



DAMG 6210: Data Management and Database Design

Course Information

Course Title: **Data Management and Database Design**

Course Number: DAMG 6210

Term and Year: SPRING2025

Credit Hour: 4

CRN:

Course Format: On-Ground

Instructor Information

Full Name: Naveen Kuragayala

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Office Hours: By Appointment

Instructor Biography

A renowned data professional with over 20+ years of experience in the field. expertise in areas such as data migrations, data processing, data analysis, visualization and integration. worked with organizations across various industries, such as healthcare, e-commerce and finance helping them design and implement robust data management solutions. In my courses I facilitate real-time use cases. I focus more on core areas such as database management systems, data modeling methodologies, SQL programming languages, Data warehousing Architectures, Data Engineering and Data Analytics.

Teaching Assistant Information

Refer to canvas for TA details

Course Prerequisites

N/A

Course Description

Studies design of information systems from a data perspective for engineering and business applications; data modeling, including entity-relationship (E-R) and object approaches; user-centric information requirements and data sharing; fundamental concepts of database management systems (DBMS) and their applications; alternative data models, with emphasis on relational design; SQL; data normalization; data-driven application design for personal computer, server-based, enterprise-wide, and Internet databases; and distributed data applications.

This course provides insights from a data perspective for engineering and business applications; data modeling, Relational Algebra, including entity-relationship (E-R) and object approaches; user-centric information requirements and data sharing; fundamental concepts of database management systems (DBMS) and their applications; alternative data models, with emphasis on relational design; SQL; data

normalization; data-driven application design for personal computer, server-based, enterprise wide, and Internet databases; SQL Injection and distributed data applications.

Course Learning Outcomes

- 1) **Understand Data Modeling Principles:** Students will be proficient in data modeling techniques, including entity-relationship (E-R) and object-oriented approaches, to design effective information systems for engineering and business applications.
- 2) **Master Relational Database Concepts:** Students will gain a comprehensive understanding of fundamental concepts of relational database management systems (DBMS), relational algebra, SQL, and data normalization; and be able to apply these concepts to design and implement relational databases. In depth SQL topics will be covered in this course.
- 3) **Design Data-Driven Applications:** Students will be equipped with the skills to design data-driven applications tailored to various computing environments, including personal computer, server-based, and Internet databases.

Course Textbooks

Database Systems Design, Implementations and Management

By Carlos Coronel, Steven Morris, Peter Rob.

Database Management Systems

by Raghu Ramakrishnan, Johannes Gehrke

Required Tools

Oracle SQL Developer

Oracle SQL Data modeler / Navicat

Required Software

Oracle Autonomous Database (License key will be provided)

SQL Server Developer edition Local installation

Course Schedule/Topics Covered

Week	In Class Topic
1	Course Overview Introduction to DBMS Client - Server Architecture overview Why SQL and NoSQL Databases
2	Codd's Rules Why Data modeling Data models Entity & Attribute Relationships Documents expected for Project Delivery
3	Normalization and SQL Introduction
4	Relational Algebra, Design Implementation using SQL High level architecture, SDLC, DML, Constraints,

	Data dictionary, DML, Views, MAT Views, User Grants and Permissions
5	Aggregation, Grouping data sets, Architecture high level, Exercise workshop
6	Date functions, Analytical functions, demo, Temporary tables (Global and Local) Why Data warehouse and its purpose
7	Mid-Term E-R diagram reviews
8	PL/SQL, ETL vs ELT, Bulk Loads importance, Introduction to Indexes
9	CAP Theorem, OLTP, Data-warehouse concepts and why we need,
10	Business Intelligence Intro, Centralized vs Decentralized
11	Performance tuning, Intro to Advance topics
12	Indexes and Performance tuning, Types of database locks and its implementation
13	Workshop on performance tuning
14	Security, SQL Injection
15	Project Demos
16	Final Exam

Assignment Grading

Assessment – Tentative	Allocation %
Weekly Assignments and Quizzes(Theory, SQL and PL/SQL based)	40%
2 Exams MCQ based (Multiple choice questions)	30%
Project – Team submission	30%

Grading Scale

Grades scored %	Grade
94% and 100%	A
90% and < 94%	A-
87% and < 90%	B+
84% and < 87%	B
80% and < 84%	B-
77% and < 80%	C+
74% and < 77%	C
70% and < 74%	C-
0% and < 70%	F

Attendance/Late Work Policy

Attendance Policy

Students registered in MGEN courses (INFO, CSYE, and DAMG) are allowed **a maximum of 2 absences per course, with 3 or more absences resulting in an automatic 'F' for that course.** Students are expected to inform their instructors of any absences in advance of the class; if a student is sick long-term or experiences a medical issue that prevents class attendance, it is strongly encouraged that they speak with their Academic Advisor (coe-mgen-gradadvising@northeastern.edu) to learn more about the Medical Leave of Absence. Should a student anticipate being unable to attend 3 or more classes, they should discuss their situation with their Academic Advisor to explore other types of leave in accordance with the University's academic and global entry expectations. International students should review the Office of Global Services webpage to understand their visa compliance requirements.

Teaching Assistants (TAs) or Instructional Assistants (IAs) will be present at each class to collect student attendance.

Late Work Policy

Students must submit assignments by the deadline in the time zone noted in the syllabus. Students must communicate with the faculty prior to the deadline if they anticipate work will be submitted late. Work submitted late without prior communication with faculty will not be graded.

End-of-Course Evaluation Surveys

Your feedback regarding your educational experience in this class is particularly important to the College of Engineering. Your comments will make a difference in the future planning and presentation of our curriculum.

At the end of this course, please take the time to complete the evaluation survey at <https://neu.evaluationkit.com>. Your survey responses are **completely anonymous and confidential**. For courses 6 weeks in length or shorter, surveys will be open one week prior to the end of the courses; for courses greater than 6 weeks in length, surveys will be open for two weeks. An email will be sent to your Northeastern University Mail account notifying you when surveys are available.

Academic Integrity

A commitment to the principles of academic integrity is essential to the mission of Northeastern University. The promotion of independent and original scholarship ensures that students derive the most from their educational experience and their pursuit of knowledge. Academic dishonesty violates the most fundamental values of an intellectual community and undermines the achievements of the entire University.

As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, examinations of whatever kind, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Students are responsible for learning the conventions of documentation and acknowledgment of sources in their fields. Northeastern University expects students to complete all examinations, tests, papers, creative projects, and assignments of any kind according to the highest ethical standards, as set forth either explicitly or implicitly in this Code or by the direction of instructors.

Go to <http://www.northeastern.edu/osccr/academic-integrity-policy/> to access the full academic integrity policy.

MGEN Student Feedback

Students who would like to provide the MGEN unit with anonymous feedback on this particular course, Teaching Assistants, Instructional Assistants, professors, or to provide general feedback regarding their program, may do so using this survey: https://neu.co1.qualtrics.com/jfe/form/SV_cTIAbH7ZRaaW0Ki

University Health and Counseling Services

As a student enrolled in this course, you are fully responsible for assignments, work, and course materials as outlined in this syllabus and in the classroom. Over the course of the semester if you experience any health issues, please contact UHCS.

For more information, visit <https://www.northeastern.edu/uhcs>.

Student Accommodations

Northeastern University and the Disability Resource Center (DRC) are committed to providing disability services that enable students who qualify under Section 504 of the Rehabilitation Act and the Americans with Disabilities Act Amendments Act (ADAAA) to participate fully in the activities of the university. To receive accommodations through the DRC, students must provide appropriate documentation that demonstrates a current substantially limiting disability.

For more information, visit <https://drc.sites.northeastern.edu>.

Library Services

The Northeastern University Library is at the hub of campus intellectual life. Resources include over 900,000 print volumes, 206,500 e-books, and 70,225 electronic journals.

For more information and for education specific resources, visit <https://library.northeastern.edu>
Network Campus Library Services: [Northeastern University Library Global Campus Portals](#)

24/7 Canvas Technical Help

For immediate technical support for Canvas, call 617-373-4357 or email help@northeastern.edu

Canvas Student Resources: <https://canvas.northeastern.edu/student-resources/>

For assistance with my Northeastern e-mail, and basic technical support:

Visit ITS at <https://its.northeastern.edu>

Email: help@northeastern.edu

ITS Customer Service Desk: 617-373-4357

Diversity and Inclusion

Northeastern University is committed to equal opportunity, affirmative action, diversity, and social justice while building a climate of inclusion on and beyond campus. In the classroom, members of the University community work to cultivate an inclusive environment that denounces discrimination through innovation, collaboration, and an awareness of global perspectives on social justice.

Please visit <http://www.northeastern.edu/oidi/> for complete information on Diversity and Inclusion

Title IX

Title IX of the Education Amendments of 1972 protects individuals from sex or gender-based discrimination, including discrimination based on gender-identity, in educational programs and activities that receive federal financial assistance.

Northeastern's Title IX Policy prohibits Prohibited Offenses, which are defined as sexual harassment, sexual assault, relationship or domestic violence, and stalking. The Title IX Policy applies to the entire community, including male, female, transgender students, faculty, and staff.

In case of an emergency, please call 911.

Please visit <https://www.northeastern.edu/ouec> for a complete list of reporting options and resources both on- and off-campus.