4/4 B.Tech - FIRST SEMESTER

IT7T5A **NETWORK PROGRAMMING** **Credits:3**

Lecture: 3 Periods/week **Internal assessment: 30 marks**

Practice/Interaction: 1Period/week **Semester end examination: 70 marks**

Objectives:

- To describe the TCP/IP protocol suite in UNIX environment.
- To introduce Berkley sockets and system calls in network programming.
- To demonstrate the socket API and IPC mechanisms.

Outcomes:

Students will be able to

- Understand the basics of network protocols and socket structures.
- Develop robust client-server applications using elementary TCP system calls.
- Understand the need of Multiplexing.
- Develop client server applications using elementary UDP socket system calls and understand the address translation in network environment.
- Understand the use of different IPC mechanisms.

Prerequisites:

Data Communication and Computer Networks, C programming and UNIX.

Syllabus:

UNIT-I

Introduction to Network Programming: OSI model, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitations

Sockets : Address structures, value – result arguments, Byte ordering and manipulation function and related functions.

UNIT-II

Elementary TCP sockets – Socket, connect, bind, listen, accept, fork and exec function, concurrent servers, close function

TCP client server: Introduction, TCP Echo server functions, Normal startup, terminate and signal handling server process termination, Crashing and rebooting of server host shutdown of server host.

UNIT -III

I/O Multiplexing: I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server, getsockopt and setsockopt functions.

UNIT-IV

Elementary UDP sockets: Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP.

Elementary name and Address conversions: DNS, get host by name function, resolver options and IPV6 support, uname function.

UNIT-V

IPC : Introduction, IPC between processes on single computer system, IPC between process on different systems, File and record locking, Pipes, FIFO, Name spaces, Message queues, Semaphores and Shared Memory, Remote Procedure Call.

Text Books:

1. UNIX Network Programming, Vol. I, Sockets API, 2nd Edition. - W.Richard Stevens, Pearson Edn. Asia.
2. UNIX Network Programming, Interprocess Communication, 2nd Edition, W.Richard Stevens. PHI.

Reference Books:

1. UNIX for programmers and Users, 3rd Edition, Graham Glass, King Ables, Pearson Education.
2. Advanced UNIX programming, 2nd Edition, M J Rochkind, Pearson Education
3. Advanced UNIX Programming, NB Venkateswarlu, BS Publications, 2nd Edition