CS101 - Fundamentals of Computing

Fall 2021

Syllabus and Information

Table of Contents

General Information

Contact Your Instructor

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Office: Root Hall A-140D (Jeff), A-015 (Krupali)
Office phone: 812-237-2126 (Jeff)

Instructor Office Hours: Jeff - 11-noon and 2-3pm Mon-Fri; Krupali 10-11am/1-2pm on Tue/Thu, and 8-9pm Mon-Thu (evening hours online only); (see syllabus for how office hours will work)

Lecture, Exam

Lecture: MWF 10-10:50 (face to face section), in A-017 Root Hall (face to face section) and Zoom/Teams (online). See syllabus for information on joining lectures by Zoom or watching recordings.
Exams:

- Exam 1: exam1
- Final Exam: exam2

Lab Help: We have a few graduate assistants who are available to help students in beginning computer science courses. Please see https://cs.indstate.edu/wiki/index.php/Unix_Lab_and_Help for details. The lab hours are in a calendar on the CS homepage, at http://cs.indstate.edu/info/index.php#lab_hours. You can join the lab when working on your programs. You can ask the lab 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).

Prerequisites

none.

Standard text

Free online sources - Automate the Boring Stuff by Al Sweigart, and others

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: "The main focus of the course is to give students a practical understanding of computing to become well-informed citizens and professionals in the computing age. Topics may include a basic study of - computational thinking, computer security, big data, artificial intelligence, and current trends in computing."

Course Outline

- How Computers Work: Binary number systems, protocols, and basic circuits
- What is inside a computer: CPU, RAM, hard drive, etc.
- Internet 101: how data is moved around the internet

- Computer and internet security: how do you know your data is secure?
- Servers and such: logging into a server, transferring files
- Python basics: Learning the Python 3 programming language
- Computational problems: things computers can do really well, and things that are impossible for computers to solve
- Current Topics in Computer Science: Basic understanding of some of the latest trends in Computer Science

Learning Outcomes

Students will be able to:

- Install and use an appropriate set of software tools to create simple computer programs.

Demonstrate an understanding and make use of:

- How Computers Work
  - Binary number system
  - Protocols and how systems communicate
  - Boolean logic
  - Basic circuitry
  - What is inside a computer
  - Name the different components that make up a computer
  - Name the connection ports on a computer
  - Describe what the terminology associated with a component means (e.g., Ghz for CPU's is the speed of the CPU, GB for the size of a hard drive)
  - Evaluate the tradeoffs between different components (e.g., one CPU versus another)
- Internet 101
  - Explain the basic infrastructure of the internet and associated terminology
  - Explain the infrastructure of a home network, and be able to configure a home network
  - Explain how web browsing and email works, in terms of which parties are involved (e.g., server and client), where data is stored, and what communication is involved
- Computer and internet security
  - Explain the concepts of encryption/decryption, digital signing, and the difference between public-key and private-key encryption
  - For given situations, be able to say whether a given interaction is secure or not
  - Know the key terminology of internet security (e.g., rsa, sha, https, etc.)
- Servers and such
  - Explain what servers are used for
  - Be able to log in to a server to transfer files to a server, and login via ssh to issue commands to the server
- How is data stored on a server, and how do we access data
- Python basics
  - Explain the basic structure of a python program
  - Be able to create and run simple python programs
  - Should be able to effectively use at least one GUI-based text editor
- Computational problems
  - Basic skills in evaluating the efficiency of an algorithm
  - Explain some examples of computational problems that either cannot be solved, or require an inordinate amount of time to solve (e.g., halting problem)
- Current Topics in Computer Science
- Simple Ciphers and Encryption
  - Understand what a simple cipher is and be able to describe one
  - Be able to calculate how difficult it would be to break a simple cipher given the implementation rules

- Artificial Intelligence
  - Understand the concept of the "Turing test" as a test of artificial intelligence
  - Know the history of some famous examples of "artificial intelligence" (e.g., chess playing, Jeopardy playing, chat-bots)
- Machine Learning
  - Understand how machine learning is different than Artificial Intelligence
  - Be able to describe the basic components of a Neural Network

Grading and Assignments

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

- **Quizzes: 25% total.** By default you will be allowed a 1 page cheat sheet on quizzes. Otherwise, you are not allowed to use your phone, a calculator, other people, or anything else.
- **Homework: 25% total.** The total of all homework assignments is worth 25% of the final grade. If you get behind you should still complete the assignments (because that is the primary way learning happens), and I will give late credit up to a certain date.
- **Exams: 50% total.** 20% mid-term, 30% final, final replaces mid-term if the final is better.
- **Class Attendance/Participation: 0% total.** TBD

Note that most weeks will have some kind of graded work (quiz, homework, exam).

Checkpoint assignment or quiz A checkpoint assignment or quiz must be completed by a date specified and with a minimum score specified in order to pass the course. Why? There will be some key points where if you fall behind too much then there would not be much hope of passing. We set a few key checkpoints early in the term to make sure you at least keep up the minimum amount needed.

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 is effectively closed and 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 3-6 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.

This is the foundation for the rest of CS, so it definitely pays off to do your best here. Note - this is your most important class (for CS majors).

Note - please find a way to spend enough time on this class (the investment will pay off in terms of skills, being able to get a job, etc.).

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 used for giving you your grades, for quizzes/exams, and for getting to online lectures (which are done using Zoom). Announcements will be sent through blackboard and to your university email. Links and such will be kept on this website.

Lectures (using Zoom)

Here at ISU section numbers starting with the number 3 (e.g.3xx: 301, 302, etc.) are generally online sections. There are 2 types of online sections, synchronous online and asynchronous online. Sections that are synchronous must be joined at the regularly scheduled time of the course, whereas sections that are asynchronous must keep up with the material independently without regularly scheduled meetings. In general async sections are more difficult, and require a great deal of self-discipline (it is much easier to think "I can watch the videos tomorrow" and just get behind). So if you are in one of these sections make sure you get off to a strong start, and ask for help sooner rather than later. Check your course schedule for course meeting times, and if you have a meeting time, then your section is synchronous, otherwise it is asynchronous (or there is an error in the system).

This course has a 301 section (asynchronous online) and 002 section (face to face). The face to face course will also be streamed over zoom and recorded, so any students in the 002 section can join by zoom if needed (e.g., if quarantined).

For ISU's links to information on getting started with Zoom, see https://indstate.teamdynamix.com/TDClient/1851/Portal/KB/ArticleDet?ID=109823. You can also see the information at https://www.indstate.edu/fcte under the heading/link "Student Resources". You will get to the lectures for this course by going to Blackboard for this course, and click on "Zoom - for lectures" on the

lefthand menu (or click on Tools and scroll down to Zoom). Once there you should see a schedule of lectures and be able to view recorded lectures. Note that you should install the Zoom application for your computer, and you will need to be logged into to Zoom with your ISU credentials to be able to connect. Also note that the lectures are recorded and only available to those in our class.

Office hours (using Teams)

Office hours will be in the office, on Zoom, and through Microsoft Teams. For in person office hours you can either make an appointment using http://cs.indstate.edu/scheduler or drop in during normal office hours. Krupali will also be logged into Zoom during her office hours (see the calendar on the bottom of the CS homepage for the link). For meeting through Teams, you should start Teams in your browser or start the application. You should be logged in using your ISU credentials. Once you have Teams open you can message your instructor to ask me questions or to ask to talk. We can use Teams to message (better than emailing back and forth repeatedly if you have questions about something that you just want to write about) or to talk and share screens (e.g., to take a look at your code). Jeff normally has Teams open all of the time, including during office hours. Krupali has Teams open at least during her lab hours listed on the CS homepage. During our office hours we will normally reply right away; at other times we will reply when we get a chance.

CS Course Policies

Note that this course follows all standard CS course policies. See http://cs.indstate.edu/info/policies.html for details.

COVID-19 Information

Information specific to CS courses - start of term announcements.

Standard ISU language required in all syllabi (read this all once, then skim for your other courses)...

Students are expected to adhere to course attendance policies, as stated in the course syllabus. Students must complete the Sycamore Symptom Assessment by email before arriving on campus each day unless they have documented their COVID immunization and have been exempted from the program. Documented COVID-related absences will be treated like any other serious medical issue. Following University policy, students with a documented, serious medical issue must contact the Office of the Dean of Students for assistance. The Office of the Dean of Students will supply documentation for faculty. Students with a documented serious medical issue should not be penalized and will be given a reasonable chance to complete exams or assignments. Once notification is made, faculty will make reasonable efforts to accommodate the student's absence and will communicate that accommodation directly to the student. Please note that faculty are not required to accommodate a serious medical issue with virtual content options, like streaming or recorded lectures. Students who have been notified by contact tracers of a close contact who has tested positive for COVID must abide by their instructions, which will include a mandatory period of quarantine, especially if the student is unvaccinated, and/or mandatory testing. To avoid the potential of missing significant class time, students are strongly encouraged to receive the COVID vaccination that has been made available on campus. For more information about the vaccines or to find a vaccination site, go to: ourshot.in.gov. The ISU Health Center also administers COVID-19 vaccines by appointment.

Students should contact the Office of the Dean of Students with questions by calling 812-237-3829.

The information provided in this section of the syllabus is subject to modification based on guidance by public health authorities. Please follow this link for updated information on ISU's Fall 2021 requirements.

Masks on campus: All faculty, staff, and students are required to wear face coverings anytime they are in public spaces. In classrooms they are required of faculty, staff, and students. Failure to comply with this policy will be treated, by policy, as would any student disruption of class. (A refusal or failure to properly wear an appropriate mask will result in the faculty member asking the student to do so. A refusal of that request may result in the student being asked to leave the class for that period. A refusal of that request may result in the faculty member cancelling class and referring the matter to the Office of Student Conduct and Integrity.) A failure of a faculty member to wear an appropriate mask/shield should be reported to the Chairperson of the faculty member.

Face coverings will be worn by all students and faculty in classrooms as well as in buildings (unless you are alone in an office). What is said/printed on a mask will be held to the same Student Code of Conduct standard as if it were printed on a shirt or hat. As a result, a political statement such as MAGA, BIDEN2020, or BLM is not grounds for demanding that it be removed/replaced. In judging what constitutes an offensive statement on a mask, the determination will be made by Student Affairs using the Student Code of Conduct. If there is a question about a mask, the faculty member will refer the matter to Student Affairs and only insist upon its immediate removal if there is no doubt that it violates the Code. Medical waivers will be made through Student Affairs and students with such a waiver are expected to carry the documentation with them and present it when asked.

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

Standard ISU language required in all syllabi...

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.

Statement on Discrimination, Sexual Harassment, and Sexual Misconduct

Standard ISU language required in all syllabi...

Indiana State University Policy 923 strictly prohibits discrimination on the basis of: age, disability, genetic information, national origin, pregnancy, race/color, religion, sex, gender identity or expression, sexual orientation, veteran status, or any other class protected by federal and state statutes in ISU programs and activities or that interferes with the educational or workplace environment.

Title IX of the Educational Amendments of 1972 prohibits discrimination based on sex, including sexual harassment. Sexual harassment includes quid pro quo harassment, unwelcome verbal or physical conduct, sexual assault, dating violence, domestic violence, and stalking.

If you witness or experience any forms of the above discrimination, you may report to:

Office: Equal Opportunity & Title IX; (812) 237-8954; Rankin Hall, Room 426
Email: ISU-equalopportunity-titleix@mail.indstate.edu
Online: https://cm.maxient.com/reportingform.php?IndianaStateUniv&layout_id=10

Disclosures made to the following confidential campus resources will not be reported to the Office of Equal Opportunity and Title IX:

ISU Student Counseling Center: (812) 237-3939; Gillum Hall, 2nd Floor
Victim Advocate: (812) 237-3829; HMSU 7th Floor
UAP Clinic/ISU Health Center: (812) 237-3883; 567 N. 5th Street