

CS456/556 - Systems Programming Syllabus and Information

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General Information

Contact Your Instructor

Name: Steven Baker

Email: Steve.Baker@indstate.edu

Phone: 812-237-3147

Office: Root A-140B

Instructor Office Hours: 10-11 TR, 1-3 MWF

Instructor/class Directories: `cd ~sbaker/public_html/cs456/`

Course website and information: <http://cs.indstate.edu/~sbaker/cs456/>

Lecture, Exam, Office Hours

Lecture: T/TR @ 2-3:15pm in Root Hall A017

Section and CRN: CS456 - 001 (CRN: 11159), CS556 - 001 (CRN: 11161)

Credit Hours: 3

Mid-term exam: Thursday, March 14th

Final exam: Thursday May 9th @ 3:00 pm

GA Tutoring: We have a few graduate assistants who will be in the computer science Unix lab, room A-015 in the basement of Root Hall, for about 20 hours per week in total. You can go to this lab to work on your programs. The computers are Linux machines, and you can use the cs456xx log-in that will be given to you during the first week of class to use them. Or, you can bring your laptop to work on. Either way, you can ask the graduate assistants to look at your programs, and you can work with any other CS students that are there (you could use the lab as a regular meeting place to work with your classmates). The regular hours that the lab will be open will be posted on the department's website.

Prerequisites

A minimum of a C in CS202 for undergraduates and a minimum of a A- in CS500 for graduates.

Standard text

Most information required for the course is available on-line. Sources that can be used for the course include the following.

- The Unix on-line manual pages (man command)
- The GNU info pages (info command)
- **Linux System Programming: Talking Directly to the Kernel and C Library, Edition 2**, Robert Love (Oâ€™Reilly)
- **flex & bison**, by John Levine (Oâ€™Reilly)
- Wikipedia.org
- Tutorials Point:
 - Unix

Course Announcements

Announcements regarding the course will be made both during class and via email to your @sycamores.indstate.edu email address. You should regularly check this email account or have it forwarded to an account that you check regularly. You can set the account to forward by logging into your indstate.edu email from Internet Explorer (the "light" version of the webmail client that opens

up from Firefox or Chrome does not give the option to forward email).

Classroom conduct

You may not use cell phones, iPods/music players, etc. during class. You should be civil and respectful to both the instructor and your classmates, and you should arrive to class a few minutes before the scheduled lecture so you are ready for lecture to begin on time. You may use your computer during class if you are using it to follow along with the examples that are being discussed. You may not check email, Facebook, work on other courses, etc. during class.

Course Description

The catalog description for this course is:

An introduction to both program translation and operating systems. There will be a survey of topics such as: top-down and bottom-up parsing, scanning, code generation, symbol table management, linkers and loaders, batch processing systems, interacting processes, multiprogramming systems, and memory management.

Course Outline

	Covers: (some TBD)
Weeks 1-8	<ul style="list-style-type: none">• Week 1: Basic Unix commands and intro to system calls: open/read/write/close• Week 2-3: fork, pipe/socketpair, exec, a simple shell.• Week 4: Make and the GNU tool-chain.• Week 5-7: Intro to X86_64 assembly• Week 8: Regular expressions, Lexical analysis and state machines.
Exam #1	~ Thursday, March 14th
Weeks 8+	Covers: <ul style="list-style-type: none">• Week 9-11: Parsing - A simple calculator & simple code generation• Week 12-15: Parsing a language, Revisiting the shell, TBD
Final Exam	Thursday May 9th @ 3:00 pm

Normal Content

- Version control: Make, RCS, Git
- File system I/O - open/close/read/write, printf/scanf, opendir/closedir/readdir/stat
- Local inter-process communication: signals, socketpairs, shared memory.
- Fork and exec: how shells work.
- Regular expressions (review!)
- Condensed introduction to x86_64 assembly language.
- How assemblers work.
- Structure of ELF files -- use of tools like objdump, readelf, nm, od.
- Lex/flex and yacc/bison examples starting with a simple calculator and then a simple programming language (something on the level of Dartmouth BASIC).

Learning Outcomes

- Solid understanding of the Unix/Linux API.
- Basic understanding of programming language translation.

Grading and Assignments

The students of this course have the following responsibilities: read assigned readings before lecture, attend lecture, complete homework assignments, take in class quizzes, take exams, and possibly complete a project. The final grade consists of:

- **Quizzes:** 15% total. There should be a quiz approximately once per week. For blackboard quizzes you will be allowed to use your notes for the quiz, any other type of quiz, use of notes or Internet or crib sheets will be decided on a case-by-case basis.
- **Homework:** 25% total. There will be a homework assignment most weeks. The total of all homework assignments is worth 25% of the final grade. If you turn in the assignment late, I may grade it at 80%. Homework turned in after I've discussed the assignment in class WILL NOT BE ACCEPTED. NOTE: you may ask me to look over an assignment before it is due and I may help by pointing out mistakes that need correction and provide other feedback.
- **Exams:** 60% total. We will have two exams. A mid-term worth ~100 points, and a final exam worth ~150 points.
- **Class Attendance/Participation:** 0% total. Attendance will be taken at the beginning of each class. Each unexcused absence beyond 2 will reduce your final grade by 10%, i.e. after 5 unexcused absences your final grade will be reduced 50% and you will receive an F in the course.

Late Homework

All homework assignments will be given a preferred due date. Assignments can be turned in past the preferred due date, but any assignments turned in late will have their value multiplied by 80% (so the highest grade you can get on a late assignment is 80%). Any assignment discussed in depth in class are effectively closed no credit will be given.

Start Homework Early

I suggest attempting a homework assignment the day it is given, or the day after, so that if you have a problem you can ask early. If you continue to have problems in trying to complete the assignment, you will have time to ask again. Many of the homework assignments require thought and problem solving, which takes "time on the calendar" not just "time on the clock". By that I mean that spending an hour on 3 consecutive days is likely to be more productive than trying to spend 3 hours at once on the assignment.

Expected Amount of Work

My expectation is that an average student will spend about 4 hours OUTSIDE of class each week (that is in addition to class time) WORKING PRODUCTIVELY/ EFFICIENTLY (not just staring at the computer) to complete their coursework for this class. Some students may spend less time than this, and some students will spend more.

Note - your classes should be more important than your part-time job.

Grade Cutoffs

Homework assignments and exams are designed so that a standard cutoff for grades will be close to what you deserve. After the first exam I will create a grade in Blackboard called "Letter Grade" that is what your letter grade would be if the semester ended today. Initially, I will assign the following grades: 93-100 A, 90-93 A-, 87-90 B+, 83-87 B, 80-83 B-, 77-80 C+, 73-77 C, 70-73 C-, 67-70 D+, 63-67 D, 60-63 D-, 0-60 F

My goal is that the different grades have the following rough meaning.

A+/A

You understand everything and probably could teach the course yourself.

B+/A-

You understand nearly everything, and should be all set to use this knowledge in other courses or in a job.

C/C+/B-/B

Some things you understand very well and others you don't (more towards the

former for a B and more towards the latter for a C).

D-/D+/C-

You did put some effort in, and understand many things at a high level, but you haven't mastered the details well enough to be able to use this knowledge in the future.

F

Normally, students that get an F simply stopped doing the required work at some point.

Blackboard

The course has a blackboard site. Click <https://blackboard.indstate.edu/> to go to blackboard. You should see this course listed under your courses for the current term. The blackboard site is only used for giving you your grades. All course content, schedule, etc. is kept in this web site (which you are currently viewing).

CS Course Policies

Note that this course follows all standard CS course policies. In particular, **(a)** cheating/plagiarism by graduate students results in an F in the course, **(b)** missing 20% of the classes results in an F for any student, and **(c)** there will be no makeup exams. See <http://cs.indstate.edu/info/policies.html> for details. My attendance policy is further amended such that each unexcused absence beyond 2 will reduce your final grade by 10%.

Academic Integrity

Please follow these guidelines to avoid problems with academic misconduct in this course:

- **Homework:** You may discuss the homework assignments, but should solve and finish them on your own. To make sure you are not violating this, if you discuss with someone, you should DESTROY any work or evidence of the discussion, go your separate ways, SPEND at least an hour doing something completely unrelated to the assignment, and then you should be able to RECREATE the program/solution on your own, then turn that in. If you cannot recreate the solution on your own, then it is not your work, and you should not turn it in.
- **Note on sources:** if you use some other source, the web or whatever, you better cite it! Not doing so is plagiarism.
- **Exams:** This should be clear no cheating during exams. The exams will be closed-book, closed-notes, no computer, and no calculator. You may be allowed one sheet of 8.5" by 11" piece of paper with **hand-written** notes to use as a crib-sheet for your tests.

- **Projects:** You should not copy from the Internet or anywhere else. The project should be your own work. It will be fairly obvious to me if you do copy code from the Internet, and the consequences will be at the least a 0 on the project.

If cheating is observed, you will at the least receive a 0 for the assignment (and may receive an F for the course), and I will file a Notification of Academic Integrity Violation Report with Student Judicial Programs, as required by the university's policy on Academic Integrity. A student who is caught cheating twice (whether in a single course or different courses) is likely to be brought before the All University Court hearing panel, which can impose sanctions up to and including suspension/expulsion. See the <http://www.indstate.edu/sjp/docs/code.pdf> and <http://www.indstate.edu/academicintegrity/> for more information.

Please ask the instructor if you have doubts about what is considered cheating in this course.

Special Needs / Disability Services

Indiana State University recognizes that students with disabilities may have special needs that must be met to give them equal access to college programs and facilities. If you need course adaptations or accommodations because of a disability, please contact us as soon as possible in a confidential setting either after class or in my office. All conversations regarding your disability will be kept in strict confidence. Indiana State University's Student Support Services (SSS) office coordinates services for students with disabilities: documentation of a disability needs to be on file in that office before any accommodations can be provided. Student Support Services is located on the lower level of Normal Hall in the [Center for Student Success](#) and can be contacted at 812-237-2700, or you can visit the ISU website under A-Z, [Disability Student Services](#) and submit a Contact Form. Appointments to discuss accommodations with SSS staff members are encouraged.

Once a faculty member is notified by Student Support Services that a student is qualified to receive academic accommodations, a faculty member is obligated to provide or allow a reasonable classroom accommodation under ADA.

Disclosures Regarding Sexual Misconduct

Indiana State University fosters a campus free of sexual misconduct including sexual harassment, sexual violence, intimate partner violence, and stalking and/or any form of sex or gender discrimination. If you disclose a potential violation of the sexual misconduct policy I will need to notify the Title IX Coordinator. Students who have experienced sexual misconduct are encouraged to contact confidential resources listed below. To make a report or the Title IX Coordinator, visit the Equal Opportunity and Title IX website:

<http://www.indstate.edu/equalopportunitytitleix/titleix>.

The ISU Student Counseling Center

HMSU 7 th Floor

812-237-3939

www.indstate.edu/cns

The ISU Victim Advocate

Trista Gibbons, trista.gibbons@indstate.edu

HMSU 7 th Floor

812-237-3939 (office)

812-230-3803 (cell)

Campus Ministries United

Campus Ministries

812-232-0186

<http://www2.indstate.edu/sao/campusministries.htm>

www.unitedcampusministries.org

ucmminister2@gmail.com

321 N 7 th St., Terre Haute, IN 47807

For more information on your rights and available resources

<http://www.indstate.edu/equalopportunitytitleix/titleix>