Western Science

Department of Computer Science

CS 4417B/9117/9647 - Unstructured Data
Winter 2026 Term
Course Outline

1. Course Information

Course Information

Unstructured Data
CS4417 (Computer Science Undergraduate)
CS9117 (Master of Data Analytics)
CS9647 (Computer Science Graduate)

Time/Place
[redacted]
Tuesday 3:30pm to 4:20pm
Thursday 2:30pm to 4:20pm

List of Prerequisites
Computer Science (CS 3319A/B) or Engineering (AISE 3309A/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course or written special permission from the Department of Computer Science to enroll in it, you may be removed and withdrawn from this course in accordance with university policy. This may be done after the add/drop deadline of the academic term, and the course will be marked as withdrawn (WDN) on your academic record.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/marking, may be **sent by OWL message** to members of the instruction team:
    - Sending a message to the TAs
        - **Questions about marks/marking 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 introduce students to techniques for the management, representation, and analysis of unstructured data, with a focus on text data e.g., transaction logs, news text, article abstracts, and microblogs. The course will also provide an overview of unstructured image, audio, and video data. Students will receive hands-on experience with modern distributed data management and analysis infrastructure.

On successful completion of this course, students shall be able to:

- Contrast unstructured data sources and management solutions with structured ones**.**
- Recognize when unstructured data sources can support a data analytics solution**.**
- Explain the role of representation learning in unstructured data analysis and provide examples.
- Estimate the computation and storage needs for analyzing and storing a given large unstructured data source.
- Recognize the process, applications, and key technologies of vector search.
- Describe embeddings and the LLM APIs used for embeddings.
- Build a search engine by using advanced Vector Search APIs.
- Select, apply, and evaluate appropriate analysis methods for unstructured text data.
- Explain how the analysis methods work and explain their results to educated non-experts.

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

Presentation Materials
All course material will be posted to OWL: https://westernu.brightspace.com/

Required Readings/Videos
Any required readings or videos before class will be posted on OWL in advance.

Suggested Textbooks
There is no required textbook for this course. However, readings from the following textbooks may be recommended to provide additional explanations on selected topics covered in class.

There is no cost for these textbooks as they can be accessible online.

Christopher D. Manning, Prabhakar Raghavan and Hinrich Schütze, *Introduction to Information Retrieval*, Cambridge University Press. 2008.
Online: https://nlp.stanford.edu/IR-book/

Stephan Buttcher, Charles L.A. Clarke, Gordon V. Cormack, Information Retrieval: Implementing and Evaluating Search Engines, MIT Press, 2010.
Online: https://mitmecsept.wordpress.com/wp-content/uploads/2018/05/stefan-bc3bcttcher-charles-l-a-clarke-gordon-v-cormack-information-retrieval-implementing-and-evaluating-search-engines-2010-mit.pdf

Additional references including academic and research papers specific to a topic may be provided; such references will be posted inside class presentations.

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

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.

Technical Requirements
Students must have access to a computer on which they can install software and write code. Students are expected to manage their own software installations necessary to complete the coursework.

5. Methods of Evaluation

Grading Scheme and Assessment Dates
The overall course grade will be calculated as listed below:
CS4417 Students

Assignments (3)	30%
Quizzes (2)	30%
Final Exam	40%
Bonus (in-class participation)	10%

CS9647/CS9117 Students

Assignments (3)	30%
Quizzes (2)	20%
Research Project Proposal	10%
Final Research Report	40%
Bonus (in-class participation)	10%

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

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 handed back to them, at least until final marks for the course are posted.

Bonus (in-class participation)

As determined by the instructor, certain class sessions may employ active learning principles, through which students can earn bonus points for meaningful engagement in hands-on activities and technical exercises that apply course concepts to real-world problems. Meaningful participation includes contributing to collaborative problem-solving, developing solutions, offering constructive observations, assisting peers, and demonstrating curiosity in exploring relevant tools and techniques. These bonus points are allocated within the assignment component and may allow students to earn up to an additional 10% toward their final grade.

Research Project Proposal

Graduate students (CS 9647 and CS 9117) are expected to individually prepare a research proposal outlining the focus of their final research paper. This proposal should be 2–3 pages in length and include the following components:

- Research Problem: Clearly define the specific research problem you intend to investigate and explain its significance, why it is important and worth exploring.
- Related Work: Summarize key existing research relevant to your topic, highlighting how previous work informs or motivates your proposed study.
- Proposed Research Plan: Provide an outline of your intended approach or methodology for addressing the research problem.

Final Research Report

Based on the submitted research proposal, graduate students (CS 9647 and CS 9117) are expected to develop a full-length research paper of 10 pages (Times New Roman, 11-point font, single-spaced). The research paper should include the following sections:

- Problem Statement: Clearly define the research problem being addressed.
- Relevant/Related Work: Review existing research in the area and discuss how it relates to your study.
- Proposed Idea/Solution/Framework: Provide a detailed description of your approach or framework for addressing the problem.
- Validation: Present experimental results, analysis, or other evidence supporting the effectiveness of your proposed solution.
- Conclusion, Limitations, and Future Work: Summarize key findings, acknowledge any limitations, and suggest directions for future research.

The deadline of the project deliverables are as follows:

Deliverable	**Due Date**
Project Research Proposal	February 5, 2026
Final Project Report	April 9, 2026

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 the following minimum standards:
Undergraduate Students (CS 4417)

- To be eligible to pass the course, a student must receive at least 40% in the exam components (i.e., 40% of 70) and at least 40% in the assignments (i.e., 40% of 30).
- 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 components (i.e., 50% of 70) and at least 50% in the assignments (i.e., 50% of 30).

Graduate Students (CS 9647/9117)

- To be eligible to pass the course, a student must receive at least 40% in the exam components (i.e., 40% of 20), at least 40% in the assignments (i.e., 40% of 30), and at least 40% in the research project components (i.e., 40% of 50).
- 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 components (i.e., 50% of 20), at least 50% in the assignments (i.e., 50% of 30), and at least and at least 50% in the research project components (i.e., 50% of 50).

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

Flexible Completion
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

Procedures on Request for Relief from Academic Decision (Graduate):
https://uwo.ca/univsec//pdf/academic_policies/appeals/graduate_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

Procedures on Scholastic Offences (Graduate):
https://uwo.ca/univsec//pdf/academic_policies/appeals/graduate_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, research project proposal, final research proposal, 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://remoteproctoring.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/.