

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
HYDERABAD CAMPUS
INSTRUCTION DIVISION
FIRST SEMESTER 2013-2014
Course Handout

Date: 14/06/2013

In addition to part-I (General handout for all courses appended to the timetable) this portion gives further specific details regarding the course:

Course Number: **IS C462**
Course Title: **Network Programming**
Instructors: **Gokul Kannan Sadasivam (gokul@hyderabad.bits-pilani.ac.in)**

Course Objective: To introduce the student to inter-process communication (IPC), in specific communication between any two devices over a network and thereby, exposing him/her to various programming techniques involved in networking.

Course Scope: The course covers TCP, UDP, and SCTP and includes Socket programming for client server architecture, including concurrency at both ends. It also covers raw sockets, routing sockets, and key management sockets.

Text Book

T1: Unix Network Programming, The Sockets Networking API Vol I, W. Richard Stevens, PHI/Pearson Edu 3rd ed 2004

Reference Books:

R1: Internetworking With TCP/IP: Principles, Protocols, And Architecture Vol. I- Fifth Edition, Douglas Comer.

R2: Unix Network Programming, Interprocess Communication, Vol II, W. Richard Stevens, PHI/Pearson Edu 2nd ed 1999.

R3: Advanced Programming in the UNIX Environment, Second Edition, W. Richard Stevens, Stephen A. Rago

Module Name	No. of Lectures	Topics	Chapter Number (*)
Introduction	1	Introduction to the Course	Class notes
Programming projects in C (UNIX env.)	2	Covers C basics, make utility, debugging, etc.	Class notes

Networking Concepts	1	Review on TCP, UDP, SCTP, IP, etc.	Class notes, T1-2
OS Concepts	2	Review on Processes, Threads, Pipes, IPC, etc.	Class notes
Socket package installation	1	Learn to install and configure the software package provided with the Textbook-1, Simple DayTime Client/Server	T1- 1
Basics of Sockets	1	Byte Ordering, IP address conversions, etc.	T1-3
Introduction to Sockets in UNIX/Linux	2	Sockets Introduction, TCP – Client Server Example	T1-4
UDP Sockets	2	Introduction to UDP sockets, UDP echo client/server, etc.	T1-8
SCTP Sockets	2	Introduction to SCTP sockets	T1-9, 10
Test-1			
Project	1	Discussion on DNS protocol and Semester project	Class notes
I/O Multiplexing	2	I/O multiplexing using select / poll	T1-6
Threads	2	Using threads for achieving concurrency in server-side sockets	T1-26
Socket options	1	Socket Options	T1-7
Name and Address Conversions	2	Accessing Domain Name Server (DNS), etc.	T1-11
Interoperability	1	IPv4 and IPv6 interoperability	T1-12
Daemon processes	1	Daemon processes and Services in UNIX/Linux	T1-13
Advanced I/O	3	Advanced reading and writing functions for sockets, Non-blocking I/O	T1-14, 16
Test-2			
Ioctl Operations	2	Native library for accessing interfaces, etc.	T1-17
Unix Domain Protocols	1	IPC within a system using Unix sockets	T1-15
Routing Sockets	1	Sockets for accessing routing table, ARP table, etc.	T1-18
Key Management Sockets	1	Sockets in the field of Security	T1-19
Raw Sockets	1	ICMP sockets, ping program, traceroute program, etc.	T1-28
Advanced UDP Sockets	3	Advanced topics in UDP Sockets	T1-22
Advanced SCTP Sockets	2	Advanced topics in SCTP Sockets	T1-23
Out-of-Band Data	1	Handling out-of-band data using sockets	T1-24
Signal-Driven I/O	1	Signals from OS which controls I/O	T1-25
Comprehensive Exam			

* Need to refer the class notes for all the topics

Evaluation Scheme

Component	Type	Duration	Date & Time	Weightage
Test-I	Closed Book	60 mins		25%
Test-II	Closed Book	60 mins		25%
Team Project	Take Home	30 days		20%
Comprehensive Exam	Open Book	3 Hrs.		30%

Chamber Consultation hours: To be announced in the class.

Make-up Policy:

Prior Permission of the Instructor-in-Charge is usually required to take a make-up for a test. A make-up test shall be granted only in genuine cases on justifiable grounds.

Notices: Notice regarding the course will be displayed on the CS & IS group notice board.