EC413 – Computer Organization

M W 10:10am-11:55 in EPC 209

<u>Instructor</u>: Tali Moreshet, PHO 528 Email: talim@bu.edu (with EC413 in the subject line) Office hours: Drop-in Mondays noon-1pm, Wednesdays 2:30-3:30pm, and Thursdays 11-noon, or sign up for an appointment: <u>https://calendly.com/talim/advising-office-hours</u>

Teaching Assistants: Xiteng Yao, xtyao@bu.edu

Haven Cook, <u>haven@bu.edu</u>, Louis Jimenez-Hernandez, <u>louisjh@bu.edu</u>, Matthew Kweon, <u>kweon10@bu.edu</u>, Varsha Singh, <u>varsingh@bu.edu</u> TA lab hours, in PHO305/307: Mon 7:30-8:30pm, Tue-Thur. 6:30-8:30pm, Fri. 3-7pm.

Discussion Sections: Monday 4:40-5:30pm, or 6:30-7:20pm, in PHO305.

The discussion sections are run by the TAs and serve two purposes: a pre-lab and/or an extension of the lectures. Attendance is not required, but is strongly recommended.

Course Description

EC413 is an introduction to the fundamentals and design of computer systems. The starting points are your basic knowledge of logic design and high-level language programming. The end points will be your ability to create a working computer from logic gates, to program that computer in assembly language, and to be able to evaluate design options. Topics include computer instruction sets, assembly language programming, logic design of arithmetic operations, design of sequential logic with registers and buses, CPU design (data path, control, integrating datapath and control, pipelining), performance evaluation, and memory systems (including caching and virtual memory). In parallel there is a lab where the focus is on in-depth understanding of selected comp org topics including HDL design using Verilog and system design methods. The <u>prerequisites</u> are EC311, including familiarity with Verilog, and high-level language programming, preferably in EC327.

<u>Textbook</u>: Patterson & Hennessy, *Computer Organization & Design: The Hardware/Software Interface*, 6th Edition, Morgan Kaufmann, 2020 (5th Edition is also fine).

Assignments, announcements, course material, readings, updated schedule, and other useful links will be posted on Blackboard (<u>http://learn.bu.edu</u>).

<u>Labs</u>

Our laboratory space is in PHO305/PHO307 (Linux machines). Request card access to PHO305/PHO307 via https://ccure-portal.bu.edu/ccureportal/login.

Evaluation

Grading:	Exams: 60%
	Homework: 5-10%
	Labs: 30%
	Participation: 0-5%
Exams:	There will be two midterms, during class time, tentative February 26 and April 9, and a
	final. Exams will be closed book/notes, no calculators, with only one letter-size two-
	sided, hand-written sheet of notes allowed.
Homework:	Homework assignments will be posted on Blackboard. Homeworks are to be submitted
	on Blackboard, as a single pdf file before the specified deadline (typically, in one week

by 8pm). Late homework will be penalized 20% for being up to one day late and will not be accepted thereafter. Doing the homework will prepare you for the exams!
Labs: The labs are assigned about a week before they are due and it is your responsibility to get them done on time, generally Friday afternoons. Please note that the amount of time any lab takes can vary by an order of magnitude (from a few hours to a few days).
Lab grading: A large part of each lab is the demo. Because there are many more students than TAs, you are urged to get the labs done early. For labs with demos, 5% bonus for finishing by Wednesday, 3% bonus for finishing by Thursday. On the other hand, there is a 10% penalty for being late one business day (usually the following Monday) and a higher penalty for being later than that.
Attendance: Attendance is essential in this class. Some of what we cover in this course will be found nowhere else. You are also strongly encouraged to actively participate, if not during

<u>Grades:</u> Grade discussion/corrections should be done within one week after the graded exam or assignment is distributed. No grade changes will be made after one week. Let us know in advance if you require an extension on an assignment due to unforeseen circumstances.

Academic integrity and Copyright:

lecture, then during office hours.

- Homework and labs are to be done individually, or with your partner, when applicable. You are
 encouraged to work together to learn the material and to discuss approaches to solving problems.
 However, you must come up with and write up the solutions on your own. Copying an answer from
 another student or source is considered cheating. You may not submit ANY code not written by
 you (or your lab partner as relevant). You may not collaborate in any way on exams.
- Clearly reference any sources you used in your work: Books, Internet, and collaborators! This
 includes websites (e.g. Stack Overflow) and AI assistants (e.g. ChatGPT) in which case you are
 required to include details of the prompts that you use. These may be useful in understanding things
 like CAD tool error messages. Note that copying code or answers from such sources, or from
 another student is considered plagiarism.
- Boston University's academic code of conduct, <u>https://www.bu.edu/academics/policies/academic-conduct-code/</u> will be strictly applied.
- All class material is copyrighted and may not be shared publicly online by any means. This includes your own solutions.

<u>Inclusion</u>: I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

<u>Accommodations for Students with Documented Disabilities</u>: If you believe you might have a disability that requires accommodations, requests for accommodations must be made in a timely fashion to Disability & Access Services, 25 Buick St, Suite 300, Boston, MA 02215; 617-353-3658 (Voice/TTY). See established policies and procedures: <u>http://www.bu.edu/disability/accommodations/</u>