Western University
Faculty of Engineering
Artificial Intelligence Systems Engineering Program

AISE 3309 – Database Management Systems

Course Outline Fall 2026

COURSE DESCRIPTION: The focus of this course is to teach database fundamentals required in the development and evolution of most software applications. The course introduces the principles of relational database management systems. In particular, the Entity-Relationship approach to data modeling, the relational model of database management systems (DBMS) and the use of structured query languages (SQL) will be covered. The course also covers relational algebra and the use of SQL in a programming environment, and a touch upon security and authorization. Students will learn the practical benefits that stem from using a DBMS to develop software applications. Hands on experience will make use of a state-of-the-art DBMS. Students will develop a small project following software engineering principles with emphasis on designing a schema, loading data and implementing queries for an application.

ACADEMIC CALENDAR: AISE 3309A
https://www.westerncalendar.uwo.ca/Courses.cfm?CourseAcadCalendarID=MAIN_030973_1&SelectedCalendar=Live&ArchiveID=

The focus is to teach database fundamentals required in the development and evolution of most software applications by providing a basic introduction to the principles of relational database management systems such as Entity-Relationship approach to data modeling, relational model of database management systems and the use of query languages.

PRE OR COREQUISITES: AISE 2205A/B (or Software Engineering 2205A/B if taken prior to 2024-25), AISE 2251A/B (or the former Software Engineering 2251A/B).

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record.

ANTIREQUISITES: Computer Science 3319A/B, Computer Science 3120A/B, Software Engineering 3309A/B.

CEAB ACADEMIC UNITS: Engineering Science 70%, Engineering Design 30%

INSTRUCTOR INFORMATION:

Name:
Office:
Office Hours:
Email:

CONTACT HOURS:

Timetable information is available at https://draftmyschedule.uwo.ca/.

Lectures occur weekly starting September 9. Laboratory sessions occur the following week.

LECTURE:	
LAB:	2 hours per week starting the 2nd week)

REQUIRED TEXT: T. Connolly & C. Begg, Database Systems: A Practical Approach to Design, Implementation, and Management, Sixth Edition, 2015, Addison Wesley.

REQUIRED SOFTWARE: Kritik (https://www.kritik.io/) - $49 maximum

RECOMMENDED SOFTWARE: MYSQL

GENERAL LEARNING OBJECTIVES (CEAB GRADUATE ATTRIBUTES)

Knowledge Base		**Engineering Tools**	D	**Impact on Society**	
Problem Analysis	D	**Individual & Team Work**		**Ethics and Equity**	
Investigation		**Communication**		**Economics and Project Management**	
Design	D	**Professionalism**		**Life-Long Learning**	

Notation: x represents the content level code as defined by the CEAB. blank = not applicable; I = introduced (introductory); D = developed (intermediate) and A = applied (advanced).

Rating: I – The instructor will introduce the topic at the level required. It is not necessary for the student to have seen the material before. D – There may be a reminder or review, but the student is expected to have seen and been tested on the material before taking the course. A – It is expected that the student can apply the knowledge without prompting (e. g. no review).

COURSE MATERIALS: Weekly content and guides will be available on the course OWL site. Material for this course will be taught in both lectures and labs; therefore, it is imperative that you attend lectures and labs.

COURSE TOPICS AND SPECIFIC LEARNING OUTCOMES:

The following table summarizes the course learning outcomes along with CEAB GAIs where the GAIs in bold indicate ones to be measured and reported annually.

Course Topics and Specific Learning Outcomes	CEAB GA Indicators
1. Introduction to Database Systems At the end of this section, students will be able to:	
1.1. Identify the importance of databases, the typical functions of Database Management Systems (DBMS), the components of DBMS environments, and the advantages and disadvantages of DBMSs	PA1
1.2. Describe the origins of the relational model and its terminology.	PA1
2. Conceptual Database Design **At the end of this section, students will be able to:**	
2.1. Use the Entity-Relationship (ER) modeling in the conceptual database design;	D1
2.2. Identify additional data modeling concepts of the Enhanced Entity-Relationship (EER) model for conceptual database design.	D1
3. Logical Database Design At the end of this section, students will be able to:	
3.1. Derive a set of relations from a conceptual model.	D4
4. Normalization At the end of this section, students will be able to:	
4.1. Describe the purpose of normalization and undertake the process of normalization;	D2, D3
4.2. Validate the set of relations using the technique of normalization.	D2
5. Relational Algebra At the end of this section, students will be able to:	
5.1. Form queries in the relational algebra.	PA2
6. SQL Data Definition and Constraints At the end of this section, students will be able to:	
6.1. Create a database schema and define SQL tables.	D1
6.2. Define integrity constraints using SQL.	D1
7. SQL Statements: Query, Insert, Update, and Delete At the end of this section, students will be able to:	
7.1. Retrieve data from the database, create Indexes, and create Views using SQL	ET1, ET2, PA3
7.2. Perform database insert, update, and delete using SQL commands.	ET2, ET3
8. Transactions and Triggers At the end of this section, students will be able to:	
8.1. Describe how the ISO Transaction model works,	PA2
8.2. Create and use Triggers.	PA2
9. Introduction to NoSQL Databases At the end of this section, students will be able to:	
9.1. Differentiate between traditional relational databases and NoSQL databases in terms of data models, scalability, and typical use-cases;	PA3
9.2. Understand and identify the primary types of NoSQL databases: Document, Key-Value, Column-family, and Graph;	ET1
9.3. Create basic data models for specific NoSQL databases.	ET2, D3

EVALUATION:

Name	% Worth	Assigned	Due Date	CEAB GAs ASSESSED
Assignments	40%	No	Posted on OWL	PA1, PA2, PA3, D1, D2, D3, D4, ET1, ET2, ET3
Midterm Exam	20%	Yes	After the reading week	PA1, PA2, PA3, D1, D2, D3, D4,
Final Exam	40%	Yes	Final Exam Period	PA1, PA2, PA3, D1, D2, D3, D4,

Note that the dates listed above are **tentative** and may be adjusted if needed. Marks will be assigned on the basis of method of analysis and presentation, correctness of solution, clarity and neatness.

For this course, the following assessment has been designated as requiring supporting documentation:

- Midterm Exam, due after the reading week
- Final Exam, due during the final examination period

Assignments:

There will be 4 assignments in this course as listed in the table below. Students will work in groups, will choose a project topic and work on these 4 assignments based on the chosen and approved topic. By the end of the 4th assignment students will have developed a database application.

Assignment #	Description	Weight
1	Requirement specification	10%
2	Relational Model/Normalization	10%
3	Creating the database system in a DBMS	10%
4	Web Interface for the database application	10%

COURSE POLICIES:

Late Submission Policy:

Please note that the assignment submission deadline includes flexibility in the form of a 48-hour submission window (grace period). As a result, the instructor reserves the right to deny any requests for academic consideration for assignments submitted after this grace period.

If students submit their assignments beyond the 48-hour grace period, a penalty of 10% per day will be applied for late submissions, up to a maximum of 3 days. After three days, late submissions will no longer be accepted. **Please note that all due dates submitted on OWL include the 48-hours grace period.**

Self-Reported Absence:

No weight-shifting is allowed for self-reported absence; missed work will be due after a covered period.

Laboratory:

Students will work on assignments and practice questions as a part of the lab sessions. In the lab sessions, the TAs will provide clarifications, will answer questions, and provide tutorials as needed to enable the completion of the assignments.

Midterm Exam:

There will be one two-hour, closed-book midterm exam; no calculators or reference materials are permitted. As this is a designated exam, any absence requires an official Academic Consideration Request. While no make-up exams will be scheduled, students with an approved request will have the midterm's weight transferred to their final exam, making the final exam worth 60% of the total grade. Failure to obtain an approved request for an absence will result in a mark of zero for the midterm.

Final Examination:

Please note that the final exam is central to the learning objectives for this course. Accordingly, students seeking academic consideration for this assessment must provide formal supporting documentation. Students who are granted academic consideration for this assessment will be provided with the following opportunity to make up this work: The final examination will take place during the regular examination period. It will be three hours long, closed book, and only simple calculators are allowed.

Use of English:

In accordance with Senate and Faculty Policy, students may be penalized up to 10% of the marks on all assignments, tests, and examinations for improper use of English. Additionally, poorly written work with the exception of the final examination may be returned without grading. If resubmission of the work is permitted, it may be graded with marks deducted for poor English and/or late submission.

Attendance and In-Class Participation:

Your active presence in this course is highly valued, as collaboration and discussion are key to mastering the material. If you face a significant, prolonged issue that requires you to miss more than a few classes, please follow the university's formal Academic Consideration process, and we will work with you to ensure you are not disadvantaged.

FACULTY OF ENGINEERING POLICIES:

Students must familiarize themselves with the policies of the Faculty of Engineering
https://www.eng.uwo.ca/electrical//pdf/2025-UG-Policy-and-Procedures.pdf

Faculty of Engineering Policies and Procedures-Undergraduate

Absence/Late Accommodation Policy

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.

Students missing assignments/labs or examinations will report the absence by submitting Academic Consideration Request form through STUDENT ABSENCE PORTAL.

- All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline. Academic consideration may include extension of deadlines, waiver of attendance requirements for classes/labs/tutorials, or re-weighting of course requirements.
- An instructor may deny academic consideration for any assessment that is not required in the calculation of the final grade (e.g., “8 of 10 quizzes”). Assessment flexibility must be indicated on the course outline.
- An instructor may deny academic consideration relating to the timeframe submission of work where there is already flexibility in the submission timeframe (e.g., 48-hour submission window). This assessment flexibility must be indicated on the course outline.
- 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 per course. Some assessments are excluded from this policy. Please refer to the course outline to determine if documentation is required.
- Requests without supporting documentation are limited to one per term per course.
- Please note that examinations scheduled during official examination periods always require official supporting documentation.
- If a student mistakenly submits their one allowed Academic Consideration request without supporting documentation for the assessments listed above that do not require academic consideration, the request cannot be recalled and reapplied. This privilege is forfeited.

An undocumented absence is only valid for a 24-hour period, from midnight on the day specified to midnight of the following day. An appropriate use of an undocumented absence would be for an in-class assessment that takes place that day. Where the time given to complete the assessment is longer than 24 hours, an undocumented absence will not cover a student for the full time given to

complete the assessment, and flexibility considerations in submitting the assessment will override the undocumented absence.

NOTE: Forged notes and certificates will be dealt with severely. To submit a forged document is a scholastic offence (see below).

It is the student's responsibility to check the date, time and location of the Special Examination.

Religious Accommodation

When scheduling unavoidable conflicts with religious holidays, which (a) require an absence from the University or (b) prohibit or require certain activities (i.e., activities that would make it impossible for the student to satisfy the academic requirements scheduled on the day(s) involved), no student will be penalized for absence because of religious reasons, and alternative means will be sought for satisfying the academic requirements involved. If a suitable arrangement cannot be worked out between the student and instructor involved, they should consult the appropriate Department Chair and, if necessary, the student's Dean.

It is the responsibility of such students to inform themselves concerning the work done in classes from which they are absent and to take appropriate action.

Academic Integrity

In the Faculty of Engineering, we encourage students to create a culture of honesty, trust, fairness, respect, responsibility, and courage, befitting the professional degree you are pursuing.

Please visit Academic Integrity Western Engineering for more information

Academic Offences

Plagiarism means using another's work without giving credit. The university has rules against plagiarism and other scholastic offences. Western Engineering has a zero-tolerance policy on plagiarism. The minimum penalty is zero on the course work and a repeat offence will earn you zero on the course. A third offence may lead to expulsion from the university.
Scholastic Discipline for Undergraduate Students & Cheating, Plagiarism and Unauthorized Collaboration: What Students Need to Know

Students must write their reports, essays and assignments in their own words. Whenever students take an idea or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. University policy states that cheating, including plagiarism, is a scholastic offence. The commission of a scholastic offence is attended by academic penalties, which might include expulsion from the program. If you are caught cheating, there will be no second warning.

All required papers may be subject to submission for textual similarity review to commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted will be included as source documents on the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between the University of Western Ontario and Turnitin.com (http://www.turnitin.com). Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, in the relevant section of the Academic Handbook:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

Faculty of Engineering AI Policy

The use of generative Artificial intelligence (GenAI) tools won't be discouraged in the Faculty of Engineering. As we pride ourselves on building the future we can't hide from the use of GenAI tools to contribute to the understanding of the course materials. Please refer to the course outline for the GenAI policy related to each course.

GenAI tools use won't be permitted in any type of examination or other assessments where the faculty have prohibited their use. If use of GenAI tools is detected by the instructor in these instances, academic offences penalties might be imposed against the student.

Accessibility

Western is committed to achieving barrier free accessibility for persons with disabilities studying, visiting and working at Western. As part of this commitment, there are a variety of services, groups and committees on campus devoted to promoting accessibility and to ensuring that individuals have equitable access to services and facilities. To help provide the best experience to all members of the campus community, please visit the Accessibility Western University for information on accessibility-related resources available at Western.
Students with disabilities may arrange for academic accommodation at Western. For a more detailed explanation, please visit Academic Support & Engagement -Academic Accommodation.

Inclusivity, Diversity, and Respect

The Faculty of Engineering at Western University is committed to creating equitable and inclusive learning environments that value diverse perspectives and experiences. We recognize that university courses often marginalize students based on social identity characteristics such as, but not limited to, Indigeneity, race, ethnicity, nationality, ability, gender identity, gender expression, sexuality, age, language, religion, and socioeconomic status. Understanding this, we strive to facilitate equitable experiences and inclusion within the classroom by respecting and integrating multiple ways of knowing, being, and doing. Please visit the Office of Equity, Diversity and Inclusion.

I. Health and Well-Being

Health & Wellness Services – Students - Offers appointment-based medical clinic for all registered part-time and full-time students.
Mental Health Support - Provides professional and confidential services, free of charge, to students needing assistance to meet their personal, social and academic goals. Services include consultation, referral, groups and workshops, as well as brief, change-oriented psychotherapy.
Crisis Support - For immediate assistant, please visit Thames Hall Room 2170 or call 519-661-3030. The crisis clinic operates between 11:00 am - 4:30 pm. For after-hours crisis support, click here.
Gender-Based Violence and Survivor Support - "Western is committed to reducing incidents of gender-based and sexual violence (GBSV) and providing compassionate support to anyone who is going through or has gone through these traumatic events. If you are experiencing or have experienced GBSV (either recently or in the past), you will find information about support services for survivors, including emergency contacts at the following website: https://www.uwo.ca/health/student_support/survivor_support/gethelp.html To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Important Contacts

Engineering Undergraduate Services

Department of Electrical and Computer Engineering
Office of the Registrar/Student Central

Important Links

- WESTERN ACADEMIC CALENDAR
- ACADEMIC RIGHTS AND RESPONSIBILITIES
- ENGINEERING PROGRESSION REQUIREMENTS AND ACADEMIC REGULATIONS
- UNIVERSITY STUDENTS' COUNCIL (USC) - SERVICES
- IMPORTANT DATES AND DEADLINES
- ACADEMIC CONSIDERATION FOR MEDICAL ILLNESS - UNDERGRADUATE STUDENTS
- ACCOMMODATIONS FOR RELIGIOUS HOLIDAYS
- SCHEDULING OF ASSIGNMENTS, TESTS, AND EXAMINATIONS
- STUDENT FORMS
- OFFICE OF THE REGISTRAR
- RETENTION OF ELECTRONIC VERSION OF COURSE OUTLINES (SYLLABI)
- ACADEMIC APPEALS
- STUDENT ABSENCE PORTAL