CS 283 Systems Programming Syllabus

Course Description

This course introduces computer systems, including interaction of hardware and software through the operating system, from the programmer's perspective. Three fundamental abstractions are emphasized; processes, virtual memory, and files. These abstractions provide programmers a common interface to a wide variety of hardware devices. Topics covered include linking, system level I/O, concurrent programming, and network programming.

Course Objective and Goals

1. To obtain practical skills in concurrency and multithreaded programming.
2. To become familiar with and comfortable using the programming facilities of the operating system, including a) File system structures, b) Network / socket programming, c) Memory system and shared memory, d) Thread mechanisms, and e) I/O system structures.
3. To operate in and self-manage in programming teams.

Audience and Purpose within Plan of Study

This is a core computer science course required by all Computer Science majors. It should be taken in the 3rd year. This course is appropriate for students interested in modern computer architecture, computer systems and high performance computing.

Prerequisites

CS 265

Instructor

Constantine Katsinis (katsinis@drexel.edu)
Office Hours: Monday 3-5 pm in UC 114

Meeting Time

Section	Day	Time
001	M	06:00 pm - 08:50 pm
002	R	06:30 pm - 09:20 pm
003	T	06:30 pm - 09:20 pm
004	TR	03:30 pm - 04:50 pm

Teaching Assistants

	Email @drexel.edu	Office Hours	
Sandesh Bhandari	sb3728	Mo	4:00 PM - 6:00 PM
		Fr	2:00 PM - 4:00 PM
Kimberlee Model	tim32	Th	10:00 AM - 12:00 PM
Anish Basu	ab3576	Fr	10:00 AM - 12:00 PM

What Students Should Know Prior to this Course

1. Programming constructs and data structures in C and/or C++.
2. Effectively use of the Unix programming environment - shell, file system, scripts, pipes, regular expressions, filters, program development tools
3. Use of effective procedures and tools for building, debugging, testing, tuning, and maintaining programs

What Students will be able to do upon Successfully Completing this Course Statement of Expected Learning

1. Use, develop and become familiar with programming constructs that interface with the operating system to provide functionality to the programmer and the user
2. Write portable systems-level applications
3. Coordinate threads using shared memory and distributed message-passing on a variety of platforms

Textbook

1. Randel Bryant and David O'Hallaron. Computer Systems: A Programmer's Perspective, 3rd Edition. Prentice Hall: 9780134092669
2. Recommended: W. Richard Stevens and Stephen A. Rago. Advanced Programming in the UNIX Environment, 2nd Edition. Addison Wesley: 0201433079
3. Recommended: Michael Kerrisk. The Linux Programming Interface. No Starch Press: 9781592372203

Topics

1. File Systems (Chapter 10)
2. Process Management (Chapter 8)
3. Thread Management (Chapter 12)
4. Network Programming (Chapter 11)
5. Memory Systems (Chapters 6, 9)
6. Compilers, Linkers and Loaders (Chapter 7)

Grading and Policies

- Homework (H1-H6) 30% (each Homework is 5%)
- Labs (L1, L2, L3) 15% (each Lab is 5%)
- In-class Exercises 15%
- Midterm Exam 20%
- Final Exam 20%

Final grades

- A range (A+, A, A-) is a course average [90, 100)
- B range is a course average [80, 90)
- C range is a course average [70, 80)
- D range is a course average [60, 70)
- F range is a course average [0, 60)

Academic Honesty Policy

The university's Academic Honesty policy is in effect for this course. Please read Drexel University Student Handbook found at http://www.drexel.edu/Studentlife/. On the first incident, students who share their work (even with best intentions) or otherwise violate the course or university academic honesty policy may receive a grade of F for the course (the students may not withdraw in this case). The students may be reported to the department, college, and/or University Judicial (Honesty) Board. Both the giver and the receiver will receive these penalties.

Submitting Assignments

- All assignments must be submitted using only BBLearn.
- All assignments must be submitted no later than the due date and time listed on the Course Schedule shown in the table below.
- No late assignments will be accepted.
- Grade breakdowns, rubrics, and/or point valuations are provided on each assignment.
- Grades will be reported via BBLearn.

Class will not meet on the following days

- Monday, January 21, 2019, Martin Luther King, Jr. Day
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Tentative Course Schedule

Lectures					Ex
Wk	Week of	Lecture Topics		Ch	
1	01/07	Make+GDB, Introduction to C	ice-1-perils ice-2-linked_list		
2	01/14	Files - Introduction	ice-1-append ice-2-descriptors	10	
3	01/21	Files - Rio	ice-3-rio	10	
4	01/28	Processes - Signals	ice-1-fork ice-2-exec	8	
5	02/04	Signals - Pipes	ice-3-signals ice-4-pipes	8	Midt
6	02/11	Networks	ice-1-hostinfo ice-2-open_clientfd	11	
7	02/18	Networks	ice-3-open_listenfd	11	
8	02/25	Threads	ice-1-threads ice-2-mutex	12	
9	03/04	Cache		6	
10	03/11	Virtual Memory Linking		9, 7	
11	03/18				Final

Deadlines: All deadlines are Thursday 06:30 pm Solutions will be posted in BBLearn at the same time.		
Homework		
Assigned	Name	Due (Assgn+10)
01/07	H1: Practice in C	01/17
	L1: Make, GDB, Valgrind	01/24
01/14	H2: File I/O Ch 10	01/24
01/21	H3: File I/O	01/31
01/28	H4: Processes Ch 08	02/07
02/04	L2: File I/O Programming	02/14
02/11	H5: Networks Ch 11	02/21
02/18	L3: HTTP Client+Server	02/28
02/25	H6: Concurrency Ch 12	03/07
03/04		
03/11		

Office of Disability Resources

Students requesting accommodations due to a disability at Drexel University need to request a current Accommodations Verification Letter (AVL) in the ClockWork database before accommodations can be made. These requests are received by Disability Resources (DR), who then issues the AVL to the appropriate contacts. For additional information, visit the DR website at drexel.edu/oed/disabilityResources/overview/, or contact DR for more information by phone at 215.895.1401, or by email at disability@drexel.edu.

University Policies

In addition to the course policies listed on this syllabus, course assignments or course website, the following University policies are in effect:

- Academic Honesty:
  - http://www.drexel.edu/provost/policies/academic_dishonesty.asp
- Student Life Honesty Policy from Judicial Affairs:
  - http://www.drexel.edu/studentlife/judicial/honesty.html
- Course Add/Drop Policy:
  - http://drexel.edu/provost/policies/course-add-drop/
- Withdrawal:
  - http://drexel.edu/provost/policies/course-withdrawal/
- The instructor may, at his/her/their discretion, change any part of the course during the term, including assignments, grade breakdowns, due-dates, and the schedule. Such changes will be communicated to students via the course web site Announcements page in BBLearn. This page should be checked regularly and frequently for such changes and announcements. Other announcements, although rare, may include class cancellations and other urgent announcements.
- Drexel Student Learning Priorities:
  - http://www.drexel.edu/provost/dcae/SymposiumLearningPriorities.PDF