

CS4433 – Selected Topics
Cybersecurity Threats & Mitigation
Winter 2026 Term
Course Outline

1. Course Information

Course Information

Cybersecurity Threats & Mitigation
CS4433 (Computer Science Undergraduate)

Time/Place

[REDACTED]
[REDACTED] Tuesday 11:30 am – 12:30 pm
[REDACTED] Thursday 11:30 am – 1:30 pm

List of Prerequisites

Computer Science (3305A/B, 3307A/B/Y, 3331A/B, 3340A/B, 3342A/B, 3350A/B).

Unless you have either the prerequisites for this course or written special permission from the Department of Computer Science to enroll in it, you may be removed and withdrawn from this course in accordance with university policy. This may be done after the add/drop deadline of the academic term, and the course will be marked as withdrawn (WDN) on your academic record. This decision may not be appealed.

2. Instructor Information

Instructors	Email	Office	Phone	Office Hours
Dr. Marwa Elsayed (Course Coordinator)	marwa.elsayed@uwo.ca	[REDACTED]	[REDACTED]	TBA
TBA Teaching Assistants				

Students must use their Western (@uwo.ca) email addresses when contacting the instructional team.

Office hours will be online via MS Teams, based on assignment and exam needs, and require a prior appointment. Timing and booking details will be conveyed through OWL as the term progresses.

Communication must be directed as follows:

To manage the large volume of communication between students and the instructional team, **we will use OWL Brightspace forums and messages** as per the policy set out below. See Section 4 below for more information about OWL. *Communication sent via an inappropriate channel (e.g. an assignment clarification question sent by e-mail) will be ignored.*

- Questions about **course content and process that are relevant to the whole class** (e.g., specific and general assignment clarifications, questions about quiz content) **must be directed to the OWL Brightspace forums**. This way, others can benefit from the answers. Conversely, **students must check the forums prior to posting**. Questions may be posted anonymously if a student wishes – *this hides their name from their classmates but not from the instructional team. Do not post any code or assignment answers in the OWL forums.*
- Questions about any **individual concerns**, for example about marks/marketing, may be **sent by OWL message** to members of the instruction team:
 - Sending a message to the TAs
 - **Questions about marks/marketing should be directed toward TAs.**
 - Sending a message to the 'Instructor' contacts the professor.
 - Sending a message to all of us helps us to respond faster and know what's going on.
- **Course-related communication not sent via OWL messaging/discussions may be ignored.**
You can set up OWL notifications to be relayed to your UWO e-mail if you prefer.

Messages from the instructional team will be sent by OWL announcement. You can set this to forward to your e-mail if you like; announcements will also be archived on the OWL site.

3. Course Syllabus, Schedule, Delivery Mode

The objective of this course is to provide an in-depth study of the principles, methodologies, and technologies that underpin modern computer system security. Designed as an intermediate-to-advanced course, it examines the theory and practice of both offensive and defensive security approaches essential to safeguarding contemporary digital infrastructures.

The defensive component focuses on the design and operation of secure systems, emphasizing threat detection, incident response, and forensic analysis. Students will study the structure of security operations centers (SOCs), the use of logging and monitoring for anomaly detection, and the processes required to effectively contain and remediate security incidents.

The offensive component explores the techniques and tools employed in ethical hacking and penetration testing. Students will learn how vulnerabilities are identified, exploited, and mitigated within networked and cloud-based environments. Emphasis is placed on understanding adversarial tactics to strengthen overall system resilience.

The course also introduces the emerging domain of AI/ML-enabled security, addressing both the use of AI to enhance cybersecurity defences and the challenges of securing AI-driven systems.

Through a combination of lectures, case studies, and hands-on laboratory exercises, students will gain practical skills and conceptual understanding necessary for professional roles in cybersecurity research, operations, and strategy.

The course assumes a foundational understanding of operating systems, networking protocols, programming languages, and machine learning concepts.

Upon successful completion of this course, students will be able to:

- Explain fundamental concepts of computer system security from both offensive and defensive perspectives.
- Analyze and mitigate vulnerabilities using industry-standard security tools and frameworks.
- Apply incident detection, response, and forensic techniques in simulated security environments.
- Evaluate the role of AI and machine learning in enhancing security monitoring and automation.
- Integrate offensive and defensive strategies into comprehensive system security architectures.

This course will be primarily delivered in person. However, certain class materials and active learning exercises may be assigned for online completion at the instructor's discretion.

Key Sessional Dates

Classes begin: January 5, 2026

Spring Reading Week: February 14 – 22, 2026

Classes end: April 9, 2026

Exam period: April 12 – 30, 2026

4. Course Materials

All course material will be posted to OWL: <https://westernu.brightspace.com/>

Recommended Textbooks

There is no required textbook for this course. However, readings from the following textbooks will be recommended to provide additional explanations on selected topics covered in class. These textbooks will be available at no cost through [Western Libraries' Course Readings Service](#) and can be accessed once provided.

Stallings, W., & Brown, L. (2024). Computer Security: Principles and Practice (Fifth edition.). Pearson Education Limited.

Pfleeger, C. P., Pfleeger, S. L., & Coles-Kemp, L. (2024). Security in Computing (Sixth edition.). Pearson Addison-Wesley.

Easttom, C. (2023). Computer security fundamentals (Fifth edition.). Pearson IT Certification.

Bishop, M., Sullivan, E., & Ruppel, M. (2019). Computer security: Art and Science (Second edition.). Addison-Wesley.

Additional references, including topic-specific research papers, may be provided throughout the course. These materials will be made available within the class presentations.

Technical Requirements

Students must have regular access to a computer with a reliable Internet connection to complete online hands-on lab exercises and access course materials.

Students are responsible for checking the course OWL site (<https://westernu.brightspace.com/>) regularly for news and updates. This is the primary method by which information will be disseminated to all students in the class.

If students need assistance with the course OWL site, they can seek support on the [OWL Brightspace Help](#) page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

5. Methods of Evaluation

Grading Scheme and Assessment Dates

The overall course grade will be calculated as listed below:

Assignments (3)	30%
Quizzes (2)	20%
Active Learning (12)	20%
Final Exam	30%

Quizzes and Exams

The dates of the exams are as follows:

- **Quiz 1:** February 12, 2026
- **Quiz 2:** March 26, 2026
- **Final Exam:** Scheduled by the Registrar

Quizzes and Final Exam

Quiz 1 will cover topics from Weeks 1-5. Quiz 2 will cover topics from Weeks 6-10.

There will be no makeup quizzes. If you miss a quiz, follow the procedure for Academic Accommodations outlined in Section 6.

The final exam will be in-person and scheduled by the Registrar. It will be cumulative, covering all course content.

All quizzes and final exams will be closed book / closed note exams. Students are not allowed to use any electronic devices, including calculators.

Active Learning

Active learning in this course involves completing weekly hands-on lab exercises hosted on an external cloud platform. Further details and access instructions will be provided by the instructor. Students will be invited to create an account and join the platform remotely to complete the required activities each week.

There will be 12 active learning exercises in total, and only the best 10 out of the 12 exercises will count towards the final grade.

Assignments

- Assignments will be made available on OWL Brightspace. Students are responsible for checking the course OWL on a regular basis. Submission instructions will be provided for each assignment.
- Three assignments of equal weight are scheduled with the following due dates:

Assignment	Due Date	Expected Load
1	February 12, 2026	Medium
2	March 5, 2026	High
3	April 2, 2026	High

- To prevent issues related to the possibility of lost assignments or recording mark errors, students are strongly advised to keep all submitted assignments whether uploaded to the course's OWL or completed on the external cloud platform, at least until final marks for the course are posted.

6. Missed Coursework

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs*, posted on the Academic Calendar: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf.

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person.

The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult [Accessible Education](#).

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage:

https://registrar.uwo.ca/academics/academic_considerations/

All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request **without supporting documentation** in this course. However, the following assessments are excluded from this, and therefore always require formal supporting documentation:

- Quizzes (Designated by the instructor as the one assessment that always requires documentation when requesting Academic Consideration).
- Final examinations scheduled during official examination periods (Defined by policy).

If you miss a quiz due to illness or other serious circumstances, you must submit valid medical or supporting documentation to the SAP (Student Absence Portal) as soon as possible. All requests for Academic Consideration must be made within 48 hours of the scheduled assessment. If your documented absence is approved, the weight of the missed quiz will be reallocated to your other quiz.

When a student mistakenly submits their one allowed Academic Consideration request **without supporting documentation** for the assessments listed above or those in the **Coursework with Assessment Flexibility** section below, the request cannot be recalled and reapplied. This privilege is forfeited.

Evaluation Scheme for Missed Assessments

Assignments. Students are expected to submit each of the three assignments by 11:55pm (electronically) on the deadline listed. Should extenuating circumstances arise, students do not need to request Academic Consideration and they are permitted to submit their assignment up to (24 hours) past the deadline without a late penalty. Should students submit their assessment beyond (24 hours) past the deadline, **a late penalty of 20% per day will be applied**. Weekend will be counted as a single day. Academic Consideration requests may be granted only for extenuating circumstances that started before the deadline and lasted longer than the No-Late-Penalty Period (24 hours). **Assignments more than 2 days late will not be accepted even with Academic Consideration granted.** (e.g., an assignment due Thursday will not be accepted after 11:55pm on the following Monday.)

Final Exam. When a student misses the Final Exam and their Academic Consideration has been granted, they will be allowed to write the Special Examination (the name given by the University to a makeup Final Exam). See the Academic Calendar for details (under Special Examinations), especially for those who miss multiple final exams within one examination period.

Essential Learning Requirements

Even when Academic Considerations are granted for missed coursework, the following are deemed essential to earn a passing grade.

The following rules are designed to ensure that students meet certain minimum standards:

- To be eligible to pass the course, a student must receive at least 40% in the exam components (i.e., 40% of 50), at least 40% in the assignments (i.e., 40% of 30), and at least 40% in the active learning exercises (i.e., 40% of 20).
- To be eligible to receive an overall grade of 60% or higher in the course, a student must receive at least 50% in the exam component (i.e., 50% of 50), at least 50% in the assignments (i.e., 50% of 30), and at least 50% in the active learning exercises (i.e., 50% of 20).

Coursework with Assessment Flexibility

By policy, instructors may deny Academic Consideration requests for the following assessments with built-in flexibility:

Flexible Completion

Active Learning Exercises. This course has 12 active learning exercises, and the 10 exercises with the highest marks are counted towards your final grade. Should extenuating circumstances arise, students do not need to request Academic Consideration for the first 2 missed exercises. Academic consideration requests will be denied for the first 2 missed exercises. Academic Consideration for missing more than 2 exercises, will be denied and given a zero mark. In such a case, students may follow the Request for Relief pathway to ask for an exception.

Assignments. Students are expected to submit each of the three assignments by 11:55pm (electronically) on the deadline listed. Should extenuating circumstances arise, students do not need to request Academic Consideration and they are permitted to submit their assignment up to (24 hours) past the deadline without a late penalty. Should students submit their assessment beyond (24 hours) past the deadline, **a late penalty of 20% per day will be applied.** Weekend will be counted as a single day. Academic Consideration requests may be granted only for extenuating circumstances that started before the deadline and lasted longer than the No-Late-Penalty Period (24 hours). **Assignments more than 2 days late will not be accepted even with Academic Consideration granted.** (e.g., an assignment due Thursday will not be accepted after 11:55pm on the following Monday.)

7. Additional Statements

7.1 Religious Accommodation

When conflicts arise with a religious holiday that requires an absence from the University or prohibits certain activities, students should request an accommodation for their absence in writing to the course instructor and/or the Academic Advising office of their Faculty of Registration. This notice should be made as early as possible, but not later than two weeks prior to the writing of the examination (or one week prior to the writing of the test).

Please visit the Diversity Calendars posted on our university's EDID website for the recognized religious holidays - <https://www.edi.uwo.ca>

7.2 Academic Accommodation Policies

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf.

7.3 General Academic Policies

The website for Registrar Services is <https://www.registrar.uwo.ca/>.

Use of @uwo.ca email: In accordance with policy,

https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf, the centrally administered e-mail account provided to students will be considered the individual's official university email address. It is the responsibility of the account holder to ensure that emails received from the University at their official university address are attended to in a timely manner.

Requests for Relief (formally known as "appeals")

Policy on Request for Relief from Academic Decision:

https://uwo.ca/univsec//pdf/academic_policies/appeals/requests_for_relief_from_academic_decisions.pdf

Procedures on Request for Relief from Academic Decision (Undergraduate):

https://uwo.ca/univsec//pdf/academic_policies/appeals/undergrad_requests_for_relief_procedure.pdf

7.4 Scholastic Offences

Policy on Scholastic Offences:

https://uwo.ca/univsec//pdf/academic_policies/appeals/scholastic_offences.pdf

Procedures on Scholastic Offences (Undergraduate):

https://uwo.ca/univsec//pdf/academic_policies/appeals/undergrad_scholastic_offence_procedure.pdf

Use of Electronic Devices During Assessments

In courses offered by the Faculty of Science, the possession of unauthorized electronic devices during any in-person assessment (such as quizzes, tests, midterms, and final examinations) is strictly prohibited. This includes, but is not limited to: mobile phones, smart watches, smart glasses, and wireless earbuds or headphones.

Unless explicitly stated otherwise in advance by the instructor, the presence of any such device at your desk, on your person, or within reach during an assessment will be treated as a *scholastic offence*, even if the device is not in use.

Only devices expressly permitted by the instructor (e.g., non-programmable calculators) may be brought into the assessment room. It is your responsibility to review and comply with these expectations.

Use of Generative AI Tools

Unless otherwise stated, the use of generative AI tools (e.g., ChatGPT, Microsoft Copilot, Google Gemini, or similar platforms) is **not permitted** in the completion of any course assessments, including but not limited to: assignments, active learning exercises, lab reports, presentations, tests, and final examinations.

Using such tools for content generation, code writing, problem solving, translation, or summarization—when not explicitly allowed—will be treated as a **scholastic offence**.

If the use of generative AI is permitted for a particular assessment, the conditions of use will be specified by the instructor in advance. If no such permission is granted, students must assume that use is prohibited. It is your responsibility to seek clarification before using any AI tools in academic work.

Contingency plan for an in-person class pivoting to 100% online learning

In the event of a health lockdown during the course that necessitates the course delivery moving away from face-to-face interaction, affected course content will be delivered entirely online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will **not** change. Any remaining assessments will also be conducted online as determined by the course instructor.

If Remote Proctoring Software may be used in this course, including in the event of a health lockdown, Tests, quizzes, and examinations in this course will be conducted using a remote proctoring service, pending approval from the Dean's Office. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at:

<https://remote-proctoring.uwo.ca>.

7.5 Support Services

Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, requests for relief, exam conflicts, and many other academic-related matters: <https://www.uwo.ca/sci/counselling/>.

Students who are in emotional/mental distress should refer to Mental Health@Western (<https://uwo.ca/health/>) for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. If you have any questions regarding accommodations, you may also wish to contact Accessible Education at

http://academicsupport.uwo.ca/accessible_education/index.html

Learning-skills counsellors at Learning Development and Success (<https://learning.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: <https://www.uwo.ca/se/digital/>.

Additional student-run support services are offered by the USC, <https://westernusc.ca/services/>.

This course is supported by the Science Student Donation Fund. If you are a student registered in the Faculty of Science or the Schulich School of Medicine and Dentistry, you pay the Science Student Donation Fee. This fee contributes to the Science Student Donation Fund, which is administered by the Science Students' Council (SSC). One or more grants from the Fund have allowed for the purchase of equipment integral to teaching this course. You may opt out of the Fee by the end of September of each academic year by completing the online form linked from the Faculty of Science's Academic Advising site. For further information on the process of awarding grants from the Fund or how these grants have benefitted undergraduate education in this course, consult the Chair of the Department or email the Science Students' Council at ssc@uwo.ca.