University of Maine — ECE571: Advanced Microprocessor-Based Design
Fall 2019

Instructor:
  Vincent Weaver
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  Office: Barrows 203
  Office Hours: 2pm-3pm Wednesday, 10am-11am Friday, or e-mail to arrange an appointment

Course Website:
  `http://web.eece.maine.edu/~vweaver/classes/ece571_2019f/`

Course Schedule:
  Lectures: Tuesday/Thursday 2:00pm-3:15pm, Boardman 115

Course Listing:
  Includes techniques for developing software and hardware for microprocessor-based systems, computer aided design using a multistation logic development system, use of components commonly found in microprocessor-based systems. Lec 2, Lab 3. (Spring.)

Content this Semester
  We will investigate modern systems, with a focus on ARM and x86 processors. We will investigate various metrics for evaluating such systems, including performance, power, energy, and code density.

Pre-requisites:
  ECE471 or permission
  Ideally you have C programming and basic Linux knowledge.

After this class you will be able to:

- Know the features and limitations when measuring performance using Hardware Performance Counters
- Understand the various Energy and Power metrics used when analyzing modern computer systems
- Be able to conduct power and performance analysis using the Linux operating system.
- Know the power and performance implications of various architectural features, including Superscalar, Out-of-order, Hardware Multi-threading, Caches, and Branch Predictors.
- Know the power and performance implications of various pieces of hardware, including CPU, GPU, Memory, and Disks.
- Know the power and performance implications of the x86 and ARM architectures.

Grading:

      Class Participation (5%)
      11 homework assignments (5% each), Lowest is dropped
      1 midterm exam, tentatively scheduled 23 October (20% total)
      1 final project (25%)

Assignments:

Assignments and class notes will be posted to the course website.

Announcements, including homework assignments, will be sent to your UMaine e-mail address.

Homework assignments will be submitted via e-mail.

Late Work: Late work is penalized at 10% a day.

Optional Book:

Computer Organization and Design: The Hardware / Software Interface by Patterson and Hennessy.

Note, the 2007 edition of this book can be read free online via the UMaine library.

University of Maine Required Statements

Academic Honesty Statement

    Academic honesty is very important. It is dishonest to cheat on exams, to copy term papers, to submit papers written by another person, to fake experimental results, or to copy or reword parts of books or articles into your own papers without appropriately citing the source. Students committing or aiding in any of these violations may be given failing grades for an assignment or for an entire course, at the discretion of the instructor. In addition to any academic action taken by an instructor, these violations are also subject to action under the University of Maine Student Conduct Code. The maximum possible sanction under the student conduct code is dismissal from the University.

Students with disabilities statement

    https://umaine.edu/citl/teaching-resources-2/required-syllabus-information/#Accessibility

Course Schedule Disclaimer (Disruption Clause)

    https://umaine.edu/citl/teaching-resources-2/required-syllabus-information/#Schedule

Observance of Religious Holidays/Events

    https://umaine.edu/citl/teaching-resources-2/required-syllabus-information/#Observance

Sexual Violence Policy and Sexual Discrimination Reporting

    https://umaine.edu/citl/teaching-resources-2/required-syllabus-information/#Reporting_Long