CS 392A Systems Programming
CS/SES
Spring 2016

Meeting Times: Monday, Wednesday, and Friday 11:00-11:50am
Classroom Location: McLean Hall, Room 218B
Instructor: Georgios Portokalidis
Contact Info: http://www.cs.stevens.edu/~gportoka/contact.html
Office Hours: By appointment
Course Web Address: TBD
Prerequisite(s):   CS 182 or CS 385

COURSE DESCRIPTION

Introduction to systems programming in C on UNIX. Students will be introduced to tools for compilation, dynamic linking, debugging, editing, automatic rebuilding, and version control. Some aspects of the UNIX system call interface will be studied, including: process creation, signals, terminal I/O, file I/O, inter-process communication, threads, network protocol stacks, programming with sockets, and introduction to RPC. Style issues to be covered include: naming, layout, commenting, portability, design for robustness and debugability, and language pitfalls.

LEARNING OBJECTIVES

After successful completion of this course, students will be able to:

1. Create efficient C programs on the Linux platform. Includes Linux commands, pointers, libraries.
2. Use Makefiles, debuggers like gdb and version control.
3. Create graphical user interfaces for basic programs and learn about terminal input/output through the termios libraries.
4. Create a client/server based application using sockets.
5. Develop applications that create new processes and communicate with each other through pipes and signals. Understand the different states of a process.
6. Understand how a system call works, virtual memory, and permissions (including setUID/setGID).
7. Learn how to deal with non-trivial assignments every week under very strict conditions.

FORMAT AND STRUCTURE

The course involves lectures and in-class and take-home assignments.

COURSE MATERIALS

Textbook(s):   W. Richard Stevens, Stephen A. Rago , Advanced Programming in the UNIX Environment , 3rd ed., Addison-Wesley Professional, 2013

Other Readings: Brian W. Kernighan and Dennis M. Ritchie , The C Programming Language , Prentice Hall, 1988. ISBN: 0-13-110362-8

COURSE REQUIREMENTS

Participation Highly encouraged but not graded. Occasionally, assignments will be given during lectures to be completed and submitted through canvas by the end of the lecture.
Quizzes Pop quizzes will be given during the course of the semester.
Exams There is going to be one midterm exam and a final exam.
Homework Take-home assignments will be given in class. They will need to be completed individually and submitted through canvas.

GRADING PROCEDURES

Grades will be based on:
- In-class & take-home assignments (50 %)
- Midterm   (25 %)
- Final   (25 %)

ACADEMIC INTEGRITY

Undergraduate Honor System
Enrollment into the undergraduate class of Stevens Institute of Technology signifies a student's commitment to the Honor System. Accordingly, the provisions of the Stevens Honor System apply to all undergraduate students in coursework and Honor Board proceedings. It is the responsibility of each student to become acquainted with and to uphold the ideals set forth in the Honor System Constitution. More information about the Honor System including the constitution, bylaws, investigative procedures, and the penalty matrix can be found online at http://web.stevens.edu/honor/

The following pledge shall be written in full and signed by every student on all submitted work (including, but not limited to, homework, projects, lab reports, code, quizzes and exams) that is assigned by the course instructor. No work shall be graded unless the pledge is written in full and signed.

"*I pledge my honor that I have abided by the Stevens Honor System.*"

Reporting Honor System Violations

Students who believe a violation of the Honor System has been committed should report it within ten business days of the suspected violation. Students have the option to remain anonymous and can report violations online at www.stevens.edu/honor.

EXAM ROOM CONDITIONS

The following procedures apply to quizzes and exams for this course. As the instructor, I reserve the right to modify any conditions set forth below by printing revised Exam Room Conditions on the quiz or exam.

1. Students may **not** use **any** electronic devices during quizzes and exams, unless explicitly allowed by the instructor before the quiz or exam.
2. Students may use the following materials during **quizzes**. Any materials that are not mentioned in the list below are **not** permitted.

Material	Permitted?	
	Yes	No
Handwritten Notes		X
Typed Notes		X
Textbooks		X

3. Students may use the following materials during **exams**. Any materials that are not mentioned in the list below are not permitted.

Material	Permitted?	
	Yes	No
Handwritten Notes	X	
Typed Notes		X
Textbooks	X	

4. Students **are not** allowed to work with or talk to other students during quizzes and exams.

LEARNING ACCOMODATIONS

Stevens Institute of Technology is dedicated to providing appropriate accommodations to students with documented disabilities. Student Counseling and Disability Services works with undergraduate and graduate students with learning disabilities, attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, and psychiatric disorders in order to help students achieve their academic and personal potential. They facilitate equal access to the educational programs and opportunities offered at Stevens and coordinate reasonable accommodations for eligible students. These services are designed to encourage independence and self-advocacy with support from SCDS staff. The SCDS staff will facilitate the provision of accommodations on a case-by-case basis. These academic accommodations are provided at no cost to the student.

Disability Services Confidentiality Policy
Student Disability Files are kept separate from academic files and are stored in a secure location within the office of Student Counseling, Psychological & Disability Services. The Family Educational Rights Privacy Act (FERPA, 20 U.S.C. 1232g; 34CFR, Part 99) regulates disclosure of disability documentation and records maintained by Stevens Disability Services. According to this act, prior

written consent by the student is required before our Disability Services office may release disability documentation or records to anyone. An exception is made in unusual circumstances, such as the case of health and safety emergencies.

For more information about Disability Services and the process to receive accommodations, visit https://www.stevens.edu/sit/counseling/disability-services. If you have any questions please contact: Lauren Poleyeff, Psy.M., LCSW - Diability Services Coordinator and Staff Clinician in Student Counseling and Disability Services at Stevens Institute of Technology at lpoleyef@stevens.edu or by phone (201) 216-8728.

INCLUSIVITY STATEMENT

Stevens Institute of Technology believes that diversity and inclusiveness are essential to excellence in education and innovation. Our community represents a rich variety of backgrounds, experiences, demographics and perspectives and Stevens is committed to fostering a learning environment where every individual is respected and engaged. To facilitate a dynamic and inclusive educational experience, we ask all members of the community to:
- be open to the perspectives of others
- appreciate the uniqueness their colleagues
- take advantage of the opportunity to learn from each other
- exchange experiences, values and beliefs
- communicate in a respectful manner
- be aware of individuals who are marginalized and involve them
- keep confidential discussions private

TENTATIVE COURSE SCHEDULE

Week #	Topics	Readings	Homework
1	UNIX and C basics	Chapters 1 & 2	
2	Memory management, C strings, and Standard I/O	Chapter 5	I/O assignment 1
3	File I/O using system calls	Chapter 3	I/O assignment 2
4	Makefiles, debuggers, and version control		
5	Files and directories	Chapter 4	ls assignment
6	Permissions and IDs (real UID, effective UID, set-UID, etc.)	Chapter 6	
7	Processes	Chapters 7	

8	Process control	Chapter 8	shell assignment
9	Signals	Chapter 10	signal assignment
10	Libraries		
11	Threads	Chapters 11 and 12	Multi-tasking assignment
12	Inter-process communication (IPC)	Chapter 15	IPC assignment
13	Daemon processes and sockets	Chapters 13 & 16	Sockets assignment
14	Advanced I/O	Chapter 14	