K. S. INSTITUTE OF TECHNOLOGY

An Autonomous Institution under VTU, Approved by AICTE

Department of Computer Science & Engineering

M.Tech SECOND SEMESTER SYLLABUS

Course : **Network Programming**		Semester	II
Course Code	**25MSCS203**	CIE Marks	50
Teaching Hours/Week (L:P:SDA)	3:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	**Theory**		

Course Objectives (Course Skill Set)

1. Define the key protocols which support the Internet
2. Explore working of the TCP/UDP Sockets
3. Demonstrate applications using techniques such as multiplexing, forking, multithreading
4. Illustrate working of Daemon Processes

Module-1

Introduction to network application, client/server communication, OSI Model, BSD Networking history, Test Networks and Hosts, Unix Standards, 64-bit architectures, Transport Layer: TCP, UDP and SCTP

Module-2

Sockets Introduction – socket address structures, value-result arguments, byte ordering and manipulation functions, address conversion functions, Elementary TCP Sockets – socket, connect, bind, listen, accept , fork and concurrent server design, getcsockname and getpeername functions and TCP Client/Server Example.

Module-3

I/O Multiplexing and Socket Options – I/O Modules, select function, str_cli function, batch input and buffering, shutdown function, TCP Echo Server, pselect function, poll function.

Module-4

Advanced I/O functions – Socket timeouts, recv and send functions, readv, writev, sendmsg and recvmsg. Unix domain protocols - socket address structure, socketpair functions, socket functions Unix domain stream client/server , Unix domain Datagram client/server.

Module-5

Client/Server Design Alternatives – TCP Client Alternatives, TCP Test Client, TCP Iterative server, TCP Concurrent server, TCP preforked server, no locking around accept, TCP preforked server, file locking around accept, TCP preforked server, thread locking around accept, TCP preforked server, descriptor passing, TCP concurrent server, one thread per client.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

- Three Unit Tests each of **25 Marks**
- Two assignments each of **25 Marks** or **one Skill Development Activity of 25 marks** to attain the COs and Pos.
- The sum of three tests, two assignments/skill Development Activities, will be scaled down to 50 marks CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper consists of Part A and Part B. Part A consists of 10 questions from 5 modules, each carrying 2 marks.
3. Part B consists of 10 questions. Each full question is for 16 marks. There will be two full questions (with a maximum of three sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module.

Suggested Learning Resources:

Text Books

1. UNIX Network Programming W. Richard Stevens, Bill Fenner, Andrew M. Rudoff Pearson Volume 1, Second Edition, 2004.

Reference Books:

1. Network Programming in C Barry Nance PHI 2002
2. Windows Socket Network Programming Bob Quinn, Dave Shute Pearson 2003 UNIX Network Programming Richard Stevens Second Edition.

Web links and Video Lectures (e-Resources):

- https://archive.nptel.ac.in/courses/106/105/106105183/

Skill Development Activities Suggested:

The students with the help of the course teacher can take up relevant technical activities which will enhance their skill. The prepared report shall be evaluated for CIE marks.

Course outcome (Course Skill Set):

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
CO1	Explain the concept of Networking and Transport Layer: TCP, UDP and SCTP.	L3
CO2	Illustrate the working of Sockets	L1
CO3	Demonstrate the Daemon Processes and No blocking I/O	L2
CO4	Explain the ioctl operations- socket SAD	L1

Program Outcome of this course:

Sl. No.	Description	POs
1	**Engineering Knowledge:** Apply knowledge of mathematics, science, engineering fundamentals, and a specialization to the solution of complex engineering problems.	PO1
2	**Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles.	PO2
3	**Design/Development of Solutions:** Design solutions for complex engineering problems and design system components that meet specified needs with consideration for public health and safety, cultural, societal, and environmental concerns.	PO3
4	**Conduct Investigations of Complex Problems:** Use research-based knowledge and methods including design of experiments, analysis, and interpretation of data, and synthesis of information to provide valid conclusions.	PO4
5	**Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools to complex engineering activities with an understanding of limitations.	PO5
6	**Engineer and Society / Project Management & Finance:** Demonstrate knowledge and understanding of engineering and management principles to manage projects, as well as societal, health, safety, legal, and cultural issues.	PO6

Mapping of COs and POs

	PO1	PO2	PO3	PO4	PO5	PO6
CO1			X			X
CO2						
CO3			X			X
CO4	X	X			X	