EECE.4810/EECE.5730: Operating Systems
Spring 2020
Syllabus

Course Meetings

Section 201: MW 2-3:15 PM, Ball 210

Course Website

Main page: http://mjgeiger.github.io/OS/sp20/

Schedule: http://mjgeiger.github.io/OS/sp20/schedule.html

<u>All</u> course announcements will be posted <u>on the course Blackboard page</u>. You are responsible for checking that site, as well as the sites listed above, on a regular basis.

Instructor

Dr. Michael Geiger
<u>E-mail:</u> Michael_Geiger@uml.edu
<u>Office:</u> Ball Hall 301A
<u>Phone:</u> 978-934-3618 (x43618 on campus)
<u>Office hours:</u> M/W 10-11:30 AM & 1-1:50 PM; Tu 12:30-2 PM, or by appointment

Regarding instructor contact:

- During office hours, student questions are my top priority. You do not need to schedule an appointment to attend office hours—just drop in!

- Any changes to office hours will be announced on Blackboard.

- We encourage you to e-mail us questions, but please allow up to 24 hours for a response.

The Centers for Learning and Academic Support Services (CLASS) provide tutoring services, including online searchable schedules that include resources on all campuses. A tutoring request form is available if no tutors are listed for your class.

Teaching Assistant

Varun Garg
<u>E-mail:</u> Varun_Garg@student.uml.edu
TA office hours will be posted ASAP.

Recommended Textbook *(not required)*

T. Anderson and M. Dahlin, *Operating Systems: Principles and Practice*, 2nd Edition, 2014, Recursive Books.
ISBN: 978-0985673529

Course Catalog Description

Covers the components, design, implementation, and internal operations of computer operating systems. Topics include basic structure of operating systems, Kernel, user interface, I/O device management, device drivers, process environment, concurrent processes and synchronization, inter-process communication, process scheduling, memory management, deadlock management and resolution, and file system structures. Laboratories include examples of components design of a real operating systems.

Prerequisites

EECE.2160: ECE Application Programming, EECE.3170: Microprocessors I, and EECE.3220: Data Structures *(must have earned a C- or better in each course)*

Course Objectives

By the end of this course, you should understand and be able to work with all of the following fundamentals of operating systems:

1. **Process Management:** Multithreading, scheduling, synchronization
2. **Memory Management:** Memory allocation, paging, virtual memory management
3. **Storage Management:** File systems, disk management, input/output systems
4. **Protection and Security:** Access rights and control, system security
5. **Distributed Systems:** Networks, socket programming, distributed file systems

Grading

Grades will be computed on an A to F scale; A+ grades may only be assigned in the graduate course (EECE.5730), in accordance with UMass Lowell policy. Also note that students in graduate courses cannot earn grades of C-, D+, or D—the only grade below C is an F.

The weights assigned to the various items are:

Programming/homework assignments	55%
Exam 1	15%
Exam 2	15%
Exam 3	15%

Incomplete grades will only be given in exceptional situations, and the student must be passing the class at the time the grade is requested.

The following rubric describes how grades will be assigned <u>if no grading curve is applied.</u> A grading curve may be used at the instructor's discretion, depending on the overall course average at the end of the term. Grades will not be curved down, meaning that the table below describes the minimum letter grade you will earn for a final average in each of the ranges shown:

Range	**Grade**	**Range**	**Grade**	**Range**	**Grade**
> 92	A	80-82	B-	68-69	D+
90-92	A-	78-79	C+	60-67	D
88-89	B+	73-77	C	< 60	F
83-87	B	70-72	C-		

Grading (continued)

Please note:

- **Students in EECE.5730 will be required to complete more work than students in EECE.4810.** This additional work may take the form of extra assignments, extra problems on assignments given to the whole class, and/or extra exam problems.

- **Your grade is based strictly on the work you do during the semester. Please do not ask for extra credit work to improve your grade—any extra credit work we give is available to the whole class, not just the students who ask for it.**

General Course Information

Programming assignments

You will have to complete 3-4 large programming projects, as well as potentially writing some smaller programs. All assignments will be posted on the course web page and discussion group.

Assignment policies include the following:

- Projects will be submitted via Blackboard. Each project description will specify submission requirements, but you can expect to submit all source code, the makefile used to build your code, and a README file describing the submission contents.

- Projects may be written in C or C++ unless otherwise specified.

- Your solutions must run on a Linux machine in Ball 410 after being compiled with gcc (C) or g++ (C++)

- Each assignment will specify whether it is to be completed individually or in a group. When groups are allowed, the maximum group size will be 3 students.

- Late assignments lose 10% per day, including weekends and holidays.

- Assignments more than 5 days late will not be accepted.

Exams

- The first two exams will be scheduled for two-hour blocks outside of class, while the third exam will be during the finals period.

- Make-up exams will only be offered in exceptional circumstances.

    o You must notify your instructor as early as possible in order to determine an appropriate make-up date.

Class participation

- **You are responsible for all material discussed or announced in class.**

- You are expected to attend class regularly and participate in any in-class discussions, as such exercises are essential to your learning.

- Although lecture attendance is not explicitly required, regular attendance will improve your understanding of the course concepts.

Student Mental Health and Well-Being

We are a campus that cares about the mental health and well-being of all individuals in our campus community. Your personal health and well-being can impact your success in this course. Students sometimes experience mental health concerns or stressful experiences that interfere with academics and have a negative impact on everyday life.

If you or someone you know are experiencing mental health challenges at UMass Lowell, please contact Counseling (information below). Their services are free and confidential, and same day appointments are available.

I am available to talk with you about stresses related to your work in my class. Furthermore, I can assist you in reaching out to any one of a wide range of campus resources, including:

- Counseling Services provides crisis intervention, assessment, referrals, short-term individual counseling, group therapy, and on-call clinicians outside of business hours. They are located at University Crossing Suite 300 and their 24/7 phone number is 978-934-6800.

- UMatter2 is a university-wide initiative to support students and promote mental health. The office may be reached at 978-934-6671.

Consider also reaching out to a friend, faculty or family member you trust for help getting connected to the support that can help.

Disability Services

Disability Services assists students with documented disabilities by providing reasonable accommodations, coordinating services and creating accessibility through assistive technology and other means. They are located in The Wellness Center at University Crossing, Suite #300 and may be called directly at 978-934-4574.

Academic Honesty

All non-group assignments and exams must be completed individually.

All group assignments must be completed within your group—no more than 3 students can collaborate on any group assignment.

You may discuss concepts or material covered in class but may not share any details of your solutions to assigned problems, including algorithms and code. Plagiarism (in this course, copying code from an outside source) will also be treated as an instance of cheating.

Students may discuss assignments in general terms and may help one another fix specific errors, such as compiler errors or output formatting. In this case, students must note in their program header that they received assistance from a classmate. However, any code sharing—even if used only to help a classmate solve a specific error—is an academic honesty violation.

Any assignment or portion of an assignment violating this policy will, at a minimum, receive a grade of 0 for all parties concerned, and violations will be reported to the Provost's Office. Depending on the severity of the infraction, or in cases of repeat violations, the instructor may give additional penalties, up to and including a failing grade in the course.

Further information on the University Academic Integrity policy can be found at:

https://www.uml.edu/Catalog/Undergraduate/Policies/Academic-Policies/Academic-Integrity.aspx

Course Schedule

This schedule contains a tentative schedule of topics we will cover throughout the term; the course website will contain the most up-to-date version. The web page will also describe textbook sections associated with each lecture and the due dates for each assignment.

The exam dates will be fixed shortly after the start of the semester. Tentative dates for the first two exams are shown below (during weeks 5 and 10), and the third exam will be held **during final exams, at a date and time to be determined by the registrar's office**.

Also, please be aware of the deadlines for withdrawing with a grade of "W": undergraduate students (even those taking EECE.5730) must withdraw by **Tuesday, 4/7**, while graduate students must withdraw by **Thursday, 4/23**.

Week	Date (M)	Lecture Topics
1	1/20	*No Monday lecture—Martin Luther King, Jr. Day* Course introduction/overview
2	1/27	*Monday, 1/27: last day to add without permission number* Processes and process management
3	2/3	*Monday, 2/3: last day to add/drop course* Inter-process communication
4	2/10	Multithreading Synchronization
5	2/17	*Lecture on Tuesday, not Monday (Presidents' Day)* Synchronization (continued) **EXAM 1 (to be scheduled during week 5)**
6	2/24	Synchronization and deadlock
7	3/2	CPU scheduling
8	3/9	*Spring Break—no classes*
9	3/16	CPU scheduling (continued)
10	3/23	Memory management **EXAM 2 (to be scheduled during week 10)**
11	3/30	Memory management (continued)
12	4/6	Memory management (continued) *Tuesday, 4/7: Undergraduate withdrawal deadline*
13	4/13	File systems
14	4/20	*Lecture on Friday, not Monday (Patriots Day)* Protection and security *Thursday, 4/23: Graduate withdrawal deadline*
15	4/27	Topics TBD *Classes end Friday, 5/1*
	TBD	**EXAM 3: during finals; time/location TBD**