

CSCE 513: Computer Architecture

1. Course number and name: CSCE 513 - Computer Architecture
2. Credit: 3-hrs; Contact: Lecture: 3 periods of 50 minutes or 2 periods of 75 minutes per week
3. Instructor: Manton Matthews
4. Text book: John L. Hennessey and David A. Patterson, *Computer Architecture: A Quantitative Approach*, 4th ed., Morgan Kaufman, 2007. [Required].

David A. Patterson and John L. Hennessey, *Computer Organization and Design: The Software/Hardware Interface*, 2nd edition, Morgan Kaufman, 1998.
[Recommended]

5. Specific course information
 - a. Catalog description: Design methodology; processor design; computer arithmetic: algorithms for addition, multiplication, floating point arithmetic; microprogrammed control; memory organization; introduction to parallel architectures.
 - b. Prerequisites: CSCE 211, 212
 - c. CSCE 5xx elective
6. Specific goals for the course
 - a. Specific outcomes of instruction are that students will be able to:
 1. Describe the principles of computer architecture and organization. {tests}
 2. Describe the techniques and principles for the development of high performance computer systems. {tests}
 3. Describe the details of extant computer architectures. {tests}
 4. Quantitatively analyze aspects of computer architecture and draw conclusions about their performance. {homework, projects, tests}
 - b. As an elective this course cannot be counted upon to contribute to the attainment of any student outcome.
7. Topics covered and approximate weight (14 weeks, 4 hours/week, 56 hours total)
 1. Overview of Computer Design (1 hour)
 2. Quantitative Principles of Computer Design (2 hours)
 3. Review of Classical Pipelining: (3 hours)
 4. Memory Hierarchy (5 hours)
 5. Microprogrammed control (3 hours)
 6. Algorithms for computer arithmetic: addition, fast addition, multiplication, fast multiplication, division, floating point numbers and operations (8 hours)
 7. Memory organization (8 hours)
 8. I/O organization (4 hours)

9. Multiprocessor and parallel computer architecture (4 hours)
10. RISC architectures (4 hours)
11. Review and examinations (3 hours)

Difference between Undergraduate and Graduate Work:

Graduate students are assigned more difficult problems and graded on a different scale than undergraduates.

Syllabus Flexibility: Low. The instructor should consult with the Graduate Committee.

Modification and Approval History:

Initial description April 1999

Revised June 2001

Revised June 2005 by Caroline Eastman to update textbook edition and revise format

Revised June 2011 by Manton Matthews