



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

NETWORK PROGRAMMING MANAGEMENT								
VII Semester: CSE (CS)								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
ACCD21	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	40	60	100
Contact Classes: 48	Tutorial Classes: 0	Practical Classes: Nil			Total Classes: 48			
Prerequisites: Computer Networks								

I. COURSE OVERVIEW:

This course will cover the practical aspects of computer network programming, with emphasis on the Internet. The goal of this course is to introduce the basics of computer networks and Internet programming and the TCP/IP protocol stack and some of its important protocols.

II. COURSE OBJECTIVES:

The students will try to learn:

- I The basic concepts of connection-oriented communication over network.
- II The concepts of multiplexing in client server environment.
- III The functions and protocols needed for connection less communication over networks
- IV The management concepts and practical issues of simple network management protocols

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

- CO1 Interpret TCP Socket functions between client and server to listen to the TCP port for incoming connections.
- CO2 Make use of different boundary conditions in the server and I/O multiplexing to establish the connection in the network.
- CO3 Match each of the socket options for each of the layer in the TCP/IP stack to improve the performance of Wired network connections.
- CO4 Recall the UDP socket functions to maintain low – latency and loss – tolerance connections between applications on the internet.
- CO5 Demonstrate the working of different communication protocols that helps to create secure socket applications.
- CO6 Illustrate various network management protocols for monitoring and controlling of networks on Local Area Network or Wide Area Network.

IV. COURSE CONTENT:

MODULE – I: ELEMENTARY TCP SOCKETS (10)

Introduction to socket programming, overview of TCP/IP protocols, introduction to Sockets, socket address structures, byte ordering functions, address conversion functions, elementary TCP sockets, socket connect, bind, listen, accept, read, write, close functions, iterative server, concurrent server.

MODULE – II: APPLICATION DEVELOPMENT (10)

TCP echo server, TCP echo client, posixsignal handling, server with multiple clients; Boundary conditions: Server process crashes, server host crashes, server crashes and reboots, server shutdown, I/O multiplexing, I/O Models, select function, shutdown function, TCP echo server (with multiplexing), poll function, TCP echo client (with multiplexing).

MODULE – III: SOCKET OPTIONS, ELEMENTARY UDP SOCKETS (10)

Socket options, getsockopt and setsockopt functions, generic socket options, IP socket options, ICMP Pocket options, TCP socket options, elementary UDP sockets, UDP server, and UDP echo client. Multiplexing TCP and UDP sockets, domain name system, and gethostbyname function, Ipv6 support in DNS, gethostbyadr function, getservbyname and getserv by port functions.

MODULE - IV: ADVANCED SOCKETS (09)

Ipv4 and Ipv6 interoperability, threaded servers, thread creation and termination, TCP echo server using threads, mutexes, condition variables, raw sockets, raw socket creation, raw socket input, raw socket output, ping program, trace route program.

MODULE – V: SIMPLE NETWORK MANAGEMENT (09)

SNMP network management concepts, SNMP management information, standard MIBs, The MIB Compiler, Importing MIBs, MIB Consistency Checking, SNMPV1 V SNMPv2, Security Management, Policies and procedures, Resources to prevent Security Breach, Cryptography.

V. TEXTBOOKS:

1. W. Richard Stevens, “UNIX Network Programming Vol-I”, Pearson Education, 3rd Edition, 2008.
2. Mani Subramanian, “Network Management: Principles and Practice”, Addison Wesley, 1st Edition, 2001.

VI. REFERENCE BOOKS:

1. D.E. Comer, “Internetworking with TCP/IP Vol- III”, (BSD Sockets Version), Pearson Education, 2nd Edition, 2003
2. William Stallings, “SNMP, SNMPv2, SNMPv3 and RMON 1 and 2”, Addison Wesley, 3rd Edition, 1999.

VII. ELECTRONIC RESOURCES:

1. <https://notes.shichao.io/unp/ch4/>
2. <https://books.google.co.in/books?isbn=8184317565>
3. <https://docs.oracle.com/cd/E19683-01/817-0573/transition-tbl-16/index.html>
4. https://docs.oracle.com/cd/E26502_01/html/E35299/sockets-22932.html

VIII. MATERIALS ONLINE:

1. Course template
2. Tutorial question bank
3. Tech-talk topics
4. Definitions and terminology
5. Assignments
6. Model question paper – I
7. Model question paper – II
8. Lecture notes
9. PowerPoint presentation
10. E-Learning Readiness Videos (ELRV)