CS 5200: Database Management Systems Syllabus & Policies

Required Textbooks

Database Systems
A practical approach to design, implementation and management (6th edition)
Thomas Connolly and Carolyn Begg

Murach's My SQL by Joel Murach (2nd or 3rd edition preferred)

Course Prerequisites

None

Course Description

This course presents the database design process practiced when creating a relational database; it also presents the relational database management system's architecture as well as the fundamental ACID properties of a relational database management system. Extended entity-relationship models will be generated and represented using the   Unified Modeling Language (UML) notation. Relational algebra and its relationship to the SQL language will be presented. Advanced topics include triggers, stored procedures, indexing, and fundamentals of transactions, concurrency and recovery. The course will also include an introduction to NoSQL databases and provide students the opportunity to compare SQL to NoSQL. Mongo DB functionality and architecture will be reviewed. Students will define a database project that includes the design and implementation of a database as well as an application for interacting with the database.

Course Outcomes
Upon completion of this course, a student will be able to:

Define an extended entity relationship diagram given a textual description of a data domain, model representation includes the Unified Modeling Language (UML) as well as MySQL EER modeling tool.
Represent SQL queries with relational algebra operations
Convert relational algebra expressions into SQL commands
Write complex SQL queries, SQL functions, SQL triggers   and SQL procedures
Connect a computer application to a commercial relational database (MySQL) and access and manipulate data from the database within the application
Act as database administer to a MySQL server, using basic shell commands for a chosen operating system
Describe the architecture of a RDMS and the importance and implementation of the ACID properties
Describe algorithms that implement transaction scheduling and database recovery mechanisms

Describe the strengths and the weaknesses of both the SQL and NoSQL DBMS

Programmatically access data stored in a Mongo Database

Describe the CAP theorem that is fundamental to NoSQL databases

Learning Assessment and Point Distribution

Homework (30%)
    10 assignments
Tests (50%)
    3 Tests
Project (18%)
Participation via canvas class discussion and piazza discussion (2%)

Homework

All homework assignments and project milestones must be submitted through canvas (Links to an external site.). No submissions will be accepted via email. One homework assignment may be late without a late penalty, it however, must be submitted within a week of the due date. All other assignments must be submitted by the assignment's deadline in order to receive full credit for the assignment. The late penalty is 10% for each day late.

Tests

The tests occur, on average, every four weeks (2 weeks in an accelerated semester). If you miss a test, you must contact the instructor before the test is administered. Makeup tests must be scheduled within 1 week of the administered test. Makeup tests will only be granted for serious conflicts. An interview for a coop is not an accepted excuse for a makeup exam. Tests are conducted during the class time through canvas. Each exam is 100 minutes and is administered at the start of the scheduled class. You must be present in class to complete the exam. The exams are open notes but given the time restriction of the exam, you are encouraged to study for the tests as if they are a closed note exam.

Course Lecture

This course, or parts of this course, may be recorded for educational purposes. These recordings will be made available only to students enrolled in the course, instructor, and any teaching assistants assigned to the course. If you do not wish to be in the video, then please keep your camera off and ask any questions you may have in the chat room in Teams.

Participation/Discussion Board

Questions on course content should be directed to piazza. On piazza you can ask your fellow students and the staff questions on course content and logistics.

When a student has a question or an interesting discussion point topic, students are expected to:

Post their questions in the discussion forum for that topic

Respond or comment on other students' posts

Check the discussion thread before seeking help from the instructor or teaching assistants

2% of your final grade is allocated to class participation, so students who do not contribute to course discussion, or the piazza discussions will not receive full credit for this portion of the course.

Communication

Communication between instructor and students is through:

E-mail via the Canvas distribution list; please ensure class communication does not end up in your spam folder

Announcements posted in canvas

Questions, answers, and notes posted on the discussion forum or the web site

Private email exchanges, although such exchanges should be reserved for private communication and not questions about course content, materials, assignments, or tests

Here is the piazza signup link:

piazza.com/northeastern/spring2022/cs520031285

Collaboration

Students may discuss assignments with other students in the class, although all of the work submitted for grading must be the student's own, and may not be copied in whole or in part from anyone.

Accommodations for Students with Disabilities

If a student has a disability-related need for reasonable academic accommodations in this course and has not yet met with a Disability Specialist, then visit www.northeastern.edu/drc   (Links to an external site.)and follow the outlined procedure to request services.

If the Disability Resource Center has formally approved an academic accommodation in this class, the student must present the instructor with a "Professor Notification Letter" during the first week of the semester, so that the instructor can address specific needs as early as possible.

Any requests for taking an exam or quiz at the Disability Resource Center must be received by the instructor in writing at least seven (7) days prior.

Academic Integrity Policy

The University views academic dishonesty as one of the most serious offenses that a student can commit while in college and imposes appropriate punitive sanctions on violators.

Students are expected to read and understand the Northeastern University Academic Honesty Policy

found here. (Links to an external site.) In general, unauthorized collaboration is any collaboration that has not been specifically authorized. However, in this course we specifically list any form of file sharing as unauthorized.

Any form of cheating or sharing of files or assignments (whether receiver or provider) will result in a grade of 0 for that assignment, a report to OSCRR, and a full letter reduction in the final grade.

Late Homework Submissions
10 percentage points will be deducted from assignments for each day that they are submitted late. Exceptions to this rule will only be granted for a valid medical excuse accompanied by a doctor's note. Any homework that is submitted more than five days past the due date will not receive any credit. One assignment may be submitted late without a penalty. However, it must be completed within 7 days of the assignment's due date.

Rules for exams
All exams will be open notes and will be 100 minutes in length.   You must state your answers in your own words and not copy answers directly from the content. The exams will be available in canvas on a specific day. You must complete the exam by yourself. No collaboration is allowed.

Grading Scale
Final semester letter grades will be awarded according to the scale below, where X is the final numerical grade:
X >= 95   A
90 <= X < 95 A-
87 <= X < 90 B+
83 <= X < 87 B
80 <= X < 83 B-
77 <= X < 80 C+
73 <= X < 77 C
70 <= X < 73 C-
67 <= X < 70 D+
63 <= X < 67 D
60 <= X < 63 D-
X < 60   F