

CSC 2700 (section 3): Systems Programming – Syllabus – Spring 2018

- Instructor:** Dr. David Trammell
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Office Hours: appointment or walk-in (M-F usually until 4:30)
- Lecture Sections:** Section 3, Tu/Th 9:00 am to 10:20 am, 2317 Patrick F. Taylor Hall
(Officially this is a 3-hour lecture class, but it will be held in a computer lab with some hands on work during lecture meetings).
- Prerequisites:** CSC 1254 or CSC 1351
- Credit Hours:** 3 hours
- Textbook:** Computer Systems: A Programmers Perspectives, Bryant & O'Hallaron 3rd Ed., 2016 (required).
- Textbook Errata:** <http://csapp.cs.cmu.edu/3e/errata.html>

Learning Objectives (subject to some changes since this is a course in development)

1. Describe the basic architecture of computer systems in detail
2. Understand binary representation of numbers and other data (hexadecimal as shorthand for binary data; pros and cons of various binary number formats; single and double precision floating point; arithmetic-logic operations performed directly on binary data).
3. Learn the relationship between high level code, assembly language and machine language. Implement this knowledge through C and x86_64 assembly in the Linux environment.
4. Compare and contrast static and dynamic linking, and learn best practices for building large programs without linking errors.
5. Describe details of control flow, hardware and software exceptions, and concurrency at the operating system level.
6. Understand virtual memory, dynamic allocation of memory, pages and segments.
7. Learn the basics of system I/O (files) and network I/O (sockets) with specific examples from Linux.
8. Understand the need for concurrency at the application level and compare and contrast with parallelism at the application level.

Major Topics:

1. Binary representation of numbers and data: signed, unsigned, two's complement, single and double precision floating point, characters, strings.
2. Binary representation of computer code, x86_64 assembly, run-time stack, pointers

3. Overview of memory hierarchy: hard drives, solid state drives, RAM, cache, locality
4. Static linking, dynamic linking, static libraries, shared libraries, object file types
5. Hardware exceptions, processes, process control, signals
6. Virtual memory: physical and virtual addressing, address spaces, paging, dynamic memory allocation, garbage collection
7. Unix/Linux file I/O: text files, binary files, file headers
8. Unix/Linux network I/O: client/server model, Internet protocol, sockets
9. Introduction to concurrency and parallelism

Grading Distribution

Assignments (homework, programming, lab):	35%
Quizzes (2 or 3):	15%
Mid-term exam	25%
Final exam	25%
Participation	>= +2.5%

TOTAL	>= 102.5%

Grade Scale:	Points	Grade
	97 to 100+	A+
	93 to 96	A
	90 to 92	A-
	87 to 89	B+
	83 to 86	B
	80 to 82	B-
	77 to 79	C+
	73 to 76	C
	70 to 72	C-
	67 to 69	D+
	63 to 66	D
	60 to 62	D-
	0 to 59	F

Assignments: Your programs must compile and be written with consistent style, appropriately descriptive function and variable names, and frequent comments. I will not likely deduct points for style, but will expect you to take into account any recommendations I make on early assignments. Hand written assignments or homework must be neat and legible.

Participation: During class, I may ask you to log onto the classes.csc system during class, spend a few moments working on a problem, and then submit a quick answer via the system. These answers will not be graded for correctness but will count as bonus participation points if you've made a reasonable attempt at answering the question.

Missed Deadlines: If you miss an assignment deadline, a quiz or major test, if an acceptable excuse is presented (as governed by LSU's PS-22) I may either delay your deadline, reschedule an alternate quiz/test or change the distribution of points for you (for example, increasing the weight of other tests or assignments to make up for the missing one, or substituting some alternate work). Without an excuse, you'll get a zero on a quiz and probably tests as well (you should contact me as soon as possible if you miss a major test).

Grading Disputes: When I return graded work, if you have some dispute, you have until the end of the following class period to bring the problem to my attention. After that, I may or may not review the disputed material at my discretion.

Cheating: Cheating comes in many forms. The most obvious is plagiarism of answers or programs from your peers or the Internet. Student programs will be compared with one another and with code from the web with assistance from a cheating detection program.

Less obviously, cheating may include explaining concepts and details to another student who is working on a programming assignment if it results in their work being similar to yours. Whenever possible, students should avoid doing work at the last minute and come to me for assistance. Document your code with comments and save any scrap files or papers you produce that may serve to defend the uniqueness of your work.

Email: You are responsible for checking your LSU email address at least once per 24 hours. Also, be sure to check your email if I'm unable to make a class meeting for any reason. Email is the preferred way to contact me.

Computer Account: You will be assigned an account on the classes.csc.lsu.edu server which will be used for writing and compiling homework assignments and submitted them for grading. Have your credentials (name/password) with you in each class meeting. Do not share your account or password with other students. If you discover a security vulnerabilities in the system, it's your duty to report it as soon as possible. Using such a vulnerability to gain unauthorized access on the system may constitute a crime.

Important Dates:	January 19, 2018	Last day to drop
	February 13, 2018	No class (Mardi Gras)
	March 23, 2018	Last day to drop with a W
	March 27 & 29, 2018	No class (Spring Break)
	April 26, 2018	Concentrated Study Period begins
	April 30, 2018	Final Exam Week begins

May 3, 2018 **Our Final Exam (Thursday 12:30 to 2:30 pm)**

Date of Last Modification: January 2018