

**EASWARI ENGINEERING COLLEGE, CHENNAI – 600 089**

**Department of Information Technology**

**LESSON PLAN**

**Sub Code : IT2351**

**Subject : Network Programming and Management**

**Faculty : Mrs.R.Radha & N.Ananthi**

**Degree/Branch : B.Tech / IT**

**Year/ Sem/ Sec : III/VI**

**Total No. of Hrs given in syllabus:**

**Tutorial : 0**

**Lecture : 45**

**Practical : 0**

**Grand Total : 45 Periods**

**COURSE OBJECTIVE**

**The student should be made to:**

- Understand about Socket Programming, its importance, its scope and review functions of protocols under TCP / IP Suite.
- Review the importance of TCP and its applications.
- Write simple programs using TCP socket
- Understand UDP, compare it against TCP and to write programs using UDP socket and also learn about socket options
- Study advanced programs using Raw socket, TCP, UDP socket and also make comparison among them
- Learn about the Network management concepts, its usage in real time and protocols used for the same

**COURSE OUTCOME**

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

1. Understand the Socket API used for implementation of client server communication
2. Understand the concept of Network management and functions of various protocols.
3. Understand and differentiate the implementation iterative and concurrent server.
4. Identify the type of server implementation for real world applications.
5. Develop client, server applications using TCP sockets for real world problems.
6. Develop client, server applications using UDP sockets for real world problems.
7. Understand the concept of Raw sockets and develop applications for real world problems
8. Ability to apply the appropriate sockets to model the complex client, server systems.

**PREREQUISITE**

Knowledge in Computer Networks, Operating Systems and Database structure.

S.No	Topics	No. of Periods	Reference Books	Page No.
<b>UNIT I ELEMENTARY TCP SOCKETS (9)</b>				
<b>Aim : To Introduce the students about Socket Programming, its importance, its scope and review functions of various protocols under TCP / IP Suite</b>				
1	Introduction to Socket Programming	1	T1	1 – 15
2	Overview of TCP/IP Protocols	1	T1	30 – 37
3	TCP State transition Diagram	1	T1	37 - 50
4	Introduction to Sockets- Socket Address Structures	1	T1	57 – 66
5	Byte ordering functions and Address conversion functions	1	T1	66 – 82
6	Elementary TCP Sockets Socket, connect, bind	1	T1	85 – 93
7	listen, accept, read, write, close functions	1	T1	93 – 102, 77 -78
8	Iterative Server	1	T1	Handouts
9	Concurrent Server	1	T1	102-110
<b>UNIT II APPLICATION DEVELOPMENT (9)</b>				
<b>Aim : To Teach the students about the importance of TCP and its applications in socket programming and also make them to write simple programs using TCP socket</b>				
10	TCP Echo Server and	1	T1	110 – 113
11	TCP Echo Client	1	T1	114 - 118
12	Posix Signal Handling	1	T1	119 - 128
13	Boundary Conditions Server process Crashes, Server host Crashes, Server Crashes and reboots, Server Shutdown	1	T1	129 – 135
14	I/O Multiplexing, I/O Models	1	T1	143 – 149
15	Select function	1	T1	150 - 155
16	shutdown function	1	T1	160 – 162
17	TCP echo client (with Multiplexing)	1	T1	156 - 162
18	TCP echo server(with Multiplexing)	1	T1	163 - 174

**UNIT III SOCKET OPTIONS, ELEMENTARY UDP SOCKETS (9)**

**Aim : To make students understand UDP, compare it against TCP and to write simple program using UDP socket and also teach them about various socket options**

19	Socket options, getsocket, setsocket functions	1	T1	177 – 183
20	generic socket options	1	T1	183 – 197
21	IP socket options, ICMP socket options	1	T1	197 – 200
22	TCP socket options	1	T1	201 – 207
23	Elementary UDP sockets UDP echo Server	1	T1	211 – 216
24	UDP echo Client	1	T1	217 - 221
25	Domain Name system, gethostbyname function	1	T1	237 - 245
26	Ipv6 support in DNS	1	T1	246 – 248
27	Gethostbyadr function, Getservbyname and getservbyport functions	1	T1	248 – 254

**UNIT IV ADVANCED SOCKETS (9)**

**Aim : To Teach the students about Raw socket programming and make them to understand advanced programs using Raw socket, TCP and UDP socket, make comparison among them**

28	Ipv4 and Ipv6 Interoperability	1	T1	261 – 267
29	threaded servers, thread creation and thread termination	1	T1	601 – 605
30	TCP echo server using threads	1	T1	605 – 610
31	Mutexes and condition variables	1	T1	622 - 631
32	Raw Sockets creation	1	T1	655 – 656
33	Raw Sockets output, input	1	T1	657 – 660
34	Ping program – read loop, recvfrom	1	T1	661 - 666
35	Ping program – process v4, send v4	1	T1	667 - 672
36	trace route program	1	T1	672 - 684

**UNIT V SIMPLE NETWORK MANAGEMENT (9)**

**Aim : To Teach the students about the Network management concepts, its usage in real time and protocols used for the same.**

37	SNMP Network Management Concepts,	1	T2	23 – 45
38	SNMP Management Information	1	T2	46 - 67
39	Standard MIB's, SNMPv1 protocol	1	T2	71 – 101
40	SNMPv1 protocol	1	T2	102-140
41	SNMPv1 ISSUES	1	T2	141-191
42	Introduction to RMON	1	T2	209 – 280
43	RMON Architecture	1	T2	281- 324
44	SNMPv2	1	T2	331 – 413
45	SNMPv3	1	T2	427 - 535

**ASSIGNMENT TOPICS**

SNO	TOPICS	SUBMISSION DATE
1	Writing an iterative and concurrent server of any one application	
2	An Application of Raw Sockets	
3	A Tool for Network monitoring and Management.	

**CONTENTS BEYOND SYLLABUS**

Applications of socket programming in Layered Architecture

**TEXT BOOKS**

T1	W. Richard Stevens, “UNIX NETWORK PROGRAMMING Vol-I” Second Edition, PHI / Pearson Education, 1998.
T2	Mani Subramaniam, “Network Management: Principles and Practice“, Addison Wesley”, First Edition, 2001.

**Prepared By**

**(R.Radha)**

**Approved By**

**(HOD)**

### **Program Educational Outcomes**

Technology.

2. Graduates will possess core competencies necessary for application of knowledge of computers and telecommunications equipment to store, retrieve, transmit, manipulate and analyze data in the context of business enterprise.
3. Graduates will be capable of thinking logically, pursue lifelong learning and will have the capacity to understand technical issues related to computing systems and design optimal solutions.
4. Graduates will be able to develop hardware and software systems by understanding the importance of social, business and environmental needs in the human context.
5. Graduates will gain employment in organizations and establish themselves as professionals by applying their technical skills to solve real world problems and meet the diversified needs of industry, academia and research.
6. Graduates will be aware of professional ethics of the software industry and equip themselves with communication skills essential for working in community.

### **Program Outcomes**

- (a) Ability to apply knowledge of computing and mathematics appropriate to Information Technology
- (b) Ability to analyze a problem, and identify computing requirements appropriate to its solution
- (c) Ability to design, implement, and evaluate a system, process, component, or program to meet specific requirements
- (d) Ability to interpret and synthesis data to provide valid conclusions
- (e) Ability to function effectively as a team member to achieve a common goal
- (f) Ability to understand professional, ethical and social issues and responsibilities
- (g) Ability to communicate effectively with a diverse groups
- (h) Ability to analyze the local and global impact of Information Technology on society
- (i) Ability to recognize and engage in continuing professional development and life long learning
- (j) Ability to use current techniques, skills, and tools necessary to accomplish projects related to Information Technology.
- (k) Ability to understand the impact of the professional engineering solutions in societal and environmental contexts for sustainable development.
- (l) Ability to understand engineering and management principles to manage projects in multidisciplinary environment.

UNITS	Course outcome	PEO1	PEO2	PEO3	PEO4	PEO5	PEO6	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO I	PO j	PO k	PO l
ELEMENTARY TCP SOCKETS	Understand the Socket API used for implementation of client server communication	W	S	S	M	S	W	M	S	M	M	W	W	W	W	M	S	M	W
	Understand and differentiate the implementation iterative and concurrent server.	W	S	W	S	S	W	M	S	M	S	W	W	W	M	M	S	M	W
APPLICATION DEVELOPMENT	Identify the type of server implementation for real world applications.	W	S	W	M	S	W	M	S	M	S	W	W	W	M	M	S	M	W
	Develop client, server applications using TCP sockets for real world problems.	W	S	W	M	S	W	M	S	S	M	W	W	W	M	M	S	M	W
SOCKET OPTIONS, ELEMENTARY UDP SOCKETS	Develop client, server applications using UDP sockets for real world problems.	W	S	W	M	S	W	M	S	S	M	W	W	W	M	M	S	M	W
ADVANCED SOCKETS	Understand the concept of Raw sockets and develop applications for real world problems	W	S	W	M	S	W	M	S	S	M	W	W	W	M	M	S	M	W
	Ability to apply the appropriate sockets to model the complex client, server systems.	W	S	M	S	S	W	M	S	S	M	W	W	W	M	M	S	M	W
SIMPLE NETWORK MANAGEMENT	Understand the concept of Network management and functions of various protocols.	W	M	M	M		W	M	M	M	M	W	W	W	W	M	W	M	S

**S - STRONG**  
**M - MEDIUM**  
**W - WEAK**