

## ECE598: Advanced Operating Systems

**Credits:** 3

**Instructor:**

Vincent Weaver

e-mail: [vincent.weaver@maine.edu](mailto:vincent.weaver@maine.edu)

Office: Barrows 203

Office Hours: Drop-in (between 10am and 5pm) or e-mail to arrange an appointment

**Course Website:**

[http://web.eece.maine.edu/~vweaver/classes/ece598\\_2015s/](http://web.eece.maine.edu/~vweaver/classes/ece598_2015s/)

**Lectures:** Neville Hall 327 ( Tuesday/Thursday 9:30am-10:45am )

**Final Exam:** Thursday 7 May 2015, 8am-10am, Neville Hall 327

**Course Summary:**

We will investigate at a low level the features of a modern operating system: virtual memory, filesystems, scheduling, device drivers, and multi-tasking. We will also write a simple operating system from scratch that will run on a Raspberry Pi.

**Pre-requisites:**

ECE471 or ECE477 or permission of instructor

(The main requirement is knowledge of C and ARM assembly language).

**Required Textbooks:**

None

**Optional Textbooks:**

- *Modern Operating Systems* by A.S. Tanenbaum.
- *Understanding the Linux Kernel* by Bovet and Cesati.
- *UNIX Systems for Modern Architecture* by Schimmel

**Hardware:**

We will be using a Raspberry Pi Model B or B+ for the homeworks.

At a minimum you will need a Pi, a memory card, a USB-micro cable, and a USB-serial adapter.

## **Preliminary List of Topics:**

1. Operating System Overview
2. Raspberry Pi Hardware Overview
3. Bootloader
4. Compilers / Assemblers / Linkers
5. Device Drivers / Serial UARTs
6. Console Input / Output
7. Virtual Memory
8. Filesystems (fat32, ext4, btrfs, journaling)
9. Multi-tasking
10. Job Scheduling
11. Graphics / Framebuffer
12. Networking

## **Grading:**

Class Participation (5%)

10 homework assignments (60% total)

The homeworks will encompass the low-level coding of the custom operating system.

1 midterm exam (15%)

1 final exam (20%)

**Late Work:** Late work is penalized at 20% a day.

**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:**

If you have a disability for which you may be requesting an accommodation, please contact Ann Smith, Director of Disabilities Services, 121 East Annex, 581-2319, as early as possible in the term.

**Course Schedule Disclaimer (Disruption Clause):**

In the event of an extended disruption of normal classroom activities, the format for this course may be modified to enable its completion within its programmed time frame. In that event, you will be provided an addendum to the syllabus that will supersede this version.

**Sexual Violence Policy:**

**Sexual Discrimination Reporting:** The University of Maine is committed to making campus a safe place for students. Because of this commitment, if you tell a teacher about an experience of sexual assault, sexual harassment, stalking, relationship abuse (dating violence and domestic violence), sexual misconduct or any form of gender discrimination involving members of the campus, your teacher is required to report this information to the campus Office of Sexual Assault & Violence Prevention or the Office of Equal Opportunity.

If you want to talk in confidence to someone about an experience of sexual discrimination, please contact these resources:

For confidential resources on campus: Counseling Center: 207-581-1392 or Cutler Health Center: at 207-581-4000.

For confidential resources off campus: Rape Response Services: 1-800-310-0000 or Spruce Run: 1-800-863-9909.

Other resources: The resources listed below can offer support but may have to report the incident to others who can help:

For support services on campus: Office of Sexual Assault & Violence Prevention: 207-581-1406, Office of Community Standards: 207-581-1409, University of Maine Police: 207-581-4040 or 911. Or see the OSAVP website for a complete list of services at <http://www.umaine.edu/osavp/>