EC700 Advanced Computer Architecture

Course Information
Lecture: Tue-Thu 3:30 pm to 5:15 pm in EPC 203
Instructor: Ajay Joshi
Number of credits: 4

Course objective

The goal of this course is to learn the recent advancements in the area of computer architecture through lectures, reviewing research papers, and completing research-focused architecture design projects. We will focus on advanced single-core processor architectures, cache/memory architectures, on-chip network architectures and multicore processor architectures.

Staff Information

Instructor:

Name:	Ajay J Joshi
Office Address:	PHO 334
Office Phone Number:	617-353-4840
Email Address:	joshi@bu.edu (Best way to contact me - Make sure you include EC700 in the subject line)
Office Hours:	Monday 3 pm to 4 pm and Thursday 11 am to 12 noon in PHO 334

Prerequisites[1]

Programming Experience: Verilog, Python, C/C++
Courses: EC513 or equivalent, EC551 or equivalent and EC571 or equivalent

Course Resources

- Recommended textbook: Modern Processor Design: Fundamentals of Superscalar Processors by John Paul Shen and Mikko H. Lipasti
- We will use research papers from top-tier Computer Architecture conferences. All papers will be posted on Blackboard.
- We will use individual book chapters from a variety of books. A copy of each book chapter will be posted on Blackboard.

Paper Reviews

We will review one paper in detail in every class. A list of papers will be shared with the class. All students are expected to review the paper before coming to class and prepare a 1-2 page summary of the paper. As part of the summary, each student has to answer the following questions:

- What problem is being solved in the paper?
- How was the problem solved in the past?
- What is the novelty of the proposed solution?
- What are the strengths of the proposed solution?
- What are the weaknesses of the proposed solution?

[1] Please talk to the instructor if you have any questions about the prerequisites.

- How can the proposed solution be improved?

The summary is due at the beginning of the class. Students should submit the summary through Blackboard as well as bring a printed copy of their summary to class to facilitate discussion. Late submissions will not be accepted.

Paper Presentation
During each lecture one student will present a research paper. The research paper and presentation slots will be assigned on the first day of classes. The presentation should be 15-20 minutes long and should address the questions listed above under Paper Reviews. We will have a detailed discussion about the paper after the presentation.

Lecture Scribes
A student from the class will be assigned as a scribe for each paper that is discussed in class. The scribe is responsible for summarizing the technical discussion about the paper. Scribe notes should include a description of the problem being tackled by the paper, how is the problem solved in the prior art, what is novel about the solution proposed in the paper, how is the proposed solution evaluated, what are the limitations of the proposed solution, and what can be done to overcome this limitation. A second student will be assigned as a reviewer of the scribe's notes. After the reviewer reviews the notes, the scribe should send his/her notes to the instructor before the next class.

Mini projects
The class will have three mini projects. The projects will involve designing hardware in Verilog and using state-of-the-art simulation and verification tools for testing the design. Students will get 2 weeks to complete each mini project.

Project
The class will have a large design project in lieu of the final exam. The project will involve design, testing and evaluation of hardware, in-class presentation and project report. Students will have approximately 1.5 months to complete the project.

Grading criterion
Three Mini Projects – 15% each.
Class Presentation – 15%.
Final Project - 40%.

Academic integrity:

- The paper summary assignments must be the result of your individual work. You may discuss the contents of the paper with your classmates but you need to write the summary in your own words. Copying the summary from another student or source is considered cheating.
- Clearly reference any sources you used in your work: paper, presentations, books, internet, and your collaborators!
- Boston University's academic code of conduct will be strictly applied.
- Boston University's computing ethics will be strictly applied.