2309 CS374/SE474/CN106 Course Outline

Subject Code	:	CS374/SE474/CN106
Subject Title	:	Network Programming
Course Type	:	Compulsory
Level	:	4
Credits	:	3
Teaching Activity	:	Lecture 22.5 hours
	:	Tutorial 7.5 hours
	:	Laboratory 15 hours
Prior Knowledge*	:	CS110: Computer Programming CS370: Computer Networks CO004: Projects on Operating Systems

Class Schedule :

Class	Week	Time	Classroom	Date
D1	TUES	15:30-18:20	C408	2023/09/04-2023/12/17
D2	FRI	09:00-11:50	C408	2023/09/04-2023/12/17
D1	FRI	09:00-11:50	C408	2023/09/04-2023/12/17

Instructor	:	Zhou Ling
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Office	:	A306a
Office Hour	:	Tuesday: 10:00-12:00 Wednesday: 14:30-17:30 Thursday: 10:00-13:00 Friday: 14:30-16:30

COURSE DESCRIPTION

This course introduces the fundamental principle for TCP/UDP socket programming. It aims for the students to gain experience in systems and network programming together with writing simple, efficient, portable client/server application programs in the Unix/Linux environment using C language. Topics covered include basic TCP/UDP socket, message construction, socket options, signalling, nonblocking I/O, multitasking, multiplexing, and multiple recipients.

TEXT BOOK

Required Text Book:
Book title: TCP/IP Sockets in C
Author/Editor: Michael J. Donahoo and Ken h L. Calvert
Edition: 2
ISBN-10: 0123745403
ISBN-13: 978-0123745408

Publisher: Morgan Kaufmann
Date: 2009
Reference Book:
Book title: Unix Network Programming, Vol. 1: The Sockets Networking API
Author/Editor: W. Richard Stevens, Bill Fenner, and Andrew M. Rudo
Edition: 3
ISBN-10: 0131411551
ISBN-13: 978-0131411555
Publisher: Addison-Wesley Professional
Date: 2004

INTENDED LEARNING OUTCOMES

Upon the successful completion of this course students will be able to:

1. Explain the ideas of TCP and UDP socket programming and the behaviour of system calls when a signal is triggered.
2. Identify the difference between iterative and concurrent servers and differentiate the errors due to non-blocking behaviour and other type of errors.
3. Apply the socket functions to implement echo TCP/UDP server and client.
4. Apply programming technique to find solution for a given network problem.
5. Develop unicast/ multicast/ broadcast programs.
6. Construction a simple client/server application in a team.

Weekly Schedule

Week	Topic	Hours	Teaching Method
1	Introduction	3	Lecture/lab
2	Overview of pointers in c	3	Lecture/lab
3	Overview of TCP/IP protocol	3	Lecture/lab
4	Client/server programming mode	3	Lecture/lab
5	How do sockets works	3	Lecture/lab
6	Basic TCP sockets	3	Lecture/lab
7	Under the hood of socket calls	3	Lecture/lab
8	Basic UDP sockets	3	Lecture/lab
9	Constructing messages	3	Lecture/lab
10	Advanced topics: socket options	3	Lecture/lab
11	Advanced topics: signaling	3	Lecture/lab
12	Advanced topics: nonblocking I/O	3	Lecture/lab
13	Advanced topics: multitasking	3	Lecture/lab
14	Advanced topics: multiplexing	3	Lecture/lab
15	Advanced topics: multiple recipients	3	Lecture/lab

ASSESSMENT APPROACH

Assessment method	**Weight(%)**
1. Attendance and assignment	30%
2. Project	20%
3. Final Exam	50%
Total	100%

Guideline for Letter Grade:

Marks	Grade
93 - 100	A+
88 - 92	A
83 - 87	A-
78 - 82	B+
72 - 77	B
68 - 71	B-
63 - 67	C+
59 - 62	C
56 - 58	C-
53 - 55	D+
50 - 52	D
Below 50	F

Notes:
Students will be assessed on the basis of continuous assessment (i.e. coursework in the form of individual assignments and group work) and by an end of semester examination.

The coursework assessment items (e.g. assignment, project, and presentation etc.) evaluate students' ability to implement programming solution to practical problems using the principle of socket programming and some advanced programming techniques (such as signalling, nonblocking I/O, multitasking, multiplexing, and multiple recipients).

Final examination will primarily evaluate students' overall understanding of main topics covered in the course (i.e., how to develop simple client/server network programs).

ADDITIONAL READINGS

Journals:

Conferences: Sigcomm, Mobicom, Infocom

Trade and other Publications:

Website:
All source codes used in teaching and guidelines are available on the course ftp site.