GUJARAT TECHNOLOGICAL UNIVERSITY

Subject Name: Network Programming
Subject Code: 3715101

Semester: I

Type of course: M.E. Computer Engineering (IT systems and Network Security)

Prerequisite:

- Understanding of Network Communication
- Understanding of Linux Operating systems
- Understanding of C Programing

Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment;

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Overview of computer networks	2	4
2	inter process communication	2	4
3	TCP/IP introduction	2	4
4	Elementary TCP sockets	2	4
5	TCP/IP Client/Server Examples	2	4
6	Elementary sockets	2	4
7	network programming, socket interface	2	4
8	Elementary UDP sockets	2	4
9	Data link socket structures	2	4
10	client server computing model	2	4
11	design issues	2	4
12	concurrency in server and clients	2	4
13	external data representation	2	4
14	remote procedural calls	2	6
15	Multicasting, Broadcasting	2	6
16	OSI Layers	**3**	6

Reference Books: -

1. UNIX Network Programming**:** ThesocketsnetworkingAPI W. Richard Stevens, BillFenner, Andrew,M. Rudoff, Addison Wesley
2. Data Communication & Networking Forouzan
3. Fundamentals of Principles, Technologies computers and And Protocols For Network networks, Natalia Olifer/Wiley
4. Linux socket programming by example Warren W. Gay, Warren Gay

Course Outcome:

After learning the course the students should be able to:

- Understand the network programing and Unit standards.
- Analyse the different computer networks and TCP/IP
- Evaluate the TCP/IP protocol architecture and basic about the TCP and UDP socket.
- Understand about the router and switch configuration.
- Understand about the I/O models, TCP echo server and IPv6 socket options.

List of Experiments: (with Open Ended Problems)

- Write a TCP Socket client server program for calc server, in which TCP client will send calculation request to the server. That request would contain float value as well. For Eg. add (a, b), where a=23.24, b=34.45, Server would able to interpret it and respond back with correct answer. Implement server for addition, division, multiplication and subtraction
- Write a UDP client server application in which client would get IP address of server. Client will enter command on client program, command will get executed on server, and server would respond back with specific filtered output. For eg. ./client <server IP> <cmd to be executed on server> <Filter String> $./client 172.16.1.1 ifconfig ip So expected output is only IP address.
- Design High availability using socket. In this program, two PCs are continuously checking the status of each other, if it is up and in network or not. In case of any PC is not working or come out of network, other working PC will intimate the server about non availability of non-working PC.
- Develop an application using socket programming current sub-network.

Major Equipments:

- Linux
- VMWare Workstation
- Switches

List of Open Source Software/learning website:

- GCC compiler
- Resources on internet for understand Network Layered approach