ECE/CSE 469 – Computer Design and Organization
Autumn 2020

Instructor: Prof. Scott Hauck (hauck@uw.edu) EE-307Q
Office hours: by appointment (email w/schedule).


Recommended: Frank Vahid & Roman Lysecky *Verilog for Digital Design* is also recommended.

Topics Covered: Introduction to computer architecture, algorithms, hardware design for various computer subsystems, CPU control unit design, memory organization, cache design, and virtual memory.

Prerequisites: CSE143, EE271 or CSE369. Strong knowledge of hardware design and Verilog from EE271 or CSE369 is essential.

Assignments: The major goals of the class are to familiarize you with basic structure of microprocessors. As part of this, students will develop a Verilog implementation of a simple RISC microprocessor based upon the ARM instruction set.

Note that the labs GROW SIGNIFICANTLY in the amount of time it takes to complete them. The average time to complete the labs is expected to be:

- Lab 1: Register File 10 hours
- Lab 2: ALU 10 hours
- Lab 3: Single-cycle CPU 20 hours
- Lab 4: Pipelined CPU 30 hours
- Lab 5: Cache Memory 15 hours

Exams: There will be one midterm and one final exam.

Grade: The grade will be determined by the following approximate weights: homeworks (20%), design project (35%), midterm (20%), final exam (25%).

Outline: The class will have the following approximate schedule. Material may be added or dropped based on class timing and progress.

* Introduction to processor architecture.
* Assembly language programming.
* Computer Arithmetic.
* Performance measures.
* Processor Datapaths & Control.
* Pipelining.
* Memory hierarchy, caches, virtual memory.
* Advanced topics in computer architecture.
**Disability and Access:**

Your experience in this class is important to me. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law. If you have arranged accommodations through Disability Resources for Students (DRS), please communicate those accommodations to me at your earliest convenience so we can discuss your needs and appropriate arrangements in this course.

If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (conditions include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), contact DRS directly to set up an Access Plan. DRS offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor(s) and DRS. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law. Contact DRS at disability.uw.edu.

**Diversity and Inclusion:**

I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the quarter so that I may make appropriate changes to my records.

**Religious accommodations:**

Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW’s policy, including more information about how to request an accommodation, is available at Religious Accommodations Policy (https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/). Accommodations must be requested within the first two weeks of this course using the Religious Accommodations Request form (https://registrar.washington.edu/students/religious-accommodations-request/)

**Safety:**

Call SafeCampus at 206-685-7233 anytime – no matter where you work or study – to anonymously discuss safety and well-being concerns for yourself or others. SafeCampus’s team of caring professionals will provide individualized support, while discussing short- and long-term solutions and connecting you with additional resources when requested.

**Academic Misconduct:**

The University takes academic integrity very seriously. Behaving with integrity is part of our responsibility to our shared learning community. If you’re uncertain about if something is academic misconduct, ask me. Acts of academic misconduct may include but are not limited to:

- Cheating (working collaboratively on quizzes/exams and discussion submissions, sharing answers and previewing quizzes/exams)
- Plagiarism (representing the work of others as your own without giving appropriate credit to the original author(s))
• Unauthorized collaboration (working with each other on assignments)

We will discuss the allowed models of collaboration in this class during the first week of the course.

Engineering is a profession demanding a high level of personal honesty, integrity and responsibility. Therefore, it is essential that engineering students, in fulfillment of their academic requirements and in preparation to enter the engineering profession, shall adhere to the University of Washington’s Student Code of Conduct (https://www.washington.edu/cssc/for-students/student-code-of-conduct/). Concerns about behaviors prohibited by the Student Conduct Code will be referred for investigation and adjudication by the College of Engineering Dean’s Office and the University’s Office of Community Standards and Student conduct. See CoE website (https://www.engr.washington.edu/mycoe/am/amprocess) for more detailed explanation of the academic misconduct adjudication process.

Inclement Weather:

Please check if the campus may be closed due to weather. Information on suspension of operations will be made public and available through the media. You can learn of campus operations status by signing up with an alert system that will contact you via email or text message if classes are canceled or delayed (https://www.washington.edu/safety/alert/). Alternatively, campus status during inclement weather is available via local radio and television news.