, Output	Client should send the request server will send back the requested file to the client
9	Sample Calculations	
10	Graphs, Outputs	
11	Results & Analysis	
12	Application Areas	Able to analyze the protocols and services used in TCP and UDP
13	Remarks	
14	Faculty Signature with Date	

Experiment 10: Client-Server communication

-	Experiment No.:	10	Marks		Date Planned		Date Conducted	
1	Title		Client server communication					
2	Course Outcomes		Analyze the behaviour of client server computations					
3	Aim		Write a program on datagram socket for client/server to display the messages on client side, typed at the server side.					

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4	Material / Equipment Required	Lab Manual
5	Theory, Formula, Principle, Concept	Server to client communication
6	Procedure, Program, Activity, Algorithm, Pseudo Code	step 1: start[source code] step 2: open UDP Client step 2: create a class UDPC step 3: end step 4: open UDP server step 5:create class UDPS step 6: end.
7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph	
8	Observation Table, Look-up Table, Output	Client should display the message which is typed at the server side
9	Sample	

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	Calculations	
10	Graphs, Outputs	
11	Results & Analysis	
12	Application Areas	• Able to analyze the protocols and services used in TCP and UDP
13	Remarks	
14	Faculty Signature with Date	

Experiment 11 : RSA Algorithm to Encrypt and Decrypt the Data

-	Experiment No.:	11	Marks		Date Planned		Date Conducted	
1	Title	RSA Algorithm to Encrypt and Decrypt the Data						
2	Course Outcomes	Calculate the error detection and correction over the network						
3	Aim	C Program for Simple RSA Algorithm to encrypt and decrypt the data						
4	Material / Equipment Required	Lab Manual						
5	Theory, Formula, Principle, Concept	RSA algorithm						
6	Procedure	step 1: start[source code]						

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	Program, Activity, Algorithm, Pseudo Code	step 2: open RSA key generation step 2: create a class RSA Keygen step 3: end step 4: open RSA Encryption and Decryption step 5:create class RSAEncDec step 6: end.
7	Block, Circuit, Model Diagram, Reaction Equation, Expected Graph	
8	Observation Table, Look-up Table, Output	Key generation RSA key generation 20 Public key :54367 Private key: 789534,3214657
9	Sample Calculations	
10	Graphs, Outputs	
11	Results & Analysis	
12	Application Areas	• Able to analyze the security issue in network management
13	Remarks	
14	Faculty	

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Experiment 12 : Congestion Control Using Leaky Bucket Algorithm

-	Experiment No.:	12	Marks		Date Planned		Date Conducted	
1	Title	Congestion Control Using Leaky Bucket Algorithm						
2	Course Outcomes	Analyze the wired and wireless networks						
3	Aim	C Program for Congestion control using Leaky Bucket Algorithm						
4	Material / Equipment Required	Lab Manual						
5	Theory, Formula, Principle, Concept	Leaky bucket algorithm						
6	Procedure, Program, Activity, Algorithm, Pseudo Code	step 1: start[source code] step2 :create a class queue step 3: write insert delete functions step 4: create aclass leaky step 5: end.						
7	Block, Circuit, Model							

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	Diagram, Reaction Equation, Expected Graph	
8	Observation Table, Look-up Table, Output	
9	Sample Calculations	
10	Graphs, Outputs	
11	Results & Analysis	
12	Application Areas	• Analyze the concept of higher layer protocols in mobility management
13	Remarks	
14	Faculty Signature with Date	

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