New York University
Tandon School of Engineering
Computer Science and Engineering
Course Outline
Introduction to Databases, CS-UY 3083, 3 Credits
Spring 2021
Course Outline (Online and In-person)
Professor Ratan Dey

Subject to Change Statement:
The syllabus and course schedule may be subject to change. Changes will be communicated via email and in NYU Classes. It is your responsibility to check email messages and course announcements to stay current in the mixed mode of the course.

To Contact Professor:
Email: ratan@nyu.edu
Room No. 849, 370 Jay Street, Brooklyn, NY – 11201.
Phone:
Office Hours: TBA (Office hours will be announced based on students' Time zones information). Others by Appointment. To make an appointment, please send an email mentioning **CS-UY 3083** in subject line. Don't forget to include your name and NYU ID in the body of the email.

If required, we'll hold special Q/A sessions via Zoom Conference.

More Contacts:

- Teaching Assistants**: TBA**
  Name: TBA
  Room No. TBA and Email:
  Office hours: TBA.

Course Pre-requisites: CS 1134 (Data Structures and Algorithms), C- or better; CS 2124 (Object Oriented Programming), C- or better; and MA 2314 (Discrete math).

Course Description: This course introduces database systems and their approach as a mechanism to model the real world. The course covers data models (relational, entity relationship), physical database design, query languages, query processing and transaction management techniques, NoSQL Databases, and brief Introduction to Big Data.

Course Objectives:

1. Gain understanding of data modeling techniques and ability to design relational databases.
2. Learn to use SQL to create database tables, modify their contents, and execute queries.
3. Develop ability to design and implement a moderately complex web-based database application program.
4. Understand how database management systems work, including indexing techniques, query processing algorithms, and transaction management techniques.
5. Using NoSQL databases and understanding differences between Relational and NoSQL databases.

Course Structure:

Most of the material will be presented in lectures. Reading assignments from the textbook and weekly or bi-weekly homework assignments will reinforce this material. Students will be required to learn to use a database management system and to write web application code through self-study. Pointers to resources and some basic instruction will be provided. Lecture notes and announcements will be posted on NYU Classes. Please check frequently for updates. Homework assignments will be posted on GradeScope.

Lectures: Lecture Slides will be uploaded in NYU classes. Lectures will be held in-person and will also be live-streamed and recorded on around Monday/Wednesday 9:30 am (Eastern Time) using Zoom Conference, remote students are required to join during the lecture session using Zoom. Students are welcome to join during the lecture and ask questions. You can also follow the lectures asynchronously for valid reasons. Please contact me if you want to follow the class asynchronously. But attending the zoom session is highly recommended. Even though you can't join, please make sure you have checked the lecture video and slides before starting the next lectures/recitation materials. As mentioned earlier, lecture will be recorded and will be available for reviewing later for all students (specially for students who won't be able to participate during the recording session). Zoom links for the lectures will be posted in NYU Classes Zoom Section.

Readings:

The recommended text for the course is:
Database System Concepts
Seventh Edition/Sixth Edition
Avi Silberschatz, **Henry F. Korth** , **S. Sudarshan**
McGraw-Hill
ISBN 978-0078022159 (Seventh Edition)
ISBN 978-0073523321 (Sixth Edition)
http://www.db-book.com/
Copies are on reserve in the library.

Please refer to the tentative schedule (will be updated later) below and updates, thereof, and read the referenced sections of the textbook before and/or after the corresponding lectures. There is some material that is covered in those textbook sections that will not be covered in the lectures. Exam questions will be drawn from topics covered in the lectures or the assignments; when reading the textbook after lectures, you may skim or skip topics that were not addressed in lectures, unless otherwise noted.

Course requirements:

Tests: There will be one midterm exam and one cumulative final exam.

Course project: A programming project involving design and implementation of a web database application. This will require substantial effort. The project will include design, implementation, and testing of application code for business logic and user interface. Implementation in Node.js, PHP, C#, Python, or Java with MySQL, Oracle, PostgreSQL, MongoDB, or SQLServer. (Other host languages or DBMS may be allowed, but please check with me first.)

You will be responsible for mastering enough in SQL, HTML, and Python/Flask (or other acceptable host languages) to allow you to do this project. An overview of PHP or of Python Web/Database modules will be presented in lectures, but self-study will also be expected. You may do the project alone or with one or two classmates.

The assignment will be done in three parts through the semester and will be based on specifications provided. In some cases, you will use solutions provided for earlier parts as the basis for later parts.

Homework assignments: There will be about 6-8 homework assignments. Homework will reinforce the material covered in the lectures and in the textbook. Some will be "paper and pencil'' exercises, and some will involve programming in SQL. Although these counts only for a small percentage of your grade, it is essential that you do these homeworks and understand the solutions. You may work with classmates (groups of up to 3 people) on the homework assignments, unless otherwise noted, but be sure that you understand all the material. It is unlikely that you will do well on the exams and the project if you do not understand how to solve problems like the homework exercises. Many of the exam questions will be based concepts from the homework assignments.

Class Attendance and Participation: Students (Remote and in-person) are expected to attend all scheduled classes unless the instructor explicitly informs the class that other ways of doing the work are acceptable. There will be no penalty if a student does not participate during the lecture session. But students are highly recommended to attend (either in-person or via Zoom Conference) all scheduled classes. Lectures will be recorded and will be available for reviewing later for all students (specially for students who won't be able to participate during the recording session). But students need to check the lecture video and slides. Students are also expected to participate during the class and discussion in the NYU Classes Forum. You can also follow the class asynchronously for valid reasons. Please contact me if you want to follow the class asynchronously.

Grading: Your grade will be based primarily on your scores on the homework, exams, class attendance and participation, and the course project. You may work with classmates on the homework assignments but be sure that you understand all the material. Grades will be computed roughly as follows:

Final score = 0.30*project + 0.20*(Midterm exam grade) + 0.35*(Final exam grade) + 0.10*homework + 0.05*(Participation).

I may tweak the formula a little, for example, by slightly changing the weights.

Grades will be determined using the following scale:

A 95-100
A- 90-94
B+ 87-89
B 83-86
B- 80-82
C+ 77-79
C 73-76
C- 70-72
D+ 67-69
D 63-66
F less than 63

You must get a grade of D or better to complete the course.

Policy on Academic Dishonesty:

Students are expected to read and understand the university's policy on academic integrity as laid out in the Undergraduate Bulletin. Plagiarism and cheating will be penalized.

In this class, you may work on homework assignments with groups of up to 3 students, unless the assignment explicitly states another policy. If you do so, the names of all members of the group should be included at the top of each file you hand in and work should be handed in using GradeScope's group hand-in option. Only one copy per group should be handed in.

You may work on the course project with a partner or a three-person team, but each person on the team must demonstrate that they've done a substantial part of the implementation. The project grade will be a combination of a team grade and an individual grade. You may use or adapt publicly available code in your project (such as templates for generating html or sample code distributed to the class), but you may NOT copy from other students, copy from previous years' course projects, or outsource any of the assigned course work to a third party.

Moses Center Statement of Disability:

If you are student with a disability who is requesting accommodations, please contact New York University's Moses Center for Students with Disabilities at 212-998-4980 or mosescsd@nyu.edu. You must be registered with CSD to receive accommodations. Information about the Moses Center can be found at www.nyu.edu/csd. The Moses Center is located at 726 Broadway on the 3rd floor.

NYU School of Engineering Policies and Procedures on Excused Absences

complete policy here

A. Introduction: An absence can be excused if you have missed no more than **10 days of school**. If an illness or special circumstance has caused you to miss more than two weeks of school, please refer to the section labeled Medical Leave of Absence.

B. Students may request special accommodations for an absence to be excused in the following cases:
    1. Medical reasons
    2. Death in immediate family
    3. Personal qualified emergencies (documentation must be provided)
    4. Religious Expression or Practice

Deanna Rayment, deanna.rayment@nyu.edu, is the Coordinator of Student Advocacy, Compliance and Student Affairs and handles excused absences. She is located in 5 MTC, LC240C and can assist you should it become necessary.

NYU School of Engineering Policies and Procedures on Academic Misconduct

complete Student Code of Conduct here

A. Introduction: The School of Engineering encourages academic excellence in an environment that promotes honesty, integrity, and fairness, and students at the School of Engineering are expected to exhibit those qualities in their academic work. It is through the process of submitting their own work and receiving honest feedback on that work that students may progress academically. Any act of academic dishonesty is seen as an attack upon the School and will not be tolerated. Furthermore, those who breach the School's rules on academic integrity will be sanctioned under this Policy. Students are responsible for familiarizing themselves with the School's Policy on Academic Misconduct.

B. Definition: Academic dishonesty may include misrepresentation, deception, dishonesty, or any act of falsification committed by a student to influence a grade or other academic evaluation. Academic dishonesty also includes intentionally damaging the academic work of others or assisting other students in acts of dishonesty. Common examples of academically dishonest behavior include, but are not limited to, the following:

    1. Cheating: intentionally using or attempting to use unauthorized notes, books, electronic media, or electronic communications in an exam; talking with fellow students or looking at another person's work during an exam; submitting work prepared in advance for an in-class examination; having someone take an exam for you or taking an exam for someone else; violating other rules governing the administration of examinations.

2. Fabrication: including but not limited to, falsifying experimental data and/or citations.
3. Plagiarism: intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise; failure to attribute direct quotations, paraphrases, or borrowed facts or information.
4. Unauthorized collaboration: working together on work meant to be done individually.
5. Duplicating work: presenting for grading the same work for more than one project or in more than one class, unless express and prior permission has been received from the course instructor(s) or research adviser involved.
6. Forgery: altering any academic document, including, but not limited to, academic records, admissions materials, or medical excuses.

Tentative Schedules (will be updated later):