



COURSE HANDBOOK

1	Course Title	Systems Programming
2	Course Code	CSC421
3	Credit Hours	4(3,1)
4	Semester	Spring 2014
5	Resource Person	Nadeem Ghafoor Chaudhry
6	Supporting Team Members	
7	Contact Hours (Theory)	3 hours per week
8	Contact Hours (Lab)	3 hours per week
9	Office Hours	Shall be communicated later
10	Course Introduction	

UNIX was developed by Ken Thompson and Dennis Ritchie in 1971 at AT&T. Many variations of it were spawned off over the years like Ultix, Xenix, HP-UX etc. In 1991 Linus Torvalds a Finish student released Linux which was essentially an open source version of UNIX capable of running on Intel's x86 based architecture. Because it was open source and inherited proven & robust architecture of UNIX, it became very popular very quickly. The purpose of this course is to cover concepts and techniques used in developing advanced programs using the UNIX/Linux system call interface & standard C library functions and have a broad understanding of LINUX kernel.

Students interested in taking this course are expected to have a good grasp of basic operating system concepts like processes, threads, memory management etc. Because the development platform will be LINUX so portion of the course covers the LINUX environment with particular emphasis on tools like GDB, make, ar, RCS.

11 Learning Objectives

Upon successful completion of this subject students should be able to:

- Code UNIX client/server applications
- Work with C programs and libraries to develop UNIX applications
- Understand and use UNIX inter-process communication facilities
- Make effective use of UNIX commands, utilities and filters

12 Course Contents

The module consists of theory and practical portion. Theory part will consist of class lecture that will introduce students to different UNIX/Linux system calls. The lab part will use more of a supervisory model in which students will be assigned problems related to the theory part that they had covered in class. They will be encouraged to come up with their own solutions and implement them. If and when they get stuck the instructor will guide them through the debugging process.

<u>Weeks</u>	<u>Topic of Lecture</u>	<u>Reading Assignment</u>
Week 1	<ul style="list-style-type: none"> • History of UNIX/Linux. • Review of C particularly struct, union, pointers. • Buffer overflow problem. Process environment 	Chapter 1 & 2
Week 2	<ul style="list-style-type: none"> • Process creation using fork() • Process Control Block, process states • Process fan, process chain 	Chapter 3
Week 3	<ul style="list-style-type: none"> • Using wait() • Reading and Writing files. • File representation • Redirection 	Chapter 4
Week 4 & 5	<ul style="list-style-type: none"> • UNIX file system • Directory structure, protection, iNode • Hard and Symbolic links • Effect of fork() on FDT 	Chapter 5
Week 6	<ul style="list-style-type: none"> • Loose ends, Sessional 1 exam, return and discussion 	
Week 7	<ul style="list-style-type: none"> • UNIX Special Files • Anonymous pipes • Named pipes 	Chapter 6
Week 8	<ul style="list-style-type: none"> • Introduction to signals in UNIX • Manipulating signal masks and signal sets • Catching and ignoring signals 	Chapter 8
Week 9 & 10	<ul style="list-style-type: none"> • Introduction to Threads • Thread synchronization using mutex and condition variables 	Chapter 12 & 13
Week 11	<ul style="list-style-type: none"> • Loose ends, Sessional 2 exam, return and discussion 	
Week 12 & 13	<ul style="list-style-type: none"> • System-V Interprocess Communication Mechanisms • Semaphore • Shared memory • Message Queues 	Chapter 15
Week 14 & 15	<ul style="list-style-type: none"> • Connection Oriented Communication • Sockets, ports, • Client/server architecture, • Multiprocessing server • Multithreaded server 	Chapter 18
Week 16	<ul style="list-style-type: none"> • Review, loose ends 	

The assessment of this module shall have following breakdown structure

Theory Part

Sessional-I Exam	10%
Sessional-II Exam	15%
Final Exam	50%
Quiz (3-6 per semester)	15%
Assignments (3-6 per semester)	10%

The minimum pass marks is 50%. Students obtaining less than 50% marks shall be deemed to have failed in this course. The correspondence between letter grades, credit points, and percentage marks shall be as follows:

Grades	Letter Grade	Credit Points	Percentage Marks
A	(Excellent)	4.0	90and above
A-		3.7	85-89
B+		3.3	80-84
B	(Good)	3.0	75-79
B-		2.7	70-74
C+		2.3	65-69
C	(Average)	2.0	60-64
C-		1.7	55-59
D	(Minimum passing)	1.3	50-54
F	(Failing)	0.0	Less than 50

16 Assessment Schedule

Week	Assignment and Quiz
Week 2	1 st Assignment and Quiz
Week 5	2 nd Assignment and Quiz
Week 8	3 rd Assignment and Quiz
Week 11	4 th Assignment and Quiz
Week 13	5 th Assignment and Quiz

17 Format of Assignment

This course indoctrinates the following format for all assignments except code:

1. Paper Size: A4
2. Left Margin: 2 Inches
3. Right Margin: 1 Inch
4. Top Margin: 0.5 Inch
5. Bottom Margin: 0.5 Inch
6. Font: Times New Roman
7. Font Size:
 - a. Main Heading 14
 - b. Sub Heading 12
 - c. Text 12
 - d. Titles 16
8. Font Color: Black
9. Line Spacing: 1.5
10. Diagrams & Charts: Need not be colored
11. Title page must be designed as guided by resource person in class