CS5200: Database Design Course Syllabus & Policies

**Books**

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

Murach’s My SQL by Joel Murach (2nd edition) *-****Recommended-***

**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. The extended entity- relationship model and normalization will be used in designing relational schemas. Relational algebra and its relationship to the SQL language will be presented. Advanced topics include triggers, stored procedures, indexing, query plan representation, elementary query optimization, 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 work in groups to 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

**Assignments**

All homework assignments and project milestones must be submitted through Blackboard. No submissions will be accepted via email. One homework assignment may be late without a late penalty. 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.

**Late Submissions**

10% 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 4 days past the due date will not receive any credit.

**Quizzes**

The Quizzes are given on a weekly basis. If you know that you are going to miss a quiz, you must contact the instructor before the quiz is administered. Makeup Quizzes will only be granted for documented illness or sports participation.

All quizzes will be closed notes and will be 60 minutes in length. They will be conducted at the beginning of classtime.

**Participation/Discussion Board**

Communication occurs primarily through piazza where students are expected to a) post their questions and b) respond to or comment on others' posts. Private email exchanges with the instructor should be reserved for private communication and not questions about course content, materials, assignments, quizzes and the like.

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

**Attendance**

While attendance at lectures is strongly suggested and imperative for successful learning, it is not mandatory and no course credit is given for attendance. However, 2% of the grade is allocated to class participation, so students who do not contribute to the classroom discussion or to piazza discussions will not receive full credit for this portion of the course.

**Learning Assessment and Point Distribution**

* Homework (24%) - 7 assignments
* Quizzes (50%) - 5 Quizzes
* Project (24%)
* Participation via class discussion and piazza discussion (2%)

**Communication**

* *Blackboard* will be used for general announcements.
* Private *email* exchanges should be reserved for private communication
* *Piazza* for questions/discussions about course content, assignments, or quizzes

**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.

*Conflicts with University-Sponsored Activities*

From the Catalog:

"Participation in University-sponsored activities, where the students are representing their University ... may cause absences from class that qualify as excused absences [ which] are not subject to penalty, and missed work may be satisfied through agreement between the students and the instructor." Work is assigned well in advance for students to complete the work on time. Exams that do conflict with university-sponsored events can be rescheduled, please contact the instructor if you need accommodations.

*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 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 (3) 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. 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.

**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