

E25/CS25: Principles of Computer Architecture Syllabus - Spring 2009

Thursday 4:00-6:30pm, Hicks 211

Course Website: <http://www.swarthmore.edu/NatSci/tali/E25>

Instructor Information:

Prof. Tali Moreshet

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Office Hours:

By appointment.

Course Description:

This course is an introduction to computer architecture. In this class, we will focus on microprocessor design, including CPU and memory, the interface between hardware and software, and an introduction to multiprocessors.

More specifically, we will cover the following topics:

- Performance evaluation
- Instruction set architecture
- Machine arithmetic
- Datapaths and pipelining
- Memory hierarchy
- Branch prediction
- Scheduling techniques
- Multiprocessors

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

Prerequisites: One of ENGR 15/CPSC 24, CPSC 35, CPSC 33, or instructor permission.

Course Objectives:

- Understand processor design concepts in modern computer architecture.
- Understand and evaluate constraints and tradeoffs in microprocessor design.
- Use digital logic, Verilog, C, and some assembly.
- Enable you to design and build a mini computer.
- Enable you to understand, use, and modify computer architecture simulation tools.

Textbooks and Resources:

- David Patterson and John Hennessy, *Computer Organization and Design: The Hardware/ Software Interface*, fourth edition, Elsevier Publishers, 2009. (Required)
- John Hennessy and David Patterson, *Computer Architecture: A Quantitative Approach*, fourth edition, Elsevier Publishers, 2006. (Optional)
- Research papers and other handouts will be provided throughout the semester.

Labs, Exams & Grading:

The course has one midterm, homework assignments, some in lab format, and a final project. Unless specified otherwise, your homework should reflect your individual work. It is legitimate to use the web for reference as long as you acknowledge it in your work. Do not use solutions that are not your own for any homework assignments.

Grading will follow approximately the divisions shown below.

Homework:	25%
Midterm Exam:	25%
Presentations:	15%
Final Project:	20%
Participation:	15%

Participation includes coming prepared to class, asking questions, and contributing to the discussion. In addition, students will be expected to take a more active role during the second part of the course via in-class presentations.

Final Projects:

The final project will involve investigating some aspect of high-performance architecture of your choice. This may include exploring some small extension to a technique studied in class. For example, you may evaluate and compare branch prediction techniques, and perhaps try to design an improved algorithm. This will involve some independent research on the selected topic. Students are expected to present their projects to the class.

Late Policy:

Homework will be due at the beginning of class on the day specified. Homework assignments are worth up to 50% credit if turned in up to a week late. The final project must be turned in by the date of the scheduled final exam in order to receive any credit.