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Introduction to Databases: CS3319

(Fri Sep 01, 2023 12:00 AM - Sat Jan 13, 2024 12:00 AM)

Western University

London Ontario

Department of Computer Science

CS3319a & CS3120a & Digital Humanities 3320a cross-listed with CS9159a/b

Introduction to Databases

Course Description - Fall 2023

1. COURSE INFORMATION

- This course introduces student to database management systems. The course discusses how to design a relational database for a real application. Design of good relational tables is followed by the use of these tables. The standard SQL data manipulation language will be used. Following the logical design phase, we discuss issues of physical storage structures and indexes. Finally, issues of backup and recovery, concurrency control and data distribution will be introduced.
- The intent is to prepare students to design a useful database for a small enterprise. Students should have a basic grounding in all the fundamentals of programming and slight UNIX knowledge.
- This year the course will be blended again (it was blended before the pandemic). The lectures are all videos which you must watch online on your own time. We will only meet as a class every TWO weeks to work on in-class practice exercise questions (FLIPPED CLASSROOM STYLE). Students should come to the very first lecture where we go over how the course will be run. Students MUST come to the 5 scheduled flipped classroom dates well-prepared (i.e. have watched the video lectures and completed the required quiz) but are not required to come to class at any other time. Marks are given towards your final grade for attending these flipped classroom sessions!

Prerequisites: Computer Science 2210A/B and Computer Science 2211A/B OR Computer Science 2121A/B OR Digital Humanities 2221A/B OR enrollment in the MDA program

Antirequisites: Software Engineering 3352A/B

- Unless you have either the prerequisites for this course or written special permission from your academic counsellor, you will be removed from this course. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

2. INSTRUCTOR INFORMATION

- Name: Laura Reid
 - Office: Middlesex College 416
 - Office Hours: Mondays: 1pm-2pm and Wednesday: 10am-11am, other times by appointment. My office hours will both be in-person and/or via zoom.
 - Email: lreid@csd.uwo.ca
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3. SCHEDULE AND DELIVERY MODE

Lecture Topics:

- **Week 1 Topics**- Introduction, ER Diagrams
- **Week 2 Topics**- Network Model, Hierarchical Model, Relational Model
- **Week 3 Topics**- Physical Data Access Methods --> Hashing Techniques, Indexes
- **Week 4 Topics**- Relational Algebra
- **Week 5 Topics**- SQL and Setting Up Your Virtual Machines
- **Week 6 Topics**- Relational Calculus, QBE, Converting EER Diagrams to the Relational Model
- **Week 7 Topics**- MySQL, PHP, JavaScript, HTML, CSS - Assignment 3 Information
- **Week 8 Topics**- System Catalog, Database Security, Triggers and Stored Procedures
- **Week 9 Topics**- Functional Dependencies and Normalization and Query Optimization
- **Week 10 Topics**- Transaction Processing, Concurrency Control, Recovery Techniques
- **NOTE: the above schedule is subject to change depending on timing.**

Class Times and Location:

- All lectures are recorded and online. In Owl, select **Week By Week** along the left side and select each week to watch the lecture videos.
- You must come to class the dates of the five blended classes. Attendance is mandatory. See dates of the 5 flipped classes below. They will be held Tuesdays, 10:30am till 12:30pm in Middlesex College Room 110.
- The 5 QUIZZES are roughly every other Monday. The Owl quiz will be open from 10AM till NOON. You will get about 30 minutes to complete the Owl quiz. SEE DATES BELOW.

TA Consulting Hours:

- To Be Announced

4. COURSE MATERIALS

- **Suggested Textbook:** Fundamentals of Database Systems, Seventh Edition. Elmasri & Navathe, Addison-Wesley Publishers, 2011. (The Fifth or Sixth Edition is also OK, as the chapters we use have not changed much, they've just moved the chapters around.) Here is a link from the book store to the latest edition: https://bookstore.uwo.ca/textbook-search?campus=UWO&term=W2022A&courses%5B0%5D=200_UW/CSC3319A This book is not required but it is great because it will help you with the trickier topics of relational algebra and calculus AND it should be helpful if you take the advanced database course as it covers a lot more than we will do in this course. Finally, it is a great resource once you are working in industry.
- **Lecture Notes:** See OWL

Course Website:

- See OWL - Please check the announcements section of OWL and your email at least every 48 hours: ***It is your responsibility not to miss any announcements or class emails.***

Required Software:

You MUST purchase (roughly 20 dollars) a subscription to <https://www.kritik.io/> in order to participate in the peer marking. **THIS IS A REQUIRED PURCHASE.** You may not take the course without making this purchase as you will not be able to complete part of each assignment without this software.

5. METHODS OF EVALUATION

Student Evaluation and Schedule:

Evaluation Description	Weight	Due Date and Time	Valid Academic Counsellor Approved Reason (ACAR): Contact them here
Assignment 1 Concept assignment. Use Draw.io or MS Visio. Then it must be scanned (or you could take photos with a digital camera/phone of each page and put the photos together into one pdf file) and then it must be submitted via OWL	9%	11:55pm, Friday, October 6 (worth 80%) and Peer Marking Evaluation Stage is open between October 10-12 (worth 15%) and Feedback Stage is open on October 13 (worth 5% - 1 day only)	If you use a ACAR you will get a 48 hour extension from the original due date. If your academic counsellor advices, you might get more than 48 hours for an ACAR
Assignment 2 Building a database at the command prompt, writing SQL statements and running them. Scripts submitted to OWL.	11%	11:55pm, Friday, October 27 (worth 80%) and Peer Marking Evaluation Stage is open between Oct 31 -8 (worth 15%) and Feedback Stage is open on Nov 9 (worth 5% - 1 day only)	If you use a ACAR you will get a 48 hour extension from the original due date. If your academic counsellor advices, you might get more than 48 hours for an ACAR
Assignment 3 Building a database, writing JavaScript and PHP to connect to the database. Code submitted to OWL.	16%	11:55pm, Friday, November 24 (worth 80%) and Peer Marking Evaluation Stage is open between Nov 28-Nov 30 (worth 15%) and Feedback Stage is open on Dec 1 (worth 5% - 1 day only)	If you use a ACAR you will get a 48 hour extension from the original due date. If your academic counsellor advices, you might get more than 48 hours for an ACAR
Virtual Machine Setup	1%	11:55pm, Wednesday, October 11	If you use a ACAR, the weight of the Virtual Machine Setup will move to the final exam. Note though --> you still must do this assignment at some point because you need the Virtual Machine for assignments 2 and 3.
PHP Setup	1%	11:55pm, Sunday, October 22	If you use a ACAR, the weight of the PHP Setup

to your database - CANNOT BE LATE

will move to the final exam. Note though --> you still must do this assignment at some point because you need the Virtual Machine for assignment 3.

5 Quizzes	Multiple choice short (about 20-30 minutes) quizzes that review the previous 2 weeks worth of material	12% (each worth 3% - I will drop the lowest quiz)	The Monday class BEFORE the Flipped Classroom Sessions classes (available from 10:00 AM till NOON on the following Monday class times Sept 18, Oct 2, Oct 16, Nov 6, Nov 20)	If you use a ACAR, the weight of the missed quiz will move to the final exam.
5 Flipped Classes	You are required to come to 5 classes and you will be put into groups of 3. Your group of 3 must complete a worksheet and mark another group's worksheet. The 5 dates that you are required to attend the flipped classroom meetings are: 10:30am - 12:20pm are given to the right. Attendance is MANDATORY for these 5 dates!	10% (each worth 2%)	Tuesday, September 19, Tuesday October 3, Tuesday, October 17, Tuesday, November 7 and Tuesday, November 21 at 10:30am-12:20pm	If you use a ACAR, the weight of the missed flipped classroom will move to the final exam.
Final Exam	Short Answer/Multiple Choice, 1 Review Sheet allowed during the exam.	40%	TBA	Not applicable

Note: This schedule/weighing is subject to change.

Exam and Quiz Information:

Final Exam Info:

- Time, Date and Room: TBA
- Students are allowed to bring in one 8 1/2 by 11 inch review sheet that has writing on both sides (typed or handwritten, either is fine).
- Students must get at least 30% on the final exam to pass the course and at least 40% on the final exam to get over 60% in the course.

Quiz Rules:

- There are 5 Quizzes: Each will be a multiple choice/fill-in-the blank Owl quiz.
- The quiz will be given the day before the flipped classroom to ensure that you arrive at the flipped classroom prepared and ready to contribute to your group during the flipped classroom.

- The quizzes will be open (available for you to complete) on the given Monday above between 10AM and Noon.
- The quizzes should take approximately 30 minutes, you MUST be done the quiz by 11:55am, so make sure you have started it by about 11:25am.
- Once you start the quiz, you have 30 minutes from the start time.
- The quiz will be delivered online via OWL.
- Each quiz is worth 3%
- Your lowest quiz score will be dropped
- If you miss a quiz without reason (i.e. it was not approved by your academic counsellor), you will receive 0
- If you have a valid reason (approved by your academic counsellor) for missing a quiz, you will receive whatever mark you get on the final exam as the mark for the missed quiz.

Group Work Information:

You may pick a group of 3 for this course using Owl or you may select a random group via Owl. Each random group will be open till 3 people join it. This will be your group for the entire term.

Flipped Class Rules (done in groups of 3):

- Each flipped classroom is worth 2% of your final grade.
- You will be put into random groups of 3 via Owl or you can create a group with your friends. This will be your group for the entire term. MDA 9159 students MUST work together (you must be in the a group with other MDA students)
- There are 5 flipped classrooms, approximately one every 2 or 3 weeks. See dates above.
- These 5 dates are the ONLY dates where we will meet together in the classroom except for the very first class where we will go over things. All other work (lecture videos, assignments, quizzes) is done on your own time.
- Make sure you have your laptop ready (charged with Internet access) and make sure you have your cell phone ready as backup
- You will be given ONE worksheet PER group. Your group must answer the questions on the worksheet.
- After an allotted amount of time, groups will switch work with other groups and we will mark the work together.
- Upon leaving the classroom, you will submit in Owl AND hand in your worksheet to the teacher so that your groups receives the grade for this flipped class
- If you have a valid reason (approved by your academic counsellor) for missing a flipped classroom, you will receive whatever mark you get on the final exam as the mark for the missed flipped classroom. IN THIS CASE THOUGH, PLEASE NOTE that it is MUCH easier to get 100% on the flipped classes than it is on the final exam, so it is worth your time and effort to attend every flipped class. Your final grade in the course will be better if you attend the flipped classes

Assignment Information:

- **Handing In Assignments:** All assignments are to be submitted using OWL, assignment instructions will contain submission details.
- **Late Assignment Policy for the 3 individual assignments:**
 - 5% per day late will be deducted; no assignments more than 3 days late will be accepted.
 - **NO** reasons are ever considered for late assignments except for notifications from the Academic Counsellor in your Dean's Office. If you have a reason that your Counsellor validates you STILL must do the assignment but you will be given a bit more time.

- System problems near or after the due date are NEVER considered as grounds for an extension (i.e. during the 3 days during which you can still hand in a late assignment)
- **NEW THIS YEAR: Late coupons.** Each student will have 3 late coupons for this course. If you feel like you can't hand in an assignment on time because you are overwhelmed with work, you can use a late coupon to give you one more day with no penalty.

Notes about the late coupons:

- A late coupon can only be used during the 3 late allowable days. You cannot, for example, use a coupon on the third (last) late day and expect to hand in your assignment on the fourth day after the due date. All assignments must be submitted within 3 days for the due date regardless of late coupons!
 - You cannot use the late coupon on the peer marking portion of the assignment, you may just use your coupons for the creation portion of the assignment.
 - If you plan to hand in assignment 1 three days late, you may use all 3 coupons on assignment 1, but keep in mind that that will mean that you now have 0 coupons left for assignment 2 and 3 so you might want to not use them all at once and save them.
 - You may only use the coupons on the 3 assignments, you may not use them on the quizzes nor on the workshops nor on the flipped classrooms.
 - In Owl, go to Tests and Quizzes to submit a late coupon for the assignment you wish to claim it on. The late coupon quiz will open immediately after the due for each assignment and stay open till 3 days after the due date and ask you how many coupons you plan to use (up to a max for the course). Once you have used all 3, they are gone even if you attempt to submit more.
 - The number of late coupons you have left can be found in gradebook. Keep in mind though that it will take the instructor a few days to update this gradebook item after each assignment because she has to do it manually.
 - If the late coupon policy is unclear, please discuss this with the instructor.
- **Cheating Policy:**
 - The first time you are caught cheating on an assignment, you will receive 0% for the assignment AND the Dean of Science (and, if you are not a Science student, your Deans office) will be notified. The Dean will mark this offence in your file. The second time you are caught cheating you will be removed from the course, and the Dean of Science will be notified again and more severe consequences (such as being removed from the university) will be applied. It is better to hand in a partially finished assignment or a late assignment and get some marks than to cheat and get 0.
 - Giving your code to someone else is considered as much a violation of the cheating policy as taking code from someone so NEVER give your code to another student and protect your code (don't leave memory sticks lying around in the labs, etc.)
 - Working together is encouraged as it promotes learning, so you can help or ask other students for help, just never ever cut/copy and paste code, always discuss and explain but do not email/give code to ANYONE!.
 - **Extensions:**
 - Extensions may be granted only by the course instructor, not the t.a.s. Extensions will only be given if we hear from your Academic Counsellor. If you have serious medical or compassionate grounds for an extension, you should follow the procedure for Academic Consideration for Medical Illness as given below.

Assignment Marking - PEER MARKING

Assignments --> We will be doing peer marking this year using the system: <https://www.kritik.io/> You must register with kritik.io in order to take this course. Each of the 3 assignments will be peer marked. The peer marking will give you a deeper understanding of the components. Your professor will supply you with an

answer key for each assignment and a rubric. Peer marking has 3 stages: 1. Creation stage where you do your actual work 2. Evaluation Phase where you mark 5 or 6 of your peers assignments and 3. Feedback stage where you review the feedback given to you by the 5 people who marked your assignment.

CREATION STAGE (Worth 80% of your assignment grade): The instructions for each of the 3 assignments are posted in Owl. You do your own work and then submit your work to kritik.io (not to Owl) by the due date. You can submit up to 3 days after the due date but you will lose 5% per day (unless you use a Late Coupon - see above). NOTE: you can see the rubric in kritik.io BEFORE each assignment is due.

EVALUTION STAGE (Worth 15% of your assignment grade, 10% for how well you follow the rubric compared to your peers and 5% for your peer's opinions of your written comments): Kritik.io will assigned you 5 or 6 other random anonymous student's assignments to mark. You have 3 days to mark the 5 - 6 other students assignments (it should take less than 15 minutes to mark each assignment). You do NOT get extra time to do the marking (there is no extension for the peer marking) so if you don't complete your marking of the 5 - 6 assignments, you will lose roughly 10-15% of your overall assignment mark. The peer marking is considered part of the assignment and is required work. Your mark for the portion representing your work will be the average of the five students who marked your assignment.

FEEDBACK STAGE (Worth 5% of your assignment grade). You will also have to give feedback to the 5 students who marked your assignment. You have ONE day to give the feedback (this part should take less than 5 minutes). You will only see the written comments they gave you, not the actual mark. You see your overall mark AFTER you submit the feedback. During the feedback stage you rank each of your peers written comments on sliding scales. The feedback mark can also NOT be late. This will also be included in your mark (about 5%).

AFTER YOU RECEIVE YOUR MARK: You are responsible for checking your overall assignment mark in kritik.io You will get 4 days to dispute the non-subjective items on the rubric by the peer markers, after you receive your mark from kritik.io. During these 4 days the teaching assistants and/or profs will check the disputes and fix any mistakes in marking. Then the kritik.io assignment marks will be finalized. Once it is finalized, any requests for remarks will not be granted. Once your grade is uploaded to Owl, you have 3 days to email your professor if you still have a question about your peer marking or feedback grade. But your creation grade will not adjusted after the dispute stage is over.

REMEMBER: No excuses for missed quizzes, late assignments, missed flipped classes or missed exams will be accepted under any condition without official notice from the Dean of Science's office.

ACCESS TO LAB ROOMS IN MIDDLESEX COLLEGE

After-hours access to Computer Science lab rooms is by student card. If a student card is lost, you will need to visit the Student Services Building to obtain a replacement. As of 2018, the cost for a replacement card is \$25.

More information is available

at https://www.registrar.uwo.ca/services/western_onecard_and_photo_standards.html

Students enrolled in Computer Science courses will be granted access to the labs within 7 days of enrollment.

If you do not have access to the labs after 7 days, please open a ticket with Science Technology Services at <https://helpdesk.sci.uwo.ca>.

EMAIL CONTACT

We will occasionally need to send email messages to the whole class or to students individually. Email will be sent to the Western email address assigned to students by Information Technology Services (ITS). It is each student's responsibility to read this email on a frequent and regular basis, or have it forwarded to an alternative email address if preferred. See the ITS web site for directions on forwarding email. You are responsible for checking your email at least every 72 hours as this will be instructors main method of communicating with the students outside of lectures.

However, you should note that email at ITS (your Western account) and other email providers such as hotmail.com or yahoo.com may have quotas or limits on the amount of space they can use. If you let your email accumulate there, your mailbox may fill up and you may lose important email from your instructors. Losing email that you have forwarded to an alternative email address is not an excuse for missing out on important information.

You are encouraged to contact the course instructor via email, with brief, email appropriate questions regarding lecture material or clarification of assignments. However, please check the course web site for answers to frequently asked questions, or to see if the information is already there, before emailing the instructor.

Note: You must send email from your Western account, and start the subject line with **CS3319** followed by whatever else you want to put in the subject line. Other email may be filtered out. Please send email in plain text format.

6. Student Absences

We have implemented the following rules/policies to help you manage the workload and absences:

Quizzes

- Your lowest quiz mark will be dropped so you can miss one quiz with no penalty
- If you miss a quiz without reason (i.e. it was not approved by your academic counsellor), you will receive 0 (but remember, if that is the only quiz you miss, it will NOT affect your mark because we drop your lowest quiz mark)
- If you have a valid reason (approved by your academic counsellor) for missing a quiz, you will receive whatever mark you get on the final exam as the mark for the missed quiz.

Assignments (the 3 main assignments)

- If you cannot hand the assignment in on time, you have 3 late coupons for the term. See above (under Assignment Information) to understand how the late coupons work
- If you have a valid reason (approved by your academic counsellor) for handing in an assignment late, you will get 48 more hours from the original due date unless your counsellor recommends more time. If you have a valid counsellor approved reason, you do NOT need to use any of your late coupons.

Flipped Classrooms

- If you miss a flipped classroom without reason (i.e. it was not approved by your academic counsellor), you will receive 0
- If you have a valid reason (approved by your academic counsellor) for missing a flipped classroom, you will receive whatever mark you get on the final exam as the mark for the missed flipped classroom.
- NOTE: the flipped classes are an integral part of the learning in this course, so we want you to show up to all 5 required classes, thus we do NOT drop your lowest flipped class mark. Please make every effort to

show up at all the flipped classes.

Final Exam

- If you miss the final exam without reason (i.e. it was not approved by your academic counsellor), you will fail the course (because you must get over 30% on the exam to pass the course)
- If you have a valid reason (approved by your academic counsellor), the makeup exam will be offered in early January. If you miss that makeup exam (again with another valid reason approved by your counsellor), you will write the makeup exam the next time the course is offered (December of 2023).

For further information on Academic Considerations please consult the University's medical illness policy at: https://uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration.pdf

7. Accommodation and Accessibility

Religious Accommodation

When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at <https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>.

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.

8. Academic Policies

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

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 e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at their official university address is attended to in a timely manner.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

9. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, 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. You may also wish to contact Accessible Education at http://academicsupport.uwo.ca/accessible_education/index.html if you have any questions regarding accommodations.

Learning-skills counsellors at the Student Development Centre (<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/>.
