# INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPT./CENTRE**:** **Electronics and Computer Engineering**

1. Subject Code**: EC – 552N** Course Title**: Network Programming in UNIX**

2. Contact Hours: **L: 3** **T: 0** **P: 0**

3. Examination Duration (Hrs.): **Theory** | **0** | **3** | **Practical** | **0** | **0**

4. Relative Weight**:** **CWS** | **15** | **PRS** | **00** | **MTE** | **35** | **ETE** | **50** | **PRE** | **00**

5. Credits**:** | **0** | **3** | 6. Semester: | **√** | | |
**Autumn** **Spring** **Both**

7. Pre-requisite**: EC – 353 and EC - 356**

8. Subject Area**: MSC**

9. Objective: To familiarize students with advanced concepts of network programming in UNIX environment.

10. Details of the Course:

| Sl. No. | Contents | Contact Hours |
|---|---|---|
| 1. | OSI model, client server model, TCP/IP protocols, introduction to Unix; Process, groups, job control and non-job control shells, reliable and unreliable signals. | 6 |
| 2. | Inter process communication in Unix, pipes, half duplex and full duplex pipes, FIFOs, properties of pipes and FIFOs, POSIX message queues, system V message queues, semaphores, shared memory, mmap function and its use, RPC, authentication, timeout and retransmission, call semantics, XDR. | 10 |
| 3. | Daemon processes and inetd daemon. | 2 |
| 4. | Introduction to Berkeley sockets, socket addressing, TCP and UDP socket functions, sockets and Unix signals, socket implementation, client and server examples for TCP and UDP and their behavior under abnormal conditions. | 8 |
| 5. | Socket options, IPv4, IPv6, TCP, I/O multiplexing, Unix I/O models, select and poll functions | 4 |
| 6. | Unix domain protocols | 2 |
| 7. | Routing sockets, raw sockets, example programs, ping, traceroute, methods for writing client and server in Unix, iterative server, concurrent server, preforking, prethreading. | 6 |

| 8. | Data link access, libpcap, BPF, DLPI, Linux SOCK_PACKET, programming using libpcap | 4 |
|---|---|---|
| | **Total** | **42** |

11. Suggested Books:

| Sl. No. | Name of Books / Authors | Year of Publication |
|---|---|---|
| 1. | Stevens, W.R., Fenner, B. and Rudoff A.M., "Unix Network Programming: Vol. I", 3rd Ed., Pearson Education | 2004 |
| 2. | Stevens, W.R., "Unix Network Programming: Vol. II", 2nd Ed., Pearson Education | 2002 |
| 3. | Stevens, W.R., "Advanced Programming in Unix Environment", Pearson Education | 2002 |
| 4. | Bovet, D.A. and Cesati, M., "Understanding the Linux Kernel", 2nd Ed., O'Reilly. | 2004 |