

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING***SE 3309A – DATABASE MANAGEMENT SYSTEMS*****Course Outline Fall 2024**

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:

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: SE 2203A/B, SE 2205A/B.

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

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

INSTRUCTOR INFORMATION:

Name: Katarina Grolinger

Office/Office Hours: by appointment, TEB 259

Email: kgroling@uwo.ca

CONTACT HOURS:

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

Lectures occur weekly starting September 5th. Laboratory sessions occur weekly starting the week of September 16th, 2024.

LECTURE:	Lectures occur weekly starting September 5 th . Attendance is mandatory Section 001: Monday 5:30-6:30 pm Thursday 10:30 – 12:30 Section 006: Tuesday 2:30 – 3:30 Wednesday 11:30-1:30
LABS:	Laboratory sessions occur weekly starting September 16 th 2 hrs/11 times during the term One lab per assignment is mandatory. Additionally, project demonstration is mandatory. Section: 003 Wednesday 3:30 pm 004 Wednesday 7:30 pm 005 Tuesday 7:30 pm 007 Monday 8:30 am

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

RECOMMENDED/ REQUIRED SOFTWARE: MySQL

RECOMMENDED RESOURCES/REFERENCES: Course notes

GENERAL LEARNING OBJECTIVES (CEAB GRADUATE ATTRIBUTES)

Knowledge Base		Engineering Tools	D	Impact on Society	
Problem Analysis	D	Individual & Teamwork		Ethics and Equity	
Investigation		Communication		Economics and Project Mgmt.	
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: Content supporting lectures will be available on the course OWL site. The material for this course will be taught in both lectures and labs; therefore, it is important that you attend each lecture and most 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 Objectives and Specific Learning Outcomes	CEAB Graduate Attributes Indicators	Tentative Timeline	Course Requirements
1. Introduction to Database Systems At the end of this section, students will be able to:		Week 1	Group Members and Project Setup, Assignment 1 Start
<ul style="list-style-type: none"> a. 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; b. 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:		Week 2-3	Assignment 1 Due, Assignment 2 Start
<ul style="list-style-type: none"> a. Use the Entity-Relationship (ER) modeling in the conceptual database design; b. 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:		Week 3-4	
<ul style="list-style-type: none"> a. Derive a set of relations from a conceptual model. 	D4		
4. Normalization At the end of this section, students will be able to:		Week 4-5	Assignment 2 Due
<ul style="list-style-type: none"> a. Describe the purpose of normalization and undertake the process of normalization; b. Validate the set of relations using the technique of normalization. 	D2, D3		
Reading Week-week 6			

Course Objectives and Specific Learning Outcomes	CEAB Graduate Attributes Indicators	Tentative Timeline	Course Requirements
5. Relational Algebra At the end of this section, students will be able to:		Week 5-7	Assignment 3 Start Midterm
a. Form queries in relational algebra.	PA2		
6. SQL Statements: Query, Insert, Update, and Delete At the end of this section, students will be able to:		Week 8-10	Assignment 4 Start
a. Retrieve data from the database using SQL commands; b. Perform database insert, update, and delete using SQL commands.	PA3, D2, ET1, ET2, ET3		
7. SQL Data Definition, Constraints, Indexes, and Views At the end of this section, students will be able to:		Week 10-11	
a. Define integrity constraints using SQL; b. Create indexes and views using SQL	D1, D2		
8. Transactions and Triggers At the end of this section, students will be able to:		Week 11-12	Assignment 3 Due
a. Describe how ISO Transaction model works, b. Create and use Triggers.	PA2		
9. Introduction to NoSQL Databases At the end of this section, students will be able to			
a. Differentiate between traditional relational databases and NoSQL databases in terms of data models, scalability, and use cases; b. Understand and identify the primary types of NoSQL databases: Document, Key-Value, Column-family, and Graph.	ET1	Week 13	Assignment 4 Due, Project Demos

EVALUATION:

Course Component	% Worth	Assigned - tentative	Due Date - tentative	CEAB GAs ASSESSED
Homework/Laboratory Assignment 1	5%	Week 1	27/Sep/2024	
Homework/Laboratory Assignment 2	10%	Week 3	11/Oct/2024	D3
Homework/Laboratory Assignment 3	10%	Week 7	22/Nov/2024	ET1, ET3
Homework/Laboratory Assignment 4	10%	Week 9	1/Dec/2024	
Midterm Test	20%		26/Oct/2024	PA2, D2,
Final Examination	45%		Dec. examination period	PA2, D2, D3, ET1

Note that the dates listed above are **tentative** and may be adjusted if needed.

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

MIDTERM TEST

Homework/Laboratory 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	5%
2	Relational Model/Normalization	10%
3	Creating the database system in a DBMS	10%
4	Web Interface for the database application	10%

COURSE POLICIES:

Midterm Test: The midterm test is **designated as requiring supporting documentation** for absence.

There will be one midterm test. The test will be closed book (no books, notes and calculators will be allowed), with a duration of two hours.

If a student misses a midterm examination, the exam will not be rescheduled. The student must follow the Instructions for Students Unable to Write Tests and provide documentation to their department within 24 hours of the missed test. The department will decide whether to allow the reweighting of the test, where reweighting means the marks normally allotted for the midterm will be added to the final exam. If no reasonable justification for missing the test can be found, then the student will receive a mark of zero for the test.

If a student is going to miss the midterm examination for religious reasons, they must inform the instructor in writing within 48 hours of the announcement of the exam date or they will be required to write the exam.

LABORATORIES: Labs will run every week starting the week of September 16th. One lab per assignment is mandatory and all team members must attend together. During the mandatory lab, team members must discuss their assignment with TA. Additionally, project demonstration is mandatory. Absence from any mandatory session or project demonstration without permission will result in a zero assigned to the corresponding assignment.

FINAL EXAMINATION: The final exam will take place during the regular examination period.

To obtain a passing grade in the course, a mark of 50% or more must be achieved on the final examination. A final examination mark < 50% will result in a final course grade of 48% or less.

LATE SUBMISSION POLICY:

Advise the instructor if you are having problems completing the assignment on time prior to the due date of the assignment and be prepared to submit an Academic Consideration Request and provide documentation if requested by the instructor at:

<https://www.eng.uwo.ca/undergraduate/academic-consideration-for-absences.html>

If you are granted an extension, establish a due date with the instructor. The approval of the Chair of your Department is not required if assignments are completed prior to the last day of classes. Extensions beyond the end of classes must have the consent of the instructor, the department Chair and the Associate Dean, Undergraduate Studies. Documentation is mandatory.

Late Submission Policy for Assignment: There will be strict deadlines for the assignments. Marks will be deducted for late assignments. 10% per day will be subtracted for late assignments, to a maximum of 3 days late. These are group assignments: extensions for absence without supporting documentation will only apply if more than 40% of group members report absence without supporting documentation.

ATTENDANCE: Attendance is mandatory for all lectures, one lab per assignment, and demos.

ABSENCE FROM MANDATORY COURSE COMMITMENTS:

Students must familiarize themselves with the Policy on **Academic Consideration for Absences:**

<https://www.eng.uwo.ca/undergraduate/academic-consideration-for-absences.html>

I. Missed/Late Accommodation Policy

1. The Academic Consideration Request Form is available through the [STUDENT ABSENCE PORTAL](#).
2. Documentation must be provided as soon as possible. Requests for academic consideration must include the following components:
 - a. Indication of the course(s) and assessment(s) affected by the request
 - b. Medical note, and
 - c. Additional supporting documentation as relevant
3. Requests for academic consideration without a medical note or other supporting documentation may be accepted once per term, per course.
4. Undocumented absences cannot be used for examinations scheduled by the Office of the Registrar during official examination periods (including take-home final exams and December mid-year exams for full courses) and practical laboratory and performance tests typically scheduled in the last week of the term. Undocumented absences also cannot be used for the “designated assessment” in each course. When flexibility in assessment exists and is clearly stated on the course outline, both undocumented absences and academic consideration requests with documentation may be denied.
5. Forged notes and certificates will be dealt with severely. To submit a forged document is a scholastic offence.

II. Exam Accommodation

1. If you are unable to write a final examination, report your absence using the Academic Consideration Request Form through [STUDENT ABSENCE PORTAL](#).
2. Be prepared to provide the Undergraduate Services Office with supporting documentation (see next page for information on documentation) the next day, or as soon as possible (in cases where students are hospitalized). **The following circumstances are not considered grounds for missing a final examination or requesting special examinations: common cold, headache, sleeping in, misreading timetable and travel arrangements.**
3. In order to receive permission to write a Special Examination, you must obtain the approval of the Chair of the Department and the Associate Dean and in order to apply you must submit an the Academic Consideration Request Form through [STUDENT ABSENCE PORTAL](#).

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

III. LATE ASSIGNMENTS

IV. Medical Accommodation

1. Requests for Academic Consideration Request Form through [STUDENT ABSENCE PORTAL](#).
2. Requests for academic consideration must include the following components:
 - a. Self-attestation signed by the student (*This is only accepted for the first/one absence*)
 - b. Medical note. Forged notes and certificates will be dealt with severely. To submit a forged document is a scholastic offence.
 - c. Indication of the course(s) and assessment(s) affected by the request
 - d. Supporting documentation as relevant
3. Requests without supporting documentation are limited to one per term per course.
4. **Students must request academic consideration as soon as possible and no later than 48 hours after the missed assessment.**
5. Once the request and supporting documents have been received and reviewed, appropriate academic consideration, if granted, shall be determined by the instructor in consultation with the academic advisor, in a manner consistent with the course outline.

Academic consideration may include extension of deadlines, waiver of attendance requirements for

classes/labs/tutorials, or re-weighting of course requirements. Some forms of academic consideration, such as arranging Special Examinations, assigning a grade of Incomplete, or granting late withdrawals without academic penalty, may only be granted by the Academic Advising office of the Faculty of Registration.

6. **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.
7. **An instructor may deny academic consideration relating to the timeframe submission of work where there is already flexibility in the submission timeframe** (e.g., 72-hour submission window). This assessment flexibility must be indicated on the course outline.

V. **Religious Accommodation**

When scheduling unavoidably 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.

VI. **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](#)

VII. **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

VIII. 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. However, the use of GenAI tools in any assignment or contribution during the course will have to be disclosed, as a resource.

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.

IX. Use of English Policy

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 except for 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.

X. 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](#).

XI. 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](#).

XII. 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 assistance, 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](#) and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced gender-based or sexual violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts, [here](#). To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Important Contacts

Engineering Undergraduate Services	SEB 2097	519-661-2130	engugrad@uwo.ca
Electrical and Computer Engineering	TEB 279	519-661-2111 x86264	eceugrad@uwo.ca
Office of the Registrar/Student Central	WSSB 1120	519-661-2100	

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](#)