Instructor	Room	Meeting time	E-Mail
Raman Kannan	N1516	SEC01TTH 7:00-8:15 pm SEC02 TTH 8:25-9:40 pm	rk2218@hunter.cuny.edu
Office Hours: on demand		3:00 to 3:50 TTH by appointment only	

Course Description

This course covers the fundamental study (what,why and how) material required to understand how databases work. The course also delves into explaining how to write SQL queries, and covers the various issues that need to be addressed in designing database systems, implementing them, and using them. Material covered includes enterprise data modeling using Entity Relationship Diagrams, deriving a relational model implementation from Entity Relationship Diagrams, Relational Algebra, SQL as a Data Definition Language and as a Data Manipulation Language, maintaining integrity of a database system, normalization, physical design, recovery and concurrency, As part of the course, students will use SQL software and will work on practical exercises and project. We will also discuss distributed database and transaction management.

Prerequisite

All students should have completed CSCI 335 with grade of C or better. If you do not satisfy this requirement, please see me immediately. This project requires engineering a full end-to-end system. If you are not familiar with terms such as SDLC, front-end, back-end,testing, integration,api,rest this course may not be for you, as we will NOT cover these topics in this course.

Course Objectives

After completing the course, the students should be able to participate in the design and development of a database. Students are expected to:
• Understand the business requirements and build the conceptual model of a database using ERD.
• Build the relational model of the database by mapping the conceptual model into the set of relations.
• Build the physical model of the database using SQL.
• Maintain the database (insert, update, delete, and retrieve data).
• Understand the relational algebra and relational calculus.
• Understand different database architectures: centralized, homogenous distributed, and heterogeneous distributed

Textbooks

• **Fundamentals of Database Systems**, by Elmasri and Navathe, Addison Wesley, the **sixth edition**, with ISBN978-0-13-608620-8
• **Database System Concepts**, by Silberschatz , Korth ,and Sudarshan , the **sixth edition** , with ISBN-13 9780073523323

Software

All programming in this course requires SQL. In Computer Science Department we use the open source **MySQL Version 5.1** or **Oracle SQL Plus** which compiles with SQL:1999 standards. You can install it on your own computer, available as a free download called MySQL Community Server as 5.1.61 at http://www.mysql.com/downloads/mysql/5.1.html#downloads Excellent documentation on MySQL is available at http://dev.mysql.com/doc/refman/5.1/en/index.html
You can also use Oracle SQL Plus, It can be downloaded free for Hunter students at http://www.oracle.com/technetwork/database/enterprise-edition/downloads/index.html

Grading and homework

Course grades are based on homework, two exams, and a term project.
Homework (3)& Short Quiz(3) --3@5-- 30%
Project 25%
Midterm exam 20%
Final exam 25%
Homework problems are due at the time specified in the assignment description; you can submit it electronically or hand it in class. All homework should be individual work. A penalty of late homework and projects will be applied as follows:
• 0 to 24 hours late: 25% penalty
• 24 to 48 hours late: 50% penalty
• More than 48 hours late: no credit will be given.

Term project

Term project will give you hands-on experience in the design and implementation of a database. You will work in a team to develop a database application using MySQL or SQL Plus. Specified in a separate document. Identify a team of fellow students who can meet together regularly. **The ideal team size is 3-4**. As we cover material in class, you will apply it to your project. Periodically you will be asked to submit your work for review. After the final projects are submitted, your project will be tested by your classmates. You will also be expected to demonstrate and explain your program and highlight its features in an individual appointment. Project evaluations will occur at Hunter on **December 16**. Your project must run in SQL.
The project is due and graded in five steps:
Step 1: identify appropriate entities, relationships, attributes, domains, and keys as well as all specializations and generalizations. **Step 2**: produce the associated ER diagram.
Step 3: map the ER diagram, and show how you normalized them if necessary, list integrity constraints
Step 4: define the database in MySQL and insert at least 20 tuples into every table.
Step 5: implement transactions and submit the full project, including an essay on the project.

Course outline

Unless specified, the referenced chapters are from the textbook **Fundamentals of Database Systems**, by Elmasri and Navathe.

Tentative Schedule

Topic	Source
Introduction to data, databases, management, Teams Formed	Chapter 1
DBMS concepts, Data Models LAB SQL Basics DDl/DML	Chapter 1, Chapter 2, Reading Assignment SQL Tutorial
The ER Model	Chapter 7
SQL TEST DUE	Take Home, submit PDF by email
Class Project Description due	Submit by email
The ER Model	Chapter 7
ER Model	Chapter 7, Chapter 8
The relational data model Relational database design	Chapter 3, Chapter 9
Normalization	Chapter 16
Normalization	Chapter 16
SQL LAB	Chapter 4 & 5
Religious No Classes Scheduled	
Religious No Classes Scheduled	
MidTerm – cumulative-in class	
Dependencies	Chapter 15
Relational Algebra	Chapter 6
Relational Algebra	Chapter 6
Relational Calculus	Chapter 6
Class Project Progress Report	
ER/Normalization/RA Lab HW#2	PDF by email DUE
Limitations of SQL	
Work Around	
Distributed databases	Chapter 25
Transactions, Concurrency control	Chapter 21,chapter 23
SQL Challenges HW#3	Take Home PDF by email due
Class Project Progress Report	Submission Due
ER, SQL Lab	
Information Retrieval, Data Mining	Chapter 27, Chapter 28
Class Project Presentation	
Class Project Presentation	
Class Review	
Finals – cumulative-in class	

ACADEMIC SCHEDULE
http://www.hunter.cuny.edu/onestop/repository/files/registrar/SPRING%202020%20ACADEMIC%20CALENDAR%20A.pdf

Academic dishonesty policy:

Academic dishonesty is unacceptable and will not be tolerated. Academic sanctions in this class will range from an F on the assignment/exam to an F in this course. A report of suspected academic dishonesty will be sent to the Office of the Dean of Students. Additional information and definitions can be found at

http://www.hunter.cuny.edu/studentservices/advising/policies-sub/proceduresforreporting-academic-integrity-violations