

ECE598: Advanced Operating Systems
Spring 2016

Instructor:

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Office: Barrows 203

Office Hours: 10:45am - noon Tuesday and Thursday, or e-mail to arrange an appointment

Course Website:

http://web.eece.maine.edu/~vweaver/classes/ece598_2016s/

Lectures: Barrows 133 (Tuesday/Thursday 9:30am-10:45am)

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 A, A+, B or B+ for the homeworks. A model 2 is **not** recommended.

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 (50% total)

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

2 midterm exams (25% total)

1 final project (20%)

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

University of Maine Administrative Policy Statements

Academic Honesty

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

If you have a disability for which you may be requesting an accommodation, please contact 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 any of your teachers about sexual 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.

Behaviors that can be “sexual discrimination” include sexual assault, sexual harassment, stalking, relationship abuse (dating violence and domestic violence), sexual misconduct, and gender discrimination. Therefore, all of these behaviors must be reported.

Why do teachers have to report sexual discrimination?

The university can better support students in trouble if we know about what is happening. Reporting also helps us to identify patterns that might arise— for example, if more than one victim reports having been assaulted or harassed by the same individual.

What will happen to a student if a teacher reports?

An employee from the Office of Sexual Assault & Violence Prevention or the Office of Equal Opportunity will reach out to you and offer support, resources, and information. You will be invited to meet with the employee to discuss the situation and the various options available to you.

If you have requested confidentiality, the University will weigh your request that no action be taken against the institution’s obligation to provide a safe, nondiscriminatory environment for all students. If the University determines that it can maintain confidentiality, you must understand that the institution’s ability to meaningfully investigate the incident and pursue disciplinary action, if warranted, may be limited. There are times when the University may not be able to honor a request for confidentiality because doing so would pose a risk to its ability to provide a safe, nondiscriminatory environment for everyone. If the University determines that it cannot maintain confidentiality, the University will advise you, prior to starting an investigation and, to the extent possible, will share information only with those responsible for handling the institutions response.

The University is committed to the well-being of all students and will take steps to protect all involved from retaliation or harm.

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 OSASP website for a complete list of services at <http://www.umaine.edu/osavp/>