Course Syllabus

[Jump to Today](#)

Coordinator	Mario Badr
Office	BA4270
Email address	**csc369-2026-01@cs.toronto.edu** (mailto:csc369-2026-01@cs.toronto.edu)
Course website	**https://q.utoronto.ca/courses/415301** (https://q.utoronto.ca/courses/415301)
MarkUs	**https://markus.teach.cs.toronto.edu/markus** ⤷ (https://markus.teach.cs.toronto.edu/markus)

Communication

There are several ways that you (the learner, the student) can communicate with us (the teaching team) outside of lectures and labs. These include announcements, email, a discussion forum, and office hours.

Announcements

All course announcements are posted on Quercus. You are responsible for reading all announcements made by the teaching team in a timely manner. And we highly recommend enabling notifications for Quercus announcements.

Email

If you have a personal question (i.e., the answer is only useful to you or contains personal details), email **csc369-2026-01@cs.toronto.edu** (mailto:csc369-2026-01@cs.toronto.edu). Please ensure that you share your UTORid in the body of your message. and allow 24-72 hours for response during regular business hours. We recommend reviewing our course policies (below) before sending an email. We strongly recommend using your mail.utoronto.ca email address for all course-related communication.

Please do not use Quercus' built-in communication tool (called "Inbox"). We do not monitor our Quercus inbox, so your message may never be seen.

Discussion forum

If you have a question related to course content, please use Piazza. As a courtesy to others (and the teaching team), please search to see if your question has already been posted. This is especially true closer to deadlines, where you may find many earlier discussions helpful to you.

Office hours

Throughout the term, Mario (the instructor) will host group-based, student-driven office hours on Mondays, 10:00 AM to 11:00 AM in BA4290. Questions during this office hour should not be specific to any particular student, but rather to course concepts and answers that every student can benefit from.

Additional office hours (hosted by members of the teaching team) will be announced throughout the term.

Course overview

The course introduces the major principles of operating systems, with a focus on systems programming in C. In many ways, the material is "core CS", and past students have indicated that the assignments and concepts have helped them in interviews. After completing this course, you should be able to:

- List, compare, and evaluate the mechanisms, policies, and abstractions used by an operating system to manage the CPU, memory, and storage.
- Trace and exemplify synchronization patterns and concurrency problems using primitives like locks, condition variables, and semaphores
- Design and implement sandboxed versions of key operating system components (e.g., schedulers, virtual memory, etc.)

The course offers you with opportunities to learn synchronously and in-person through lectures and labs. All lectures and labs start at 10 minutes past the hour of the time specified on ACORN. The rest of this section gives more information about lectures, tutorials, and assessment.

Textbook and references

A lot of your learning will happen outside of lectures and tutorials. The course textbook, which can be **accessed online** ⤴ **(https://pages.cs.wisc.edu/~remzi/OSTEP/)** for free, is a must-read resource:

> Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseau. Operating Systems: Three Easy Pieces. Arpaci-Dusseau Books. November, 2023 (Version 1.10)

You may find that following a traditional textbook is useful (but this is not required). For a solid treatment of the theoretical concepts and historical context, we recommend:

> Andrew, S. Tanenbaum, and Bos Herbert. Modern operating systems (fourth edition). Pearson Education, 2015.

If you would prefer a greater emphasis on implementation details, we recommend:

> Stallings, William. Operating systems internals and design principles (ninth edition). Pearson Education, 2017.

Lectures

Lectures introduce, build on, or reinforce fundamental operating systems concepts. You are expected to prepare for each lecture ahead of time by reading and reviewing the chapters the lecture covers. And, while lecture attendance is not mandatory, we highly recommend you attend.

A more detailed lecture schedule, with a tentative sequencing of topics, is shown in the table below. Please note that, in some lectures, we may cover material not found in the textbook.

Lecture	Week of	Chapters	Topics
Lecture 1	January 5th	2, 4, 5	Introduction, processes
Lecture 2	January 12th	6, 7	Direct execution, scheduling
Lecture 3	January 19th	8, 9	MLFQ, lottery scheduling
Lecture 4	January 26th	15, 16, 17	Address translation, segmentation, free space
Lecture 5	February 2nd	18, 19, 20	Paging, translation lookaside buffers
Lecture 6	February 9th	21, 22, 23	Swapping, complete VM systems
Reading week (no lecture)			
Lecture 7	February 23rd	26, 27, 28	Threads, locks
Lecture 8	March 2nd	30, 31	Condition variables, semaphores
Lecture 9	March 9th	32, 37, 39	Concurrency bugs, files and directories
Lecture 10	March 16th	40, 41	File systems
Lecture 11	March 23rd	42	FSCK and journaling
Lecture 12	March 30th	44	Flash-based SSDs, conclusion

If the lecture hall supports it, lecture recordings will be made available on Quercus. This is not a guarantee, and you should not rely on recordings in case they are not available (e.g., due to technical issues). Please see below for our policy on lecture recordings.

Technology can support student learning, but it can also become a distraction. Research indicates that multi-tasking during class time can have a negative impact on learning. Out of respect for your fellow students in this class, please refrain from using laptops or mobile phones for purposes unrelated to the class. Do not display any material on a laptop which may be distracting or offensive to your fellow students.

Assessments

You can assess your learning in the course through a variety of ways. A summary of graded assessments is shown below, followed by more information about each assessment category.

Category	Count	Weight	Deadline or date(s)	Submission
Labs	5	10% (2% each)	Sundays before 1:00 PM	MarkUs
Assignments	2	20% (10% each)	February 12th and March 12th before 1:00 PM	MarkUs
Tests	3	30% (10% each)	January 28th, February 25th, and March 25th	In-person
Final exam	1	40%	To-be-scheduled by Arts & Science	In-person

The rest of this section discusses each assessment category in more detail. See our expectations for labs and assignments, as well as policies for submission and accommodations, in the next section (Policies and statements).

Labs

There are a total of five labs that you must complete individually. These programming exercises are small relative to assignments, but cover key concepts in operating systems, C programming, or both. The lab exercises are designed to help complement your understanding of the concepts and C programming skills you need in larger assignments.

Lab logistics are shown in the table below. Students are not assigned to a particular room, so please distribute yourselves across rooms for the section you are in.

Section	Date and Time	Rooms
LEC0101	Wednesdays, 1:00 to 2:00 PM	BA2200, BA3175, BA3185, BA3195
LEC0201	Wednesdays, 2:00 to 3:00 PM	BA2200, BA3175, BA3185, BA3195

The rooms are booked at the times above for the entire term. However, teaching assistants will only be in the rooms during a scheduled lab session. The schedule for the five different labs is shown below. Please note that labs tend to focus on a specific topic. The chapter coverage column gives you a sense of which chapter the topic of the lab may come from.

Lab	Date	Topic from...
Lab 1	January 14th	Chapters 4 to 7
Lab 2	January 21st	Chapters 8 to 9
Lab 3	February 4th	Chapters 15 to 19
Lab 4	March 4th	Chapters 26–28, 30, 31
Lab 5	March 18th	Chapters 37, 39, 40

Assignments

There are a total of two assignments that you must complete individually. Assignments are much larger than labs, covering several topics covered in the lectures and textbook. For example, the assignment may involve the programming of some subsystem of an operating system in a sandboxed environment. Or you may be asked to solve a problem (or set of problems) related to an operating system concept. We *highly recommend* you begin assignments early.

Tests

There are three in-person tests scheduled during your Wednesday lab time (1:00 PM to 2:00 PM for LEC0101, 2:00 PM to 3:00 PM for LEC0201). Since the lab time is part of the course's regularly scheduled lecture time on ACORN, you should have no conflicts (e.g., with another course) with this time. In addition, you must write in the section you are enrolled in. Logistics regarding which room to write the test in will be announced closer to the date.

Test coverage is outlined in the table below. Tests cover lecture and lab material, and the corresponding textbook chapters are shown below as well. Note that tests are cumulative, so an understanding of topics from earlier tests is expected in (though not the focus of) later tests.

Test	Coverage (by week)	Coverage (by chapter)
Test 1	Weeks 1 to 3 (inclusive)	Chapters 2 to 9 (inclusive)
Test 2	Weeks 4 to 6 (inclusive)	Chapters 15 to 23 (inclusive)
Test 3	Weeks 7 to 9 (inclusive)	Chapters 26, 27, 28, 30, 31, 32

Missed test policy: We recommend reviewing our course policies below regarding accommodations and required documentation. If you will miss (or have missed) a test, you should email us **as soon as possible**.

Final examination

A final examination will be scheduled by the Faculty of Arts and Science during the final assessment period (i.e., between April 9th and April 29th). It covers all the course content. Please note that we (the teaching team) do not handle any accommodations related to the final exam. Please contact your college registrar, instead.

Policies and statements

Expectations for labs and assignments

You must submit your work through MarkUs (see our submission policy below). For your labs and assignments to be graded, **they must meet the minimum standards of a professional computer scientist**. This means that:

- Submissions that are missing files or do not compile may receive a grade of 0
- Submissions *must* compile cleanly, without errors or warnings, on the teach.cs lab machines
- Code should be tested thoroughly before submission

Labs and assignments will typically include a "sanity checker" on MarkUs. The sanity checks can be used to confirm that your submission compiles and runs on teach.cs machines. In some cases they may

include a few correctness checks. **But the sanity check is not an indicator of your final grade**. Additional hidden tests, which are not provided, may be used to assess your overall grade.

MarkUs submission policy

All labs and assignments must be submitted on MarkUs and never through email. You can always submit to MarkUs, even after the deadline and late policy has passed. Internally, MarkUs uses a git repository for your assessments, so a submission is simply a commit pushed to MarkUs (even if you don't use git but instead, for example, a file upload through MarkUs' web interface).

The commit that is graded is, typically, the most recent one before the due date, plus any late period (please see our late submission policy below). However, this may change depending on extenuating circumstances (please see our accommodation policies below). If you are requesting accommodations for a late submission after the deadline has passed, you should submit to MarkUs before sending the request.

Late submission policy

Any lab or assignment may be submitted *three days late* without penalty. Submissions will not be accepted beyond this window.

If a student is registered with Accessibility Services, they may receive an extension from the deadline based on accommodations set out by their accessibility advisor. See our statement below on *Students with disabilities or accommodation requirements* for more information. Other extenuating circumstances will be considered on a case by case basis, based on the policies outlined below (see: *Specific medical circumstances* and *Accommodation for personal reasons*).

All extensions will be based on the original due date of assignments, *not including the no-penalty late period.* This means that the reason for your accommodation must have impacted you before the due date. Please note that extensions and the no-penalty late period are mutually exclusive. That is, if you receive an extension, it cannot be combined with the no-penalty late period.

Grading errors

If you believe there is a mistake in your grade, you can email us for clarification (**csc369-2026-01@cs.toronto.edu** (mailto:csc369-2026-01@cs.toronto.edu)) within two weeks of the grade being released to you. Your email should clearly and concisely describe why you believe your assessment was incorrectly graded. Please note that your inquiry may increase the original grade, leave it as is, or decrease the original grade, depending on the grading error or errors found.

Academic Integrity

All suspected cases of academic dishonesty will be investigated following procedures outlined in the **Code of Behaviour on Academic Matters**

(https://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019) . If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, please reach out to the course email address. Note that you are expected to seek out additional information on academic integrity from your instructor or from other institutional resources. For example, to learn more about how to cite and use source material appropriately and for other writing support, see the **U of T writing support website (http://www.writing.utoronto.ca/)** . Consult the Code of Behaviour on Academic Matters for a complete outline of the University's policy and expectations. For more information, please see **A&S Student Academic Integrity (https://www.artsci.utoronto.ca/current/academic-advising-and-support/student-academic-integrity)** and the **University of Toronto Website on Academic Integrity (https://www.academicintegrity.utoronto.ca/)** .

Artificial Intelligence

In this course, you may use generative artificial intelligence (AI) tools, including ChatGPT, Microsoft Copilot, and GitHub Copilot, as learning aids and to help complete assignments. You will not be permitted to use generative AI on the tests or the final exam. While some generative AI tools are currently available for free in Canada, please be warned that these tools have not been vetted by the University of Toronto and might not meet University guidelines or requirements for privacy, intellectual property, security, accessibility, and records retention. Generative AI may produce content which is incorrect or misleading, or inconsistent with the expectations of this course. These tools may even provide citations to sources that don't exist—and submitting work with false citations is an academic offense. These tools may be subject to service interruptions, software modifications, and pricing changes during the semester.

Generative AI is not required to complete any aspect of this course, and we caution you to not rely entirely on these tools to complete your coursework. Instead, we recommend treating generative AI as a supplementary tool only for exploration or drafting content. Ultimately, you (and not any AI tool) are responsible for your own learning in this course, and for all the work you submit for credit. It is your responsibility to critically evaluate the content generated, and to regularly assess your own learning independent of generative AI tools. Overreliance on generative AI may give you a false sense of how much you've actually learned, which can lead to poor performance on the tests or the final exam, in later courses, or in future work or studies after graduation.

Equity, diversity, and inclusion

The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. The University of Toronto does not condone discrimination or harassment against any persons or communities.

Students with disabilities or accommodation requirements

Students with diverse learning styles and needs are welcome in this course. If you have an acute or ongoing disability issue or accommodation need, you should register with Accessibility Services (AS) at the beginning of the academic year by visiting the **AS website (https://studentlife.utoronto.ca/department/accessibility-services/)** . Without registration, you will not be able to verify your situation with your instructors, and instructors will not be advised about your accommodation needs. AS will assess your situation, develop an accommodation plan with you, and support you in requesting accommodation for your course work. Remember that the process of accommodation is private: AS will not share details of your needs or condition with any instructor, and your instructors will not reveal that you are registered with AS.

Accommodation for specific medical circumstances

If you become ill and it affects your ability to do your academic work, email us right away. Normally, we will ask you for documentation in support of your specific medical circumstances. This documentation can be an Absence Declaration (via ACORN) or the University's Verification of Student Illness or Injury (VOI) form. The VOI indicates the impact and severity of the illness, while protecting your privacy about the details of the nature of the illness. If you cannot submit a VOI due to limits on terms of use, you can submit a different form (like a letter from a doctor), as long as it is an original document, and it contains the same information as the VOI (including dates, academic impact, practitioner's signature, phone and registration number). For more information on the VOI, please see **http://www.illnessverification.utoronto.ca (http://www.illnessverification.utoronto.ca/)** . For information on Absence Declaration Tool for A&S students, please see **https://www.artsci.utoronto.ca/absence (https://www.artsci.utoronto.ca/absence)** . If you get a concussion, break your hand, or suffer some other acute injury, you should register with Accessibility Services as soon as possible.

Accommodation for personal reasons

There may be times when you are unable to complete course work on time due to non-medical reasons. If you have concerns, email us or an advisor in your College Registrar's office; they can help you to decide if you want to request an extension or other forms of academic consideration. They may be able to email your instructors directly to provide a College Registrar's letter of support and connect you with other helpful resources on campus.

Mental health and well-being

Your mental health is important. Throughout university life, there are many experiences that can impact your mental health and well-being. As a University of Toronto student, you can access free mental health and wellbeing services at **Health & Wellness (https://studentlife.utoronto.ca/department/health-wellness/)** such as same day counselling, brief counselling, medical care, skill-building workshops, and drop-in peer support. You can also meet with a Wellness Navigation Advisor who can connect you with other campus

and community services and support. Call the mental health clinic at 416-978-8030 ext. 5 to book an appointment or visit **https://uoft.me/mentalhealthcare** ⬈ **(https://uoft.me/mentalhealthcare)** to learn about the services available to you.

You can also visit your College Registrar to learn about the resources and supports available: **https://www.artsci.utoronto.ca/current/academic-advising-and-support/college-registrars-offices (https://www.artsci.utoronto.ca/current/academic-advising-and-support/college-registrars-offices)**

If you're in distress, you can access immediate support: **https://uoft.me/feelingdistressed** ⬈ **(https://uoft.me/feelingdistressed)**

Quercus information

This Course uses the University's learning management system, Quercus, to post information about the course. This includes posting readings and other materials required to complete class activities and course assignments, as well as sharing important announcements and updates. New information and resources will be posted regularly as we move through the term. To access the course website, go to the U of T Quercus log-in page at **https://q.utoronto.ca**.

SPECIAL NOTE ABOUT GRADES POSTED ONLINE: Please also note that any grades posted are for your information only, so you can view and track your progress through the course. No grades are considered official, including any posted in Quercus at any point in the term, until they have been formally approved and posted on ACORN at the end of the course. Please contact me as soon as possible if you think there is an error in any grade posted on Quercus.

Course materials

Course materials are provided for the exclusive use of enrolled students. These materials should not be reposted, shared, put in the public domain, or otherwise distributed without the explicit permission of the instructor. These materials belong to your instructor, the University, and/or other sources depending on the specific facts of each situation and are protected by copyright. Students violating these policies will be subject to disciplinary actions under the Code of Student Conduct.

Video recording and sharing

This course, including your participation, will be recorded on video and will be available to students in the course for viewing remotely and after each session.

Course videos and materials belong to your instructor, the University, and/or other sources depending on the specific facts of each situation and are protected by copyright. In this course, you are permitted to download session videos and materials for your own academic use, but you should not copy, share, or use them for any other purpose without the explicit permission of the instructor.
For questions about the recording and use of videos in which you appear, please contact your instructor.

Course Summary:

Date	Details	Due
Sun Jan 18, 2026	📝 [Lab 1](https://q.utoronto.ca/courses/416938/assignments/1645935) (https://q.utoronto.ca/courses/416938/assignments/1645935)	due by 1pm
Sun Jan 25, 2026	📝 [Lab 2](https://q.utoronto.ca/courses/416938/assignments/1645955) (https://q.utoronto.ca/courses/416938/assignments/1645955)	due by 1pm
Wed Jan 28, 2026	📝 [Test 1](https://q.utoronto.ca/courses/416938/assignments/1628386) (https://q.utoronto.ca/courses/416938/assignments/1628386)	due by 1pm
Sun Feb 8, 2026	📝 [Lab 3](https://q.utoronto.ca/courses/416938/assignments/1645959) (https://q.utoronto.ca/courses/416938/assignments/1645959)	due by 1pm
Thu Feb 12, 2026	📝 [Assignment 1](https://q.utoronto.ca/courses/416938/assignments/1645962) (https://q.utoronto.ca/courses/416938/assignments/1645962)	due by 1pm
Wed Feb 25, 2026	📝 [Test 2](https://q.utoronto.ca/courses/416938/assignments/1628387) (https://q.utoronto.ca/courses/416938/assignments/1628387)	due by 1pm
Sun Mar 8, 2026	📝 [Lab 4](https://q.utoronto.ca/courses/416938/assignments/1645994) (https://q.utoronto.ca/courses/416938/assignments/1645994)	due by 1pm
Thu Mar 12, 2026	📝 [Assignment 2](https://q.utoronto.ca/courses/416938/assignments/1645998) (https://q.utoronto.ca/courses/416938/assignments/1645998)	due by 1pm
Sun Mar 22, 2026	📝 [Lab 5](https://q.utoronto.ca/courses/416938/assignments/1646004) (https://q.utoronto.ca/courses/416938/assignments/1646004)	due by 1pm
Wed Mar 25, 2026	📝 [Test 3](https://q.utoronto.ca/courses/416938/assignments/1628389) (https://q.utoronto.ca/courses/416938/assignments/1628389)	due by 1pm