EC311 – Introduction to Logic Design Spring 2025

T Th 9:00 – 10:45pm, PHO 210

Instructor: Tali Moreshet, PHO 528 Email: talim@bu.edu (with EC311 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: https://calendly.com/talim/advising-office-hours

Graduate Teaching Assistants:
Abin George, abg309@bu.edu, Office hours: Fri 2:30-4:15pm,
Beste Oztop, boztop@bu.edu, Office hours: Th 5:30-5:15pm, both in PHO 115

Lab assistants/ Graders: Alex Jones, afjones@bu.edu, Fadi Kidess, fadik@bu.edu,
David Li, dav@bu.edu, Maiko Lum, mlum@bu.edu

Course objectives

The class covers the theory and practice of digital hardware design. Students will learn to formulate real world tasks using Boolean algebra and FSM theory, and to apply manual and computer-aided techniques to solve the problems. In addition, they will also learn fundamental circuit design and verification skills using Verilog HDL and FPGAs.

Textbooks

Digital Design, Sixth Edition, Mano and Ciletti, Pearson (5th ed also acceptable).
Starter's Guide to Verilog 2001, Ciletti, Pearson (optional).

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

Goals

To provide students with:

- An understanding of the basic tools of logic design
- An understanding of sound design methodologies
- An experience with hardware implementation and the use of CAD tools

Course Outcomes

As an outcome of completing this course, students should be able to:

- Understand the applications of logic design
- Understand abstraction and hierarchy in digital design
- Understand what components are available for logic design
- Understand the use of Boolean algebra in logic analysis and design
- Understand logic minimization criteria and methods for use in design
- Understand the concept of state in digital systems
- Design combinational digital logic systems given specifications
- Design sequential digital logic systems (finite state machines) given specifications
- Implement logic designs in hardware and with CAD tools
- Discover component availability and data using the Internet or other resources

Evaluation

Grading: Three exams: 70%
Labs/Project: 20%
Homework: 10%

Exams: The first two exams will be during class time, tentatively Feb. 20 and April 3. The third exam will take place during the scheduled final exam timeslot.

Homework: Homework assignments will be posted on the Blackboard website. Homeworks are to be submitted on Gradescope before the specified deadline (typically, in one week by 9pm). Submissions may be typed or scanned, as long as they are legible. There is significant penalty for late homework.

Labs: Lab assignments will be posted on Blackboard. Grades will be assigned by demonstrating the lab and submitting the Verilog code on Blackboard. Students are expected to attend their scheduled lab section every week, and complete labs outside of lab hours as needed. Request card access to PHO115 via https://ccure-portal.bu.edu/ccureportal/login.

Course Policies

- **Exam/Home/Lab Grade discussion**: 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.
- **Academic integrity:**
  - The homework and lab assignments must be the result of your individual work. 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 of HW/Lab problems by yourself. Copying the solution and/or 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 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.
  - *Boston University's academic code of conduct,* https://www.bu.edu/academics/policies/academic-conduct-code/ will be strictly applied.
- **Copyright:** All class material is copyrighted, and may not be shared publicly online by any means. This includes your own solutions to assignments.

Inclusion: 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.

Accommodations for Students with Documented Disabilities: 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: *http://www.bu.edu/disability/accommodations/*