CSC 626/726 Advanced Computer Architecture
Spring 2011

Wednesday, 6:30 PM – 9:15 PM, Room TEC 101

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Office Hours: M/W, 11:00-12:00 PM
T/TR, 9:30-11:00 AM
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Required Text:
Computer Architecture: A Quantitative Approach
John L. Hennessy & David A. Patterson. 3rd Ed. Morgan Kaufmann Publishers

Course Objectives and Outcomes:
This course will provide advanced knowledge on computer architectures to computer science and electrical engineering graduate students. Specifically the focus will be on the understanding of the computer hardware and software and their interaction at various levels from a quantitative perspective. Currently many different computer architectures exist like, servers, embedded system, desk-top computing, Laptop computers, cluster computers, PDA and other portable devices. The course will primarily focus on (i) finding out the important subsystems of computer organization like Arithmetic Processing, Memory to store information, control and data paths of the computer and Input/Output devices to work with the external world; (ii) identifying the important performance metrics of a computer and how the organization of the computer can be changed to improve the performance. We will discuss the new cluster computing and blade server concepts and also review the specification of the few existing computers.

General Policies:
Students are responsible for checking the course Website frequently for updates and notices relative to class materials and schedule. Email may be used occasionally to send notices of an advisory nature, but should NOT be relied upon as the official means of communication to the class.

The course schedule is aggressive, but achievable. However, if necessary, the schedule will be modified during the semester to allow coverage of most critical topics. I will attempt to provide advance notice of changes, but you should check the schedule frequently on the course Website at http://www.cs.usm.edu/~pghosh
Grading Policy:

Homework/Quizzes (6) 30%
Mid-term Exam 35%
Final 35%

The instructor reserves the right to make other assignments that are not part of the published schedule. Discussion or challenges of individual grades will not be entertained in the classroom before, during or immediately following class. Normal office hours are available for this purpose. Solutions/keys for assignments will be discussed in class, but will generally not be posted or made available for general distribution.

Final Papers will not be returned in class, but will be available for student pick up after the Final Exam. Final Exam papers will not be returned to the student.

Grade Distribution:
In general, semester grades will be determined by following distribution.

A 100 to 90
B 89 to 80
C 79 to 70
D 69 to 60
F 59 and below

All grades will be curved based on overall class performance. Grades are final once submitted, and are not changed unless a grading error has been made.

Late / Makeup Policy:

Late homework assignments will be accepted at a penalty of 10% per 24 hours, or fraction thereof, beyond deadline. Homework assignments will not be accepted after 30% has been deducted (i.e. 3 days late), and a grade of zero will be assigned.

Tentative Course Plan:

1. Introduction to Computer Architecture
2. Computer Benchmarking: SPEC
3. Instruction set
4. Memory Addressing
5. Operand and Operations
6. Control Flow
7. Instruction Coding
8. Compiler in Computer Architecture
9. Instruction level Parallelism
10. ILP-Software
11. Cache
12. Virtual Memory
13. Memory Technology
14. Multi Processor Architecture
15. Storage System
16. Bus
17. Cluster Computer