CSC 3510 – Computer Organization

Spring 2022

Catalog description

"A study of the logical organization of computers, including combinatorial and sequential digital logic, computer arithmetic, and circuits. Machine and assembly languages, memory, addressing techniques, interrupts, and input-output processing also are studied."

You've likely heard this course is hard… have you also heard:

"I also took Computer Organization, a class I found extremely enlightening and fun. It allowed me to develop an understanding of computing from the ground up."

"Professor Kivolowitz was an amazing professor (as usual). He only further increased my passion for computers and computer programming. He was able to delve into the History of computer science which is a rather under-taught topic in the computer science world. Despite being online, the class was an amazing experience and will definitely assist me in my future career."

"While the weekly programming assignments allowed me to learn and apply the concepts efficiently, it was slightly overwhelming. However, this overwhelmingness was likely due to my course-load and not this class itself. Overall, an amazing class and essential for a computer science education."

"Professor Kivolowitz is amazing! He's tough but honestly, without him, I wouldn't have wanted to work so hard. When people talk about the professor, I always say he expects excellence from you. Some people take it the wrong way but the people that make it the right way respond well because they want to be just as great or even better than he is. His teaching methods and explanations are the best for me. He explains it clearly to where I can actually understand and breaks it down even more if we still don't understand. I highly recommend him if you're really willing to work hard."

I have included these quotes to show you the side of this course that isn't typically shared amongst students. If you allow yourself, there is a lot to be gained from this course that will be impactful on your professional development.

Intent

This course is your opportunity to learn what really happens when you execute code on a computer. If you truly understand the lowest levels, you'll be more expert at the higher levels.

Required course

You cannot graduate as a Computer Science major without a passing grade in this course.

Content

To expand upon the catalog description above, we will cover in detail:

- The AARCH64 ISA (Instruction Set Architecture)
- Linux command line use
- Bit operations
- Computer arithmetic and number representations
- Parallel programming and synchronization

Class text

There is no class text however several web-based resources are specified. You are **EXPECTED and REQUIRED** to make use of these resources as if they were required texts. See Schoology under "REFERENCE MATERIAL".

Grading

Type	Weight	Comment
Projects / Homework	90%	Projects and other forms of homework
Final	10%	Multiple choice, cumulative

Use of student projects for in-class learning

It is really important to learn how to locate errors and fix them in your code. Student projects may be chosen after grading to be used in-class for bug-hunting practice. This is definitely not intended as a slight - finding and fixing of bugs is among the most important lessons you can learn.

Class GitHub page

Is found here: https://github.com/pkivolowitz/CSC3510-S-2022

Environment

We will use a command-line only version of Debian Linux designed for the ARM AARCH64 ISA.

The installation instructions are found here:
https://github.com/pkivolowitz/CSC3510-S-2022/blob/main/install.md

Accommodations

The Carthage Advising Center offers a variety of services and accommodations to students with disabilities, based on appropriate documentation, nature of disability, and academic need. In order to initiate services, students should meet with Diane Schowalter at the start of the semester to discuss reasonable accommodation. After meeting with Diane Schowalter, students in need of accommodations should also speak with individual faculty members from whom accommodations are sought to communicate their needs and make requests in a timely manner. If a student does not request accommodation or provide documentation, the faculty member is under no obligation to provide accommodations. You may contact Diane Schowalter at ext. 5802 or via e-mail at dschowalter1@carthage.edu.

A note about accessibility

Carthage College strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers due to your disability (including mental health, learning disorders and chronic medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, you also need to register with Diane Schowalter in Learning Accessibility Services (dschowalter1@carthage.edu).

Concerning learning outcomes

Students may vary in their competency levels of any stated outcome. Students can expect to achieve stated outcomes only if they honor all course policies, attend classes regularly, complete all assigned work in good faith and on time and meet all other course expectations of them as students.

Possibility of changes made to the course

Please note the above schedule, policies, procedures and assignments in the course are subject to change in the event of extenuating circumstances, by mutual agreement and / or to encourage better student outcomes.

Academic success and health

Good health can help you achieve academic success. The Health and Counseling Center (HCC) supports students by addressing physical, mental, and emotional well-being. All services are free and confidential and are provided by experienced and licensed professionals. Services are available to all full-time, undergraduate students.

Office hours

I do not publish office hours because no matter what I choose them to be, many of you will not be able to make it. What I do instead, I think, is way better.

I strive to keep my Google Calendar up to date. You have access to my calendar. Consult it, find an empty spot, set a meeting adding me as a guest and send me an invitation. In this way, I can meet with you when it is convenient for you rather than ask you to conform entirely to my schedule.

To make an appointment use Google Calendar. You have access to it – we all do. Select show co-worker's schedule and enter "pkivolowitz." When my schedule is visible, pick a blank spot. Click on the blank spot you want and enter an informative title and adjust the time carefully.

MAKE SURE YOU SEND ME AN INVITATION. Do this by entering my email address where guests are specified. Make sure you click the "send invitation" button shown to you when you've saved the meeting.

Academic honesty guidelines

Carthage College Academic Honesty Guidelines are found here:
https://www.carthage.edu/community-code/academic-concerns/academic-honesty-guidelines/.

TL; DR

Plagiarism	Don't do it
Cheating on a Test	Don't do it
False Citation	Don't do it
Multiple Submissions	Don't do it

More detail

Because this is an advanced required course, I will make an attempt to look for academic honesty violations. If I find any, those involved will be prosecuted as here:
https://www.carthage.edu/community-code/academic-concerns/penalties/

Class meeting

The class meeting will be held on Zoom at:
https://carthage-edu.zoom.us/j/96177856652?pwd=czdqUEk5UmVyMjRCbkd2L2hUcGV4dz09

Attendance

Attendance is required. Cameras on.

Critical request

Teaching is a partnership between instructor and student. The instructor's job is to present material in a logical and understandable way. The instructor's task is facilitated by active feedback from the student and by the student's active involvement. Without participation from the student, the instructor's task is made difficult.

Please speak up in class.
Please interact.
Please ask questions.
Please interrupt me.
Please ask me to repeat, clarify and explain.

Please be my partner in making this class a fun and educational experience for all of us.