ECE 2020 Fundamentals of Digital Design

Course Information

- **Instructor:** Matthieu R Bloch (matthieu.bloch@ece.gatech.edu)
- **Course Prefix and Number:** ECE 2020 A (CRN 86002)
- **Term:** Fall 2026

Course Description

Description ECE 2020 introduces the many levels of abstraction that enable today's digital systems. It explores digital design at the layers from switches and wire to a programmable machine. At each layer, the design process of transforming a specification into an implementation is introduced and practiced.

Course Learning Outcome

1. Understand Boolean logic and be able to produce desired logic functions in truth-table, schematic, and algebraic forms.
2. Understand physical implementations of digital logic, be able to produce logic functions using it, and analyze its timing behavior.
3. Understand how numbers are represented and manipulated in digital logic.
4. Understand basic digital building blocks such as multiplexers and encoders and be able to use them to build larger digital devices.
5. Understand digital storage elements and sequential logic and be able to create finite state machines to implement a desired behavior.
6. Understand basic processor operation and be able to create simple programs in assembly code.

Required Course Materials

The main textbook is Wakerly, Digital Design: Principles and Practice 4th Edition or 5th Edition
In addition free resources will be available:

1. Supplemental textbook: Wills & Wills, Digital Computer Systems (see https://ece2020.ece.gatech.edu/ComputerDesign.pdf
2. Common Course Website: http://ece2020.ece.gatech.edu/
3. Instructor notes

Grading Policy

Your course grade will be based upon my assessment of your understanding of the material covered throughout the semester. The weights used for grade assignment will be

- **Homework:** 5%
- **Labs:** 10% (2 labs at 5% each)
- **Tests** 52% (4 tests at 13% each)
- **Final exam** 33%

Thresholds for letter grade assignment are as follows.

- **A:** 90% $\leq$ total grade $\leq$ 100%
- **B:** 80% $\leq$ total grade $<$ 90%
- **C** 70% $\leq$ total grade $<$ 80%
- **D** 60% $\leq$ total grade $<$ 70%
- **F** 0% $\leq$ total grade $<$ 60%

Attendance Policy

Attendance is mandatory and will be checked with an ungraded short quiz or roll call. You are allowed up to three non-excused absences without questions asked. Beyond 3 non-excuses absences, 5% will be deducted from the final course grade.

Academic and Research Honesty/Integrity Statement

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review the Student Code of Conduct and the Academic Honor Code, especially Appendix A: Graduate Addendum to the Academic Honor Code.

Students are expected to perform research in an ethical and responsible manner. All Doctoral and Master's Thesis students are required to take the Responsible Conduct of Research training, and it is expected that students abide by the principles taught in that training while performing research.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Allegations of scientific or scholarly misconduct are handled in accordance with the procedures outlined by the Policy for Responding to Allegations of Scientific or Other Scholarly Misconduct.

Core IMPACTS

Not applicable

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulates some basic expectations that you can have of me and that I have of you. Additional information for research-related work is given in The Expectations of Advisors and Advisees. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.