Course Syllabus

CIS*3110 Operating Systems W (3-1) [0.50]
School of Computer Science, University of Guelph, Guelph
Winter Semester | 2020

1. INSTRUCTIONAL SUPPORT

Instructor Information

Instructor Name	Office	Phone	Email
Dr. Xiaodong Lin	Reynolds 2210	X53889	xlin08@uoguelph.ca
Office Hours: Monday/Wednesday, 3:30 pm - 5:00 pm or by appointment			

Prerequisite(s): CIS*2520, and (CIS*2030 or ENGG*2410).

Teaching Assistant Information

Teaching Assistant Name	Email
Fatemeh Safari	safarif@uoguelph.ca
Office Hours: TBD	

Teaching Assistant Name	Email
Marshall Asch	masch@uoguelph.ca
Office Hours: TBD	

Teaching Assistant Name	Email
Alex Chen	cchen22@uoguelph.ca
Office Hours: TBD	

Teaching Assistant Name	Email
Shiqi Gu	sgu02@uoguelph.ca
Office Hours: TBD	

Teaching Assistant Name	Email
Sanaz Nakhodchi	nakhodcs@uoguelph.ca
Office Hours: TBD	

Lectures

Day	Time	Location
Monday/Wednesday/Friday	01:30PM - 02:20PM (01)	ALEX, Room 200
	11:30AM - 12:20PM (02)	MCKN, Room 117

Labs

Lab Section	Day	Time	Location
0101	Thursday	10:30AM - 11:20AM	MCKN, Room 234
0102	Monday	08:30AM - 09:20AM	MCKN, Room 235
0103	Tuesday	01:30PM - 02:20PM	MCKN, Room 235
0204	Tuesday	10:30AM - 11:20AM	MCKN, Room 235
0205	Wednesday	08:30AM - 09:20AM	MCKN, Room 233
0206	Thursday	01:30PM - 02:20PM	MCKN, Room 235

Note: Unless otherwise stated, the lab will be used for advising and consulting with the Teaching Assistant, including the review of key knowledge and skills essential for solving programming assignments as well as written homework.

2. LEARNING RESOURCES

Textbook

- Operating System Concepts, 9th Ed. Silberschatz, Galvin, Gagne, John Wiley & Sons. INC

Reference resources

- The Linux Command Line. William Shotts.
  Available at: http://linuxcommand.org/tlcl.php
- Programming in C: UNIX System Calls and Subroutines using C
  Available at: http://www.cs.cf.ac.uk/Dave/C/CE.html
- C Programming (Wikibook)
  Available at: https://en.wikibooks.org/wiki/C_Programming
- Andrew Tanenbaum. Modern Operating Systems (4th Edition), Prentice Hall.
- Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseau. Operating Systems: Three Easy Pieces
  Available at: http://pages.cs.wisc.edu/~remzi/OSTEP/

Course Website

Course information for CIS*3110 Operating Systems is posted on **Courselink**. It is the student's responsibility to check these pages frequently for new information or updates.

- Lecture Information: Selected notes will be posted on the course website as instructors have time to make them available. You are expected to take your own notes during lecture.
- Labs and Tutorials: Selected tutorial and lab materials will be available on the course website.
- Assignments: Assignment descriptions will be posted on the course website. Assignments are submitted via the course website.

Course Description

This course gives an introduction to the basic concepts used to structure modern computer operating systems. More specifically, this course will primarily study general purpose, time-shared operating systems. It will introduce the core concepts of operating systems, such as processes and threads, scheduling, synchronization, memory management, file systems, input and output device management and security. At the completion of the course, the student will be able to discuss and evaluate synchronization control techniques, the structure of an operating system, and will additionally have some familiarity with system programming interfaces for synchronization, data sharing and control.

The course will consist of two parts, weekly lectures and a sequence of programming assignments. The goal of the lectures is to introduce the core concepts of Operating System. The goal of the programming assignments is to give students some exposure to operating system code. It offers students practical and theoretical knowledge and understanding of issues related to Operating System. Thus, an important part of the course will be the hands-on experience or programming assignments. For that, you will develop assignments in C on a Linux system to familiarize yourself with OS interfaces, key concepts, and design tradeoffs.

Please see The Academic Calendar for more details. The Academic Calendars are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs:
http://www.uoguelph.ca/registrar/calendars/index.cfm?index

3. COURSE OUTCOMES

On the successful completion of the course, students will be able to:

1. identify and discuss the functions of major operating system components.
2. know and identify (from content description or C code), the most common data structures used in an OS implementation.
3. analyze the tradeoffs inherent in operating system design.
4. explain what a process is and how processes are synchronized and scheduled.
5. distinguish between a resource, a program, a process, and a thread.
6. understand different approaches to memory management.
7. analyze virtual memory management algorithms.
8. describe how files are stored in secondary storage.

9. identify potential threats to operating systems and the security features designed to guard against them.

4. COURSE TOPICS

Introduction
Operating System Structure
Processes and Threads
CPU scheduling
Process Synchronization
Deadlock detection and prevention
Memory management
Virtual Memory
File systems
Protection and Security

5. EVALUATION METHOD

Final grade calculation
In determining the overall grade of the course, the following weights will be used:

Coursework	Amount	% of Grade
Programming assignments	4	35
Written homework	2	10
Midterm exam	1	20
Final exam	1	35

- Programming assignments: 35%, where
  - Assignment 1: 6% Week 4
  - Assignment 2: 12% Week 7
  - Assignment 3: 11% Week 9
  - Assignment 4: 6% Week 12
- Written homework: 10%
  - The schedule of written homework will be determined according to the progress within the course. There are two written homework for the Operating Systems course this Winter. **5%** each.
- Mid-term Exam: 20% February 28
- Final Exam: 35% TBA by Registrar

The final grade is the weighted sum of all assessments shown above, using the weights indicated in the table above.

Course Grading Policies
Development environment: Assignments are to be done in the C language on a POSIX (Unix/Linux) system, particularly on a Linux Virtual Machine (OSC-2016.ova) provided by the textbook (http://os-book.com/). They will be graded by the TA on the same VM environment.

Students who choose to develop their assignments on other systems and/or with other versions of software are fully responsible for ensuring compatibility with the environment provided by the textbook for marking purposes.

Late assignments: All assignments are due at 11:59 PM on the due date. Barring truly exceptional circumstances, submissions after the deadline will not be accepted, unless an extension has been negotiated in advance of the deadline date. Any work that is late without approval will receive zero.

Compiler errors/warnings: Program code which does not compile will not be accepted for marking and a grade of **zero** (0) will be assigned. Code that does not compile "clean" will lose marks for compiler warnings. Code **must** compile and run on the Linux Virtual Machine.

Submission policy: All assignments will be only be accepted via submission through Courselink unless otherwise indicated on the assignment by the instructor. Failure to submit assignments correctly (e.g., incorrect file names, faulty/missing makefile, etc.) will result in a mark penalty.

Regrades: Students may request a reassessment of their assignments in writing and specify the reasons for such requests. Their entire assignment will be reassessed, and the reassessment may result in raising or lowering of the original marks. Remark requests will only be accepted up to **5 calendar days** from the release of the assignment mark. Please carefully read through the comments made by the marker on Courselink before sending a remark request.

Missed Assessments: If you are unable to meet an in-course requirement due to medical, psychological, or compassionate reasons, please make an appointment to meet your course instructor. Please see below for specific details and consult the undergraduate calendar for information on regulations and procedures for Academic Consideration: http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

Note: **There are no makeup assignments or midterm exams.** If you miss an assessment and have documentation to show that you are eligible for Academic Consideration, the weight of the assessment will be moved to the final exam.

Accommodation of Religious Obligations: If you are unable to meet an in-course requirement due to religious obligations, please email the instructor within two weeks of the start of the semester to make alternate arrangements. See the undergraduate calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations: http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml

Plagiarism Policy: All work submitted must be your own. Regarding programming assignments, you may discuss assignment strategies openly (including online). You can also search the Internet for strategies and code examples. However, **when writing the actual code, you must do all of the work yourself**. Submission of program code for an assignment that is written by another person, or in collaboration with another person (unless explicitly stated otherwise in the assignment, for example, group assignments) also constitutes Academic Dishonesty. Similarities

between assignment submissions are monitored using the program MOSS (Measure of Software Similarity) as well as by manual means.

Exams: Course examinations will be based on material discussed in the course lectures. Simply reading the course notes will not be adequate preparation for the exams. Written homework will be provided during the course and placed on the course website. Attempting these is one valuable tool for you to reinforce concepts that were taught in class and assess your understanding of the course material, preparing yourself for exams. The exams are closed book and include a mix of multiple-choice, fill-in-the-blank(s), and short answer questions.

Special Note:

• All cases of academic misconduct are handled by the Dean, in conjunction with the School Director. Successive infractions of misconduct affirmed by this process could have consequences as serious as expulsion from the University. For details please see related pages in the University of Guelph Undergraduate Calendar 2019-2020.
• Requests for academic consideration because of illness or of a compassionate nature must be made in writing and accompanied by certification whenever possible.

6. STANDARD STATEMENTS

The following are standard statements for inclusion on all course outlines (adapted with permission from the College of Arts). Some departments or colleges may also elect to post this information on a common website and link to such sites in the course outline. However, it is strongly recommended that statements on academic misconduct and links to the academic misconduct section of the academic calendars are included on all course outlines.

E-mail Communication
As per university regulations, all students are required to check their <mail.uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

When You Cannot Meet a Course Requirement
When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. See the undergraduate calendar for information on regulations and procedures for Academic Consideration.

Drop Date
Students will have until the last day of classes to drop courses without academic penalty. The regulations and procedures for course registration are available in their respective Academic Calendars.

Copies of out-of-class assignments
Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Accessibility
The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required, however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance, and not later than the 40th Class Day. More information: www.uoguelph.ca/sas

Academic Misconduct
The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it.

Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The Academic Misconduct Policy is detailed in the Undergraduate Calendar.

Recording of Materials
Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Resources
The Academic Calendars are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.