EC605 – Computer Engineering Fundamentals M W 10:10-11:55am in CDS 262

Instructor: Tali Moreshet, PHO 528 Email: talim@bu.edu (with EC605 in the subject line) Office hours: Drop-in Mondays noon-1pm, Tuesdays 11-noon, and Wednesday 2-3pm, or sign up for an appointment: https://calendly.com/talim/advising-office-hours

<u>Teaching assistants</u>: Steven Hopkins, <u>stopkins@bu.edu</u>, Jianglong "Link" Huang, <u>huangjl@bu.edu</u> Lab hours: M-Th 6:30-8:30pm, PHO305/PHO307

Course Description

This is an introductory course to computer engineering, focusing on the hardware/software interface, and presenting a bottom-up view of a computer system. Topics include logic design: binary arithmetic, combinational and sequential logic; computer organization: assembly language programming, CPU design, and memory systems; introduction to compilers, operating systems, and computer networks.

Prerequisites

This course is intended for graduate students with little or no background in computer engineering. It is expected that students have some programming background, and so EC602 (or EC327) is a co-requisite.

<u>Textbook</u>

• Computer Organization and Design, The Hardware/Software Interface, RISC-V 2nd Edition, David Patterson and John Hennessy, Morgan Kaufmann, 2021.

Optional Reference Texts

- Digital Design, 6th (or earlier) edition, Morris Mano and Michael Ciletti, Pearson.
- Computer Systems, A Programmer's Perspective, third edition, Randal Bryant and David O'Hallaron, Pearson, 2016.
- Computer Networks (5th/6th ed.), Andrew Tanenbaum and David Wetherall, Prentice Hall.
- Computer Networking: a Top-Down Approach (8th ed.), J.F. Kurose, K.W. Ross, Pearson.

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

Outcomes

- 1. Understand the fundamentals of binary arithmetic.
- 2. Understand what components are available for logic design.
- 3. Design combinational digital logic systems given specifications.
- 4. Design sequential digital logic systems given specifications.
- 5. Understand the basics of assembly language programming.
- 6. Understand concepts of CPU and memory design.
- 7. Gain knowledge of some basic concepts of compilers.
- 8. Gain basic understanding of operating systems, including Unix and file systems.
- 9. Understand basic concepts of computer networks, with an emphasis on TCP/IP.

Evaluation

Grading:	Exams: 60%
	Labs: 25%

Homework: 5% Class participation: 10%

- Exams: There will be one midterm exam, during class time, tentative Oct. 9, and a cumulative final exam. Exams are closed book, but you are allowed to bring one sheet of hand-written notes (to be turned in with your exam). No calculators are allowed.
- Labs: Lab assignments will be posted on the Blackboard website. The labs need to be submitted on Blackboard and demoed to a TA. Some of the labs are to be completed in groups of two, others are individual.
- Homework: Homework assignments will be posted on the Blackboard website. Homeworks are to be submitted on Blackboard, in readable pdf format, before the specified deadline.
- Attendance: You are expected to attend class, actively participate, and keep up with the material. You are also encouraged to attend office and lab hours. In-class attendance quizzes will be given during some lectures.

Collaboration and Copyright:

- The homework and labs must be the result of your individual work (or with your partner).
- You may discuss the contents and general approach to a problem with your classmates but not the detailed solution. You are expected to formulate your approach and write the solutions by yourself.
- Clearly reference any sources you used in your work: books, Internet, and your 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.

Late policy:

- Little to no credit will be given for late homework.
- For labs, you are allowed up to 2 days late submission total for the semester. No credit will be given for late labs after this.
- Lab demos should be done according to the specified schedule with no delay. You are encouraged to attend lab hours for help. Request card access to the lab: (https://www.bu.edu/dbin/eng/zaius/

Exam/Homework/Lab Grade dispute:

• Grade discussion/corrections should be done within one week after the graded exam or homework is distributed. No grade changes will be made after one week.

Copyright:

• 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>