

E15: Fundamentals of Digital Systems Syllabus - Fall 2011

M W F 9:30-10:20, Hicks 211
Lab: M/W 1:15-4:15, Hicks 310

Course Website: <http://www.swarthmore.edu/NatSci/tali/E15/E15.html>

Instructors Information:

Prof. Tali Moreshet
Office: Hicks 218
Phone (office): 328-8331
Email: tali@swarthmore.edu
Office Hours: TBD, Open door policy.

Prof. Matt Zucker
Office: Hicks 219
Phone (office): 328-8636
Email: mzucker1@swarthmore.edu
Office Hours: TBD

Course Description:

This class introduces students to the basic concepts of digital systems, including analysis and design. Both combinational and sequential logic will be covered. Students will gain experience with several levels of digital systems, from simple logic circuits to hardware description language and interface programming in C.

The following topics will be covered:

- Number systems
- Boolean algebra
- Binary arithmetic
- Logic gates
- Programmable logic
- Combinational logic and building blocks
- Synchronous sequential circuit design
- Latches, flip-flops, registers and counters
- State machines
- Verilog and C programming

Please check the course website for an updated course schedule, readings, labs and homework schedule.

Prerequisites: Any engineering course, any computer science course, or instructor permission.

Course Objectives:

- Apply Boolean algebra and other techniques to express and simplify logic expressions.
- Analyze and design combinational and sequential digital systems.

- Use different techniques, among them a hardware description language and a functional programming language, to design digital systems.

Textbook:

- M. Moris Mano and Michael D. Ciletti, *Digital Design*, 4th edition, Prentice Hall, 2007. (required)
- Brian Kernighan and Dennis Ritchie, *The C Programming Language*, 2nd edition, Prentice Hall. (optional)
- Stephen Brown and Zvonko Vranesic, *Fundamentals of Digital Logic with Verilog Design*, 2nd edition, McGraw-Hill Higher Education, 2008. (optional)

Labs, Exams & Grading:

The course has two midterm exams and a final exam, weekly homework assignments and labs.

- It is legitimate to work together on homework, but not to copy. The homework you turn in should reflect your individual work.
- Labs will be done in groups of 2-3. You may discuss your lab report with other groups, but you may not copy anything from their reports.
- Any outside sources used for your lab reports (or homework, where appropriate), such as books and on-line resources, should be explicitly cited.

Grading will follow approximately the divisions shown below.

Homework:	10%
Labs:	30%
Exams:	2 x 15%
Final Exam:	25%
Participation:	5%

Exams will be cumulative, but will focus on the most recent material.

Late Policy:

Homework will be due at the beginning of class on the day specified. I will do my best to return your graded work in a timely manner, and I expect you to turn in your work on time. Substantial grade penalty will be given to work that is turned in late without advanced permission.

Labs are due at the beginning of the next lab meeting (that is, in two weeks).