CS 3330 Computer Architecture
Spring 2020 Syllabus

COURSE CONTACT AND LOGISTICS

Samira Khan (Instructor)
Email: samirakhan@virginia.edu
Office: Rice 308
Office Hour: TBD

Amel Fatima (Teaching Assistant)
Email: af3szr@virginia.edu
Sihang Liu (Teaching Assistant)
Email: sihangliu@virginia.edu
Korakit Seemakhupt (Teaching Assistant)
Email: ks4hb@virginia.edu
Yasas Senevirathne (Teaching Assistant)
Email: dns8cz@virginia.edu
Yizhou Wei (Teaching Assistant)
Email: yw2bc@virginia.edu
Office: Rice 432
Office Hour: To be determined

Course Webpage: https://www.cs.virginia.edu/~smk9u/CS3330S20/home.html
Review Submission: Collab
Piazza: piazza.com/virginia/spring2020/cs3330s20khan/home

COURSE OVERVIEW

Computer architecture is the science and art of designing, selecting, and interconnecting hardware components and co-designing the hardware/software interface to create a computer that meets functional, performance, energy consumption, cost, and other specific goals. This course examines the fundamental computer design trade-offs, and provides an extensive knowledge of state-of-the-art proposals with the goal of developing an understanding that will enable students to perform cutting-edge research in computer architecture. We will learn, for example, how different computing models have different tradeoffs and how to design new domain specific accelerators can be designed using the fundamentals. Examining the trade-offs of different designs requires that you already know how to correctly design a system. **The concept and content of this course is adapted from the CMU Computer Architecture course ECE 18-447.**

COURSE GOALS

- Goal 1: To familiarize with both fundamental design tradeoffs and recent research issues/trends in processor, memory, and platform architectures in today's and future systems. A strong emphasis will be given on fundamental principles and design tradeoffs.
- Goal 2: Using the fundamental design concepts in the context of new technology trends. Learning the whole system stack design philosophy for recent emerging applications and technologies. A strong emphasis will be given to accelerators, processing in memory and storage, and emerging memory technologies.
- Goal 3: To provide the necessary background and experience to advance the state-of-the-art in computer architecture and systems through a research project. A strong emphasis will be given on exploring state of the art designs (through the course research project).

TEXTBOOKS AND RESEARCH MATERIAL

There is no required textbook. But we recommend several textbooks below which may be helpful supplements to the material covered in the lectures, labs, and homework assignments.

The following textbooks could be useful as supplements to lectures:

- Computer Organization and Design: The Hardware/Software Interface, Fifth Edition by Patterson and Hennessy, Morgan Kaufmann/Elsvier.
- Introduction to Computing Systems: From Bits and Gates to C and Beyond, Second Edition by Patt and Patel, McGraw-Hill.

Reading material will be distributed in class and/or will be available on the website electronically. Lecture slides, videos, readings, homework, and exams from CMU 447 Spring 2015, Spring 2014, Spring 2013, and past incarnations of the course are available here:

http://www.archive.ece.cmu.edu/ ece447/s15/doku.php?id=start
http://www.archive.ece.cmu.edu/ ece447/s15/doku.php?id=start
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GRADING

The course will be graded on a curve scale. The tentative breakdown of grades is given below:

HW0 and Class Participation	5%
Homeworks	15%
Labs	35%
Class Project	15%
Exam I	15%
Exam II	15%

HOMEWORKS

Homework assignments are due at the start of class on the date due. No late homework accepted. Discussions about homework in small groups are encouraged. However, homeworks must be written up individually and independently.

LABS

Lab assignments will be done individually unless otherwise specified. You can get your labs checked off in any of the recitation sections, regardless of which section you are officially registered in. You will have a total of five lab late days for the semester that you may use however you wish to turn in late labs. For example, you could turn in one lab five days late, or you could be one day late on five labs. Weekend days are included in this count. The TAs are available during lab sessions to assist you in completing your assignment, but the length of 3330 labs and projects are not designed to fit completely within just the lab hours. You will need to spend a lot of outside time. On the week a lab is due, you should come to a lab session with the milestones completed and ready for check-off. Lab sessions are designed to enhance your understanding of the lecture material, help you with homework assignments, exams, and labs, and get one-on-one help from the TAs on the labs. You can attend any lab session.

THE UNIVERSITY OF VIRGINIA'S HONOR CODE

The injunction is simple: students pledge never to lie, cheat, or steal, and accept that the consequence for breaking this pledge is permanent dismissal from the University.

By today's standard, an Honor Offense is defined as a Significant Act of Lying, Cheating or Stealing, which Act is committed with Knowledge. Three criteria determine whether or not an Honor Offense has occurred:

- Act: Was an act of lying, cheating or stealing committed?
- Knowledge: Did the student know, or should a reasonable University student have known, that the Act in question was Lying, Cheating, or Stealing?

- Significance: Would open toleration of this Act violate or erode the community of trust? Although a student should always conduct himself honorably, a student is only formally bound by the Honor System in Charlottesville and Albemarle County, and elsewhere at any time when he identifies himself as a University of Virginia student in order to gain the reliance and trust of others. The geographic limitation is intended to prevent an overextension of the System, for the Honor System can only act effectively where it is reasonably well-known and understood.