

Computer Science 594/690

University of Tennessee, Knoxville

Spring 2020
University of Tennessee, Knoxville

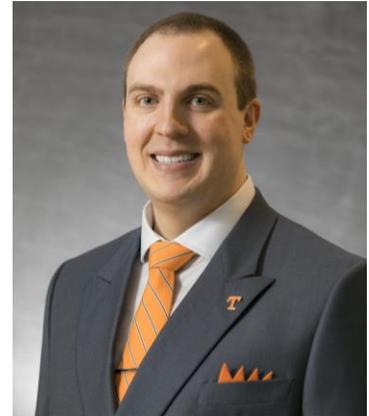
<https://utk.instructure.com/courses/90022>

Course Section: 1

Course Credit Hours: 3

Faculty Contact Information

- Dr. Stephen G. Marz
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Welcome to Adv. Operating Systems

Hello students! This course is designed to be a practical learning experience with operating systems. Many operating systems courses are mired in theory and abstract concepts, but in this course, your labs will be a hands-on experience working with an operating system kernel.

This course is challenging because you will need to take rather complex topics and apply them to your labs. I have written a general blog at <http://oblog.stephenmarz.com/>, which we will follow. It isn't finished, yet, but when our course is finished, we will have a fully functioning operating systems, complete with user processes and file systems.

Procrastination will be detrimental to your learning in this course. There are a lot of moving parts, and this will be a hands-off approach. I suggest that you work in groups, so those in 594 work with those in 594 and those in 690 work with those in 690.

Instructor Availability

All office hours and times have been posted to Canvas. Please make sure you check these times before attending office hours as they may change from time to time.

Please do not hesitate to ask questions. The newness of everything may be overwhelming at first. I'm hoping that as the course progresses, you'll be confident to make decisions about your code and know where to go for guidance.

COURSE DESCRIPTION

Threads, operating system structure, process management, scheduling, synchronization, deadlock, memory management, virtual memory and demand paging, file system management and implementation, mass storage structure, protection, security, and distributed systems.

Student Learning Outcomes/Objectives

Students who successfully complete this course can expect to learn the following:

- Understand how computers boot.
- Understand how control is transferred to a bootloader.
- Understand how an operating system controls hardware.
- Understand the different input/output systems: PIO and MMIO.
- Understand how hardware changes can be detected through interrupts and/or polling.
- Understand the differences between user space and kernel space.
- Understand how user space enters kernel space.
- Understand how an operating system kernel can allocate memory.
- Understand how the operating system programs the memory management unit (MMU).
- Understand how virtual addresses translate into physical addresses.
- Understand the goals of different file systems.
- Understand how a set of file systems link together through a virtual file system (VFS).
- Understand how operating systems efficiently write/read from I/O.
- Understand the choices made with operating system design.
- Understand the pros/cons of monolithic, micro, and hybrid kernels.
- Understand how the components of an operating system perform a task together.
- Understand how tasks are accomplished using various scheduling techniques.

Value Proposition

Operating systems are the bedrock of many computer systems. User programs can be optimized, but a poorly designed operating system can be detrimental to the performance of even the most optimized program.

Students will learn how the operating system connects the software to the hardware. Even though this is a computer science course, we will be delving deeper into computer architecture.

LEARNING ENVIRONMENT

We will be using Canvas modules which compartmentalize the assigned readings and assignments for a given week of instruction.

HOW TO BE SUCCESSFUL IN THIS COURSE

Online courses may be a challenge for some students at first. You will be expected to keep up with all due dates and assignments without prompting. Remember, this information can be found on Canvas--your one-stop shop.

UT's Online Programs department has put together a helpful checklist on Programs [How to be Successful in an Online Course \(https://volsonline.utk.edu/students/\)](https://volsonline.utk.edu/students/).

Learner Expectations

- Actively check Canvas for due dates and upcoming assignments.
- Actively contribute to the learning activities in class.
- Abide by the UT Honor Code.
- Abide by the Policy Manual.
- Exercise due diligence when asking questions.
 - Remember, we won't be there when you're doing this for real!

COURSE REQUIREMENTS

Texts/Resources/Materials

We will be using the RISC-V documentation, my blog, and other resources.

Computer Requirements

Students must have a laptop or other computer capable of connecting to Canvas.

Course Resources

Students unfamiliar with the online environment may find additional information from the resources below:

1. [Getting Started with Zoom](#)
2. [Online@UT Canvas](#)
3. [UT Library](#)
4. [Information for Distance Education](#)

Technical Support

For technical issues, contact the OIT HelpDesk by phone at (865) 974-9900 or at the [Walk-in HelpDesk](#). For IT and Computing issues, use the online [Contact Form](#).

COURSE COMMUNICATIONS POLICY

Students are required to frequently check Canvas. Students must also make sure that they are receiving announcement notifications so that any pertinent information is received in a timely fashion.

Questions

Students **MUST** use Piazza to submit all online questions. Any question with assignment information must make sure they submit a private question.

Students must come to office hours with questions already in mind. The room will fill up fast, so students must ask their question and leave. If the student has other questions, they may come back, but we must serve a large student body, so please help us keep the questions flowing so that all students can have their questions answered.

Email

For most purposes, do **NOT** email the TAs or professor directly. These emails are likely to be ignored. Instead, students must use the Piazza link provided on Canvas for all communications and questions.

Virtual Office Hours

A link to Zoom will be provided on Canvas for students to attend virtual office hours. Students must frequently check the office hours page before they attend virtual office hours in case anything has changed.

COURSE ATTENDANCE AND PARTICIPATION POLICY

Students must attend the weekly meeting, which is set for Wednesdays, 1400 – 1500 in Min Kao Conference Room 354.

ASSIGNMENTS, ASSESSMENTS, AND EVALUATIONS

Students will have their assignments graded on Canvas. Students may appeal any grade they receive provided they submit, in writing, their request for a regrade within 7 days of receiving the grade. Students who submit a request outside of 7 days may not appeal their grade, and the grade they receive will stand.

Student Feedback to Inform Course Improvements

Students must complete a weekly survey where they can submit comments and ratings for that week's course content and delivery. Since we are working to improve this course, students are encouraged to be honest and write constructive criticism to help. Please be specific to what we could do better.

Procedures for Turning in Assignments

Students will submit all assignments through Canvas. Students are responsible for ensuring that what they submit is what they wish to be graded. Students are encouraged to download their submission to ensure it is what they expected to submit. Only the latest submission made will count for those assignments that offer multiple submissions or attempts.

Plagiarism

Students are encouraged to work with other students; however, their submissions must be their own. In other words, work with someone else, but submit YOUR work, not somebody else's.

GRADING CRITERIA

Grading Scale

Students will be graded based on the UT standard graduate-level grading system.

Grades

All grades and feedback will be provided on Canvas. Students must check Canvas to see their standing in the class.

Disability Services

Any student who feels s/he may need an accommodation based on the impact of a disability should contact Student Disability Services in Dunford Hall, at 865-974-6087, or by video relay at, 865-622-6566, to coordinate reasonable academic accommodations.

Your Role in Improving Teaching and Learning Through Course Assessment

At UT, it is our collective responsibility to improve the state of teaching and learning. During the semester, you may be requested to assess aspects of this course either during class or at the completion of the class. You are encouraged to respond to these various forms of assessment as a means of continuing to improve the quality of the UT learning experience.

You will be asked to participate in surveys in this course. This course is still being developed to be fully accessible to all students, so please give your honest and constructive feedback on these surveys.

Key Campus Resources for Students

- [Center for Career Development](#) (Career counseling and resources; HIRE-A-VOL job search system)
- [Course Catalogs](#) (Listing of academic programs, courses, and policies)
- [Hilltopics](#) (Campus and academic policies, procedures and standards of conduct)
- [OIT HelpDesk](#) (865) 974-9900
- [Schedule of Classes/Timetable](#)
- [Student Health Center](#) (visit the site for a list of services)

- [Student Success Center](#) (Academic support resources)
- [Undergraduate Academic Advising](#) (Advising resources, course requirements, and major guides)
- [University Libraries](#) (Access to library resources, databases, course reserves, and services)

COURSE SCHEDULE/OUTLINE/ASSIGNMENTS/UNITS OF INSTRUCTION

Students must check Canvas frequently for a list of topics, policies, procedures, and weekly assignments.

*Please note: The instructor reserves the right to revise, alter or amend this syllabus as necessary. Students will be notified in writing/email of any such changes.