Boston University
College of Arts and Sciences
Computer Science Department

# CAS CS 460/660: Introduction to Database Systems

Fall 2017

**Instructor:** Prof. George Kollios, *gkollios@cs.bu.edu*, phone 617-353-8928.
**Office Hours:** Mon 2:30 pm-4:00 pm and Tue 1:00 pm-2:30 pm in MCS 283, or by appointment (the best way to reach me is via email.)

**Teaching Fellows:** Mona Jalal, *jalal@bu.edu* and Baichuan Zhou, *baichuan@bu.edu*.
**Office Hours:** Mona: Tue/Thu 2:00-3:15 pm and Fri 10:15-11:45 am.
Baichuan: Wed 2:30-4:30 pm and Thu 2:30-4:30 pm.

**CS460 Course Description:** Introduction to database management systems. Examines entity-relationship and relational data models; commercial relational query languages: SQL and relational algebra; file organization, indexing and hashing, query optimization, transaction processing, concurrency control and recovery, integrity, and security. Finally, we will cover new trends in data management including Big Data and NoSQL databases and data management on the Cloud.

**CS660 Course Description:** Graduate-level introduction to database systems and implementation. Students attend the CS460 lectures and are expected to complete additional work on assignments and exams.Furthermore, students in CS660 will have to attend and participate in database seminars.

**Prerequisites:** CAS CS 112. Working knowledge of Python or Java programming and data structures. CS 350 is recommended.

**Class Home Page:** `http://www.cs.bu.edu/fac/gkollios/cs460f17/`
All class assignments, schedules, and lecture notes can be found on this page. We will also use Piazza for discussions and other material distribution.

**Time and Place:** Mon and Wed 4:30-5:45pm in LSE B01.

**Required Textbook:** Raghu Ramakrishnan and Johannes Gehrke, "Database Management Systems", McGraw-Hill, Third Edition. 2002. ISBN: 0-07-246563-8.

**Grading Policy:** The course grade will break down as follows.

| | CS460 | CS660 |
|---|---|---|
| Written Assignments | 25% | 20% |
| Programming Assignments | 25% | 25% |
| Midterm | 20% | 20% |
| Final Exam | 30% | 25% |
| Extra Assignments | 0% | 10% |

**Important Dates:** *Midterm Exam*: Mon, Oct 23, 2017 (tentative), *Final Exam*: Thu, Dec 21, 2017.

**Collaboration/Academic Honesty:** All course participants must adhere to the College of Arts and Sciences Academic Conduct Code. All instances of academic **dishonesty** will be reported to the academic conduct committee. Printed copies of the code are available from CAS room 105.

**Late Policy – Make up exams:** Late written assignments will not ordinarily be accepted. If, for some compelling reason, you cannot hand in an assignment on time, please contact me as far in advance as possible. If a written assignment is due at the beginning of a class, you should hand it in at the *beginning* of the class. Late programming projects will be levied a late penalty of 10% per day for up to three (3) days. After three days, no credit will be given. No make-up exams (except under extremely unusual circumstances).

Tentative Course Schedule

| Week# | Topics | Readings |
|---|---|---|
| 1 | Introduction | Chapter 1 |
| 2 | ER-Model;<br>Relational Model and Algebra | Chapters 2, 3, 4 |
| 3 | SQL | Chapter 5 |
| 4 | Integrity and Security | Chapters 5, 21 |
| 5 | DB Design | Chapter 19 |
| 6 | Normalization and Transactions | Chapters 19, 16 |
| 7 | Storage and Files | Chapter 9 |
| 8 | **Midterm Exam** | |
| 9 | Indexing and Hashing | Chapters 10, 11 |
| 10 | Advanced Indexing | Chapter 28 |
| 11 | Query Processing and Optimization | Chapters 12, 13 |
| 12 | Query Optimization and Transactions | Chapters 14, 15, 16 |
| 13 | Concurrency Control and Recovery | Chapters 17, 18 |
| 14 | NoSQL and Big Data | Chapter 25 |
| 15 | Cloud and Distributed Databases | Chapters 22 |