

# ECE 505 Computer Architecture

**When:** Mondays and Wednesdays 4:00 – 5:30 pm, starting Thursday, Aug. 27, 2015

**Where:** AK 219

**Instructor:** Thomas Eisenbarth

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**Office hours:** Wednesday 3:00pm – 4:00 pm, by appointment, or just come by

## Course description

This course introduces the fundamentals of computer system architecture and organization. Topics include CPU structure and function, addressing modes, instruction formats, memory system organization, memory mapping and hierarchies, concepts of cache and virtual memories, storage systems, standard local buses, high-performance I/O, computer communication, basic principles of operating systems, multiprogramming, multiprocessing, pipelining and memory management. The architecture principles underlying RISC and CISC processors are presented in detail. The course also includes a number of design projects, including simulating a target machine, architecture using a high-level language (HLL).

*Prerequisites:* Undergraduate course in logic circuits and microprocessor system design, as well as proficiency in assembly language and a structured high-level language such as C or Pascal.

## Textbook

*Computer Architecture: A Quantitative Approach*, 5th edition, by Hennessy and Patterson Morgan Kaufman (Elsevier), ISBN 9780123838728.

## Course Outline

Each of following topics will be covered over a period of two to three weeks:

### Part 1:

- Introduction to Computer Architecture and Performance Metrics Chapter 1
- Instruction Set Architecture (ISA) and Pipelining Appendix A, C
- Pipelining and Dynamic Scheduling Chap. 3

### MidTerm

### Part 2:

- Cache and Memory Chap. 2, App. B
- Multiprocessor and TLP Chapter 5
- DLP and GPUs Chapter 4

### Final

## Grading

Grading is based on 4 to 6 projects, one MidTerm exam, the Final exam and a presentation. Exams will be in-class, take-home or a mix of both. The weights for the final grade are as follows:

Presentation		<b>15%</b>
Projects		<b>40%</b>
MidTerm Exam	(Oct. 12)	<b>20%</b>
Final Exam	(Dec 7 or 9)	<b>25%</b>

The following grading scale will be used:

<b>Cumulative Performance</b>	<b>Grade</b>
>90%	A
>80% - 90%	B
>65% - 80%	C
55% - 65%	D
<55%	F

## Honor Code

Students at WPI are expected to maintain the highest ethical standards. Academic dishonesty, including cheating and plagiarism, is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see:

<http://www.wpi.edu/offices/policies/judicial/sect5.html>

## Students with Disabilities

If you need course adaptations or accommodations because of a disability, or if you have medical information to share with me, please make an appointment with me as soon as possible. If you are entitled to accommodation in accord with documentation on file at the [Disabilities Service Office](#), let me know as soon as possible so I can arrange for the accommodation.

This syllabus is subject to reasonable changes at the discretion of the instructor.