ECE 505 Computer Architecture

When: Thursday 6:00 – 7:50 pm, starting Thursday, Aug. 22, 2019
Where: AK 233

Instructor: Berk Sunar  <sunar@wpi.edu>
               phone: (508) 831-5494, office: AK 302

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

Website
Material relevant to the course will be made available on the course website including lecture notes, assignments, supplementary reading documents. In addition, the website will be updated frequently with announcements, e.g. new assignment, class cancellation etc. http://users.wpi.edu/~sunar/courses/ece505/

Tentative 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)
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Pipelining and Dynamic Scheduling  (Chapter 3)
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Midterm
Midterm
Part 2:
Part 2:
• Cache and Memory  (Chapter 2, App. B)
• Multiprocessor and TLP  (Chapter 5)
• DLP and GPUs  (Chapter 4)
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• Multiprocessor and TLP  (Chapter 5)
• DLP and GPUs  (Chapter 4)

Grading
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Grading is based on 4 assignments, one (in-class) Midterm exam, and a (pass/fail) Final
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presentation.
presentation.
The weights for the final grade are as follows:
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Assignments 40%, Midterm Exam 30%, Final Presentation 30%.
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The following grading scale will be used:
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>90% A, 80-90% B, 65-80% C, 55-65% D, else F.
>90% A, 80-90% B, 65-80% C, 55-65% D, else F.

Honor Code
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Students at WPI are expected to maintain the highest ethical standards. Academic
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dishonesty, including cheating and plagiarism, is considered a serious breach of these
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ethical standards, because it interferes with the university mission to provide a high
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.
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Academic dishonesty is also destructive of the university community, which is grounded
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in a system of mutual trust and places high value on personal integrity and individual
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responsibility. Harsh penalties are associated with academic dishonesty.
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Students with Disabilities
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If you need course adaptations or accommodations because of a disability, or if you
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
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
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
file at the Disabilities Service Office, let me know as soon as possible so I can arrange for
the accommodation.
the accommodation.