# Lakehead University

3473 - Operating Systems

Department of Computer Science

Fall 2023

**Instructor Information**

Instructor: Ali A. Nazari-Shirehjini

Office Location: TBA

Telephone: TBA

E-mail: TBA

Office Hours: Online via Zoom / Google

**Wed 12:0 pm- 12:30 pm**

**Tue 09:00 am -09:45 am**

[**https://calendar.app.google/L754cueFiURJ8n1s5**](https://calendar.app.google/L754cueFiURJ8n1s5)

**Teaching Assistant (TA) Information**: TBA

**Course Identification**

Course Number: Computer Science 3473

Course Name: Operating Systems

Course Location: ZOOM

Class Times:

Prerequisite(s): [Computer Science 2412](https://csdc.lakeheadu.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&topicgroupid=30674&entitytype=CID&entitycode=Computer+Science+2412&loaduseredits=True), [2453](https://csdc.lakeheadu.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&topicgroupid=30674&entitytype=CID&entitycode=Computer+Science+2453&loaduseredits=True) and [2476](https://csdc.lakeheadu.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&topicgroupid=30674&entitytype=CID&entitycode=Computer+Science+2476&loaduseredits=True)

**Course** Type C: Engineering, Mathematical and Natural Sciences

**Course Description/Overview** - Processes and device handlers and their implementation, communication, and synchronization. Synchronization primitives. Process allocation. Memory management. The software required to support a virtual memory system. Resource allocation algorithms. File system implementation. Security and protection. [*System implementation strategies. The evolution of computer systems: batch processing, multiprogramming, multi-processing, real-time, time-sharing, distributive systems*]; and coding exercises.

**Course Learning Objectives (Student Learner Outcomes, SLOs)**

1. Appraise the role of individual components of an operating system (processes & threads, scheduling and synchronization algorithms, memory, file system, I/O systems) within the big-picture view of the entire OS and the computer.
2. Compare different implementation alternatives of the individual components of an operating system (processes & threads, scheduling and synchronization algorithms, memory, file system, I/O systems) from a theoretical standpoint, and contrast their advantages and limitations.

**Course Resources**

Course Website(s)

* myCourseLink:

Required Course Text(s)

* Abraham Silberschatz, Peter Baer Galvin, and Greg Gagne, *Operating System Concepts*, 10th edition, John Wiley & Sons, ISBN 978-1119800361. Feb. 9 2021 ([Loose Leaf edition](https://www.amazon.ca/Operating-System-Concepts-Abraham-Silberschatz/dp/1119800366/ref=zg_bs_g_15305781_sccl_40/133-3653744-2334458?psc=1)).

Additional ISBNS: 9781119439257, 9781119127482, 9781119800378, 9781119800361, 9781119329480, 9781119329485, 9781119702498, 9781119320917

Alternative Course Text

* Abraham Silberschatz, Peter Baer Galvin, and Greg Gagne, *Operating System Concepts*, 10th edition, John Wiley & Sons, ISBN 978-1119320913. April 2018 ([e-book edition](https://www.wiley.com/en-fr/Operating+System+Concepts%2C+10th+Edition-p-9781119320913)).

**Course Schedule/Outline**

|  |  |
| --- | --- |
| Date | Main Topics |
| Week 1 | Introduction |
| Week 2 | OS Structures |
| Week 3 | Operating System Processes |
| Week 4 | Operating System Processes |
| Week 5 | Threads, Concurrency |
| Week 6 | Thanksgiving, Study Week |
| Week 7 | IPC |
| Week 8 | CPU Scheduling |
| Week 9 | Deadlock |
| Week 10 | Main Memory |
| Week 11 | Virtual Memory, I/O, File Systems |
| Week 12 | TBA |
| Week 13 | TBA |

Last day to drop the course is Friday, November 3, 2023. Check the university website for [academic schedule of dates](https://csdc.lakeheadu.ca/~/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=30&topicid=48548&topicgroupid=31622)

**Assignments and Evaluations**

|  |  |  |
| --- | --- | --- |
| Item | Date(s) | Value |
| Assignments | September 29  November 4  November 20 | 30% |
| 1 Mid-Term Test | October 21 | 30% |
| Final Examination | TBA | 40% |
| Total |  | 100 |

**The midterm exam** is a closed book exam and covers the material presented in class prior to the midterm break.  **The final exam** is also a closed book exam and covers all material presented during the term. The exam date is set by the university.

**Take-home Assignments**

Students are expected to follow a specific guideline (provided by the instructor) when preparing their assignment report, failing to comply with the provided guideline will be **penalized** accordingly. There will be a **penalty** for late assignments (**15% each day**). If you are expecting to be late contact me ASAP and you must have a valid reason.

Assignment 1: Processes

Assignment 2: Threads

Assignment 3: TBA

**Course Policies**

Important announcements area posted to D2L and may be also sent to your university e-mail directly. Be sure to consult the website and your e-mail account regularly.

Students are expected to read and agree to the following:

**Academic Integrity Statement:**

I understand and agree that:

(1) Unless otherwise allowed by the course instructor, I must complete the assignments in this course without the assistance of anyone else.

(2) Unless otherwise allowed by the course instructor, I must not access any sources or materials (in print, online, or in any other way) to complete any course exam.

I further understand and agree that, if I violate either of these two rules, or if I provide any false or misleading information about my completion of course assignments or exams, I may be prosecuted under the Lakehead University Student Code of Conduct – Academic Integrity, which requires students to act ethically and with integrity in academic matters and to demonstrate behaviours that support the University’s academic values.

**Copyright Compliance:**

I understand and agree that all instructional, reference, and administrative materials to which I am given access in this course (the "course materials"), whether they consist of text, still or kinetic images, or sound, whether they are in digital or hard copy formats, and in whatever media they are offered, are protected in their entirety by copyright, and that to comply with this copyright and the law

(1) I may access and download the course materials only for my own personal and non-commercial use for this course; and

(2) I am not permitted to download, copy, or store (in any medium) any text, image, or sound component of the course materials for any other purpose whatsoever, or to forward or share, transmit, broadcast, show, post or play in public, adapt, or change in any way any text, image, or sound component of the course materials, except as expressly authorized, and only to the extent authorized, in writing, by the course instructor."

I further understand and agree that, if I infringe the copyright of the course materials in any way, I may be prosecuted under the Lakehead University Student Code of Conduct – Academic Integrity, which requires students to act ethically and with integrity in academic matters and to demonstrate behaviours that support the University’s academic values.

**Regulations**

It is the responsibility of each student registered at Lakehead University to be familiar with, and comply with all the terms, requirements, regulations, policies, and conditions in the Lakehead University Academic Calendar. This includes, but is not limited to, Academic Program Requirements, [Academic Schedule of Dates](https://www.lakeheadu.ca/students/academic-success/important-dates), [University and Faculty/School Policies and Regulations](https://www.lakeheadu.ca/about/policies-procedures) and the Fees and Refund Policies and Schedules.

**Academic Integrity**

A breach of Academic Integrity is a serious offence. The principle of Academic Integrity, particularly of doing one’s own work, documenting properly (including use of quotation marks, appropriate paraphrasing and referencing/citation), collaborating appropriately, and avoiding misrepresentation, is a core principle in university study. Students should view the [Student Code of Conduct - Academic Integrity](https://www.lakeheadu.ca/sites/default/files/policies_procedures/Student%20Code%20of%20Conduct%20-%20Academic%20Integrity_0.pdf) for a full description of academic offences, procedures when Academic Integrity breaches are suspected and sanctions for breaches of Academic Integrity.

**Supports for Students** – there are many resources available to support students. These include but are not limited to:

* [Health and Wellness](https://www.lakeheadu.ca/current-students/student-health-and-counselling-centre)
* [Student Success Centre](https://www.lakeheadu.ca/current-students/student-success-centre)
* [Student Accessibility Centre](https://www.lakeheadu.ca/current-students/student-services/accessibility/)
* [Library](https://library.lakeheadu.ca/)
* [Lakehead International](https://www.lakeheadu.ca/international)
* [Indigenous Initiatives](https://www.lakeheadu.ca/indigenous)

Lakehead University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities and/or medical conditions to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability and think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as early as possible. For more information, please contact [Student Accessibility Services](http://studentaccessibility.lakeheadu.ca/)  (SC0003, 343-8047 or [sas@lakeheadu.ca](mailto:sas@lakeheadu.ca))