NYU Polytechnic School of Engineering
Computer Science and Engineering
CS 6083, Fall 2014

Principles of Database Systems (CS 6083) - INET

Course Prerequisites: Good programming skills, familiarity with basics of operating systems (incl. file systems, caching, concurrency), and knowledge of basic algorithms and data structures (such as sorting, search trees, and hashing). Formally, you need to have taken a course on data structures or algorithms, and a course on operating systems, at the graduate or undergraduate level, or have permission from the instructor.

Instructor: Prof. Paul Giura, `pg860@nyu.edu`

Course Communication: All announcements will be sent via the course mailing list to your student email account.

Required text book: A. Silberschatz, H. Korth, S. Sudarshan, *Database System Concepts*, 6th Edition, McGraw-Hill, 2009. (You may also use the 4th or 5th edition if those are cheaper or easier to get.)

Grading Policy: Homeworks: 25%. Midterm: 35%. Project: 40%.

Code of Conduct and Plagiarism Policy: Please be aware of NYU's Policy on Academic Dishonesty at https://engineering.nyu.edu/academics/code-of-conduct/academic-dishonesty

General Information: The course aims to give a broad introduction to database systems, including the relational data model, query languages, index and file structures, query processing and optimization, concurrency and recovery, transaction management, and database design. The course material will be delivered in the format of interactive learning modules. The examination will use homeworks, a midterm exam and a comprehensive project.

Project Design and Implementation: In addition to homeworks and midterm exam, there will also be a project that will contain two parts

1. Project Part I: Designing a complex schema and queries for a given application scenario. (See the suggested scenario or create one of your own)
2. Project Part II: implement a web-based application, typically with PHP and Oracle, mySQL, or another database system, based on the schema and scenario from Part I.

Course Outline (tentative)

1. Introduction and Basics (Chapters 1 to 2 and Chapter 6) *(weeks 1-2)*
   (a) Overview
   (b) Relational Model
   (c) Relational Algebra
   (d) Relational Calculus
2. Basic Relational Queries, Basic SQL(Chapter 3) *(weeks 3)*
3. Entity-Relationship Model (Chapter 7) *(week 4)*
4. Intermediate and Advanced SQL (Chapters 4 and 5) *(weeks 5-6)*
   (a) Integrity Constraints
   (b) Views and Triggers
   (c) Application Programming
5. Relational Design and Normal Forms (Chapter 8) *(week 8)*
6. Storage and Indexing (Chapters 10 and 11) *(weeks 9-10)*
   (a) Disk Models
   (b) External Sorting
   (c) Disk and File Organization
   (d) Indexing
7. Query Processing (Chapters 12 and 13) *(week 11-12)*
   (a) Query Evaluation
   (b) Query Optimization
8. Transaction Management (Chapters 14 to 16) *(weeks 13-14)*
   (a) Transactions
   (b) Concurrency Control
   (c) Recovery

Course Schedule

09/02/14 Week 1	Introduction to Basics
09/09/14 Week 2	Introduction to Basics
09/16/14 Week 3	Basic Relational Queries, Basic SQL
09/23/14 Week 4	Entity-Relationship Model
09/30/14 Week 5	Intermediate SQL
10/07/14 Week 6	Advanced SQL
10/14/14 Week 7	MIDTERM EXAM
10/21/14 Week 8	Relational Design and Normal Forms
10/28/14 Week 9	Storage
11/04/14 Week 10	Indexing
11/11/14 Week 11	Query Evaluation
11/18/14 Week 12	Query Optimization
11/25/14 Week 13	Transactions and Concurrency Control
12/02/14 Week 14	Transactions and Recovery Control
12/09/14 Week 15	PROJECT DEMOS