

UNIVERSITY OF WINDSOR
03-60-330: Operating System Fundamentals
SCHOOL OF COMPUTER SCIENCE – WINTER 2018



INSTRUCTOR:	Dr. Alioune Ngom Telephone: 253-3000 Ext. 3789 E-mail: angom@uwindsor.ca
PRE-REQUISITE:	Passing grades in 03-60-212, 254, 256 and, either 265 or 266. NOTE: Courses may only be taken twice for credit. Failure to obtain a passing grade on the second attempt may result in a requirement to withdraw from the program of study. Students may take a course a third time <u>only with approval</u> of the Associate Dean of Science.
LECTURES:	Tuesday and Thursday 8:30AM--9:50AM EH 2123
OFFICE HOURS:	Thursday 10:00--12:00PM and Friday 8:30--11:00AM (Other times by appointment only). Email is an effective means for asking questions.
GA HOURS	Fen Zhao < zhao15m@uwindsor.ca >. Location and hours: TBA. Jacob McLean < mclea119@uwindsor.ca >. Location and hours: TBA. William Briguglio < briguglw@uwindsor.ca >. Location and hours: TBA.
COURSE OBJECTIVES :	This course presents a contemporary survey of the design and implementation of modern operating systems. This survey covers fundamental issues including Operating system services, introduction to primary components of multi-programming operating systems, CPU scheduling, concurrent processes, process synchronization and inter-process communication, deadlocks, memory management, file systems, virtual memory, disk scheduling.
COURSE TOPICS :	Operating System Overview; Multiprocessing; Multithreading; Mutual Exclusion; Deadlock; Virtual Memory; Processor Scheduling; Input/Output Subsystems. Depending on time the topics of Operating systems for mobile computing may be covered.
REQUIRED TEXTBOOK:	A. Silberschatz, P. Galvin and G. Gagne. <i>Operating System Concepts 9th Edition</i>. John Wiley & Sons, Inc., 2012-2013, ISBN 978-1-118-06333-0. (Students may wish to purchase and use an older edition of this textbook – no less than the 7 th edition.) <u>Recommended textbook:</u> A. Silberschatz, P. Galvin & G. Gagne, <i>Operating System Essentials</i>, 2nd Edition, Wiley, ISBN: 978-1-118-80492-6 (Students may wish to use 1 st edition)
GRADING SCHEME:	New grading scale in effect since Fall 2013. Only raw percent scores are used in course work. <u>Comments:</u> In computing a student's average, grades from 0% to 22% are calculated as 22%. Grades from 23% to 40% calculated as 40%. Grades from 40% to 49% are calculated as is into the student's average. All grades are recorded in the transcript as is. All grades below 50% are considered failures. (Check the following link for your clear understanding about grading system and your evaluation). http://web4.uwindsor.ca/units/registrar/calendars/undergraduate/cur.nsf/inToc/CA4AB426E84D6C51852573690055F0A1?OpenDocument

COURSE EVALUATION:	<table><tr><th>Component</th><th>Weight</th><th>Info/Date</th></tr><tr><td>Assignments</td><td>25%</td><td>Up to 6 programming assignments.</td></tr><tr><td>Midterm</td><td>25%</td><td>Tuesday, February 27, 2018 at 8:30AM.</td></tr><tr><td>Project</td><td>25%</td><td>Friday, April 6, 2018 by 4:30PM.</td></tr><tr><td>Final Exam</td><td>25%</td><td>Thursday, April 19, 2018 at 8:30AM.</td></tr></table> <p>NOTE: Exams are closed-book. Calculators are permitted.</p>	Component	Weight	Info/Date	Assignments	25%	Up to 6 programming assignments.	Midterm	25%	Tuesday, February 27, 2018 at 8:30AM.	Project	25%	Friday, April 6, 2018 by 4:30PM.	Final Exam	25%	Thursday, April 19, 2018 at 8:30AM.
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MISSED EXAM POLICY:	<p>There is no make-up of midterm exam. Instead, the weight of the missed midterm (25%) is added to the weight of the final (25%), and hence, the weight of the final exam of students who miss the midterm will be 50%.</p> <p>Students who miss the final exam will be given a make-up test.</p> <p>Suitably documented and acceptable excuses (e.g. illness, death in family, etc.) for missing the midterm or the final exam must be submitted to me within a week (before or after) of the missed test. This is required in order to grant a final exam weight of 50% (for missed midterm) or to a grant make-up final exam (for missed final).</p> <p>Medical Notes: The only valid medical note is a copy of the Student Medical Certificate filled in and signed by a certified medical doctor.</p>															
MISSED AND LATE ASSIGNMENT OR PROJECT POLICY:	<p>Students who do not submit an assignment will receive zero for that assignment. An assignment that is submitted late will be penalized at the amount of 10% for each day up to a maximum of 7 days; with penalty starting immediately after the assignment's due date and time. Submission times will be those determined by the email system on campus.</p> <p>Students who do not participate in and/or do not submit a project will receive a mark of zero. Project work that is submitted late will be penalized at the amount of 20% for each day up to a maximum of 3 days, with penalty starting immediately after the set due dates and times. Submission times will be those determined by the email system on campus. Note that all parts will be evaluated based on required submissions of work and/or a formal evaluation meeting between each students and the instructor (or GA/TA) may be required where the project work will be demonstrated and explained.</p>															
UNIVERSITY REGULATIONS AND POLICIES CONCERNING FINAL EXAMINATION:	<p>Students who are unable to write a final examination(s) during the regularly scheduled time slot because of a conflict (eg, religious conviction, etc) must apply for the alternative examination(s) in the course(s) involved by the end of the normal add/drop period for the particular session. The Registrar's Office will schedule the alternative examination(s) for those students in another slot(s) within the regular examination period. Please download the appropriate form from http://www.uwindsor.ca/registrar and submit to the Office of the Registrar.</p>															
COURSE PAGE:	<p>The course website is on Blackboard at https://blackboard.uwindsor.ca/.</p>															

SET:	Student Evaluation of Teaching forms will be administered in the last two weeks of classes, in accordance with Senate policy.
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TEXTBOOK COVERAGE

The following chapters of the textbook are assigned for reading and study: Chapters 1-10, inclusive, with a possibility that Chapters 11, 12, and 13 may be covered. From time to time, specific parts of these chapters will be emphasized for study while some other portions may be excluded from consideration. Some specific parts of additional chapters may be discussed depending on time and relevance to project work.

The following syllabus is designed for a typical undergraduate course where the goal is to introduce students to the concepts of operating systems. A typical undergraduate introductory operating system course partially covers the first 13 chapters of the textbook. Below are some tentative recommendations what safely may be skipped yet still provide the student with a solid understanding of what operating systems are and what they do.

This text integrates three different APIs - Win32 (Windows), POSIX (Unix-based), and Java. I may choose to cover just one of the APIs depending upon student experience. (For example, if most student are familiar with C on Unix/Linux/Mac OS X machines, I may choose to just cover POSIX.)

Chapter 1: Introduction. Section 1.2 (Computer System Organization) may be skipped. Section 1.10 (Distributed Systems) may be omitted.

Chapter 2: Operating System Structures. Sections 2.6 (Operating System Design and Implementation), 2.8 (Virtual Machines), 2.9 (System Generation), and 2.10 (System Boot) may be omitted.

Chapter 3: Processes. Section 3.6 (Communication in Client-Server Systems) may be skipped.

Chapter 4: Threads. Section 4.4 (Threading Issues) may be covered lightly.

Chapter 5: Process Synchronization. Section 5.3 (Peterson's Solution) may be omitted. Sections 5.7 (Monitors) and 5.10 (Atomic Transactions) may be omitted.

Chapter 6: CPU Scheduling. Sections 6.4 (Multiple-Processor Scheduling) and 6.9 (Algorithm Evaluation) may be omitted.

Chapter 7: Deadlocks. I may only cover Sections 7.1 through 7.4.

Chapter 8: Main Memory. Sections 8.6 and 8.7 may be omitted.

Chapter 9: Virtual Memory. Sections 9.7 (Memory-Mapped Files) and 9.8 (Allocating Kernel Memory) may be omitted. Section 9.9 (Other Considerations) may be covered lightly.

Chapter 10: Mass-Storage Structure. Sections 10.3 (Disk Attachment) may be skipped. Sections 10.5 (Disk Management) and 10.6 (Swap Space Management) may be covered lightly. Sections 10.7 (RAID Structure), 10.8 (Stable Storage Implementation) and 10.9 (Tertiary-Storage Structure) may be skipped. Disk scheduling algorithms (Section 10.4) make nice programming exercises.

Chapter 11: File-System Interface. Sections 11.3.3 and 11.3.4 may be omitted (Single-Level and Two-Level Directories). Sections 11.5 (File Sharing) and 11.6 (Protection) may be omitted.

Chapter 12: File-System Implementation. Section 12.2.3 (Virtual File Systems) may be skipped. Section 12.6 (Efficiency and Performance) may be covered lightly. Sections 12.7 (Recovery), 12.8 (Log-Structured File Systems) and 12.9 (NFS) may be omitted. I may also choose to skip coverage of the WAFL File System in Section 12.12.

Chapter 13: I/O Systems. Section 13.1 and 13.2 may be omitted. Section 13.6 (STREAMS) may be omitted. Remaining sections may be covered lightly.