

Course Title : Network Programming  
 Course Code : Elective  
 Credit : 3  
 Class Load : 3 hours  
 Evaluation :

	<b>Theory</b>	<b>Practical</b>	<b>Total</b>
<b>Sessional</b>	25	25	50
<b>Final</b>	50	-	50
<b>Total</b>	75	25	100

**1. Network Programming Fundamentals**

**(6 hrs)**

Introduction to Networking and network programming  
 Client/Server mode  
 Communication Protocol (TCT, IP, UDP, SCTP)  
 TCP state transition Diagram  
 Protocol comparison

**2. UNIX Programming**

**(22 hrs)**

Sockets Introduction  
 Socket Address Structures  
 Values Result arguments  
 Byte ordering and Manipulation functions  
 Fork and exec function  
 Concurrent Servers  
 UNIX/INTERNET domain socket  
 Socket System Calls  
 Passing file descriptor  
 I/O models (blocking, non-blocking, multiplexing, signal driven, asynchronous)  
 Socket option, getsockopt, setsockopt, fcntl  
 Daemon Process, Syslog Daemon, syslog function, ioctl operation, ioctl function  
 Socket operations  
 UNIX and Internet domain socket implementation.

**3. Winsock Programming**

**(15 hrs)**

Introduction to Winsock architecture  
 Winsock DLL  
 Windows sockets and Blocking I/O  
 Windows Socket Extension: Setup and Cleanup Function  
 Function for Handling Blocked I/O  
 Asynchronous Database function  
 Asynchronous I/O functions  
 Error Handling Functions; Asynchronous Operation  
 Using Non-Blocking socket, Non-Blocking with connect  
 Select in conjunction with accept, select with recv/recvfrom and send/sendto  
 Sending and Receiving Data over connection.

**4. Network Utilities and Application**

**(2 hrs)**

Telnet

Netsat  
ifconfig/ipconfig  
ping  
TFTP  
Remote Login

**Laboratory Exercises:**

1. Implementing ECHO server using C and LINUX.
2. Implementing Date and Time Routines in C and LINUX.
3. Implementing Concurrent Server using FORK and EXEC call in LINUX.
4. UNIX and Internet Domain SOCKET in LINUX using C.
5. Implementing Winsock using C.
6. Implementing Message Exchanger between LINUX and Windows.

**Reference Books:**

1. Steven R., UNIX network Programming VOL-1
2. Alok k. Sinha, Network Programming in WINDOWS NT, Addison Wesley-1996
3. Douglas E.Comers, David L. Stevens Internet working with TCP/IP Volume III, Second Edition.