

# Comp 521 – Files and Databases

## Bulletin Description:

Placement of data on secondary storage. File organization. Database history, practice, major models, system structure and design.

## General Course Info:

Term: FALL 2019  
Department: COMP  
Course Number: 512  
Section Number: 001  
Time: T R, 2:00-3:15  
Location: Murphey 116  
Website:  
<http://www.csbio.unc.edu/mcmillan/index.py?run=Courses.Comp521F19>

## Instructor:

Name: Prof. Leonard McMillan  
Office: SN 316  
Email: [mcmillan@cs.unc.edu](mailto:mcmillan@cs.unc.edu)  
Phone: 919-590-6078  
Web: <http://www.cs.unc.edu/~mcmillan>  
Office Hours: W 3:00 – 5:00

## TA Info:

Name	Office	Email	Office Hours
Tao Tao	SN337	<a href="mailto:ttao@cs.unc.edu">ttao@cs.unc.edu</a>	TBA

## Textbooks and Resources (Optional, not required):

### *Database Management Systems*

by Raghuram Ramakrishnan and Johannes Gehrke  
3rd Edition, McGraw-Hill Higher Education © 2003, ISBN: 0072465638.

### *Designing Data-Intensive Applications:*

#### *The Big Ideas Behind Reliable, Scalable, and Maintainable Systems*

by Martin Kleppmann  
1st Edition, O'Reilly © 2017, ISBN: 1449373321.

**Course Description:**

Databases are an indispensable tool for managing information, and a course on the principles and practice of database systems is now an integral part of any computer science curricula. This course covers the fundamentals of modern database management systems, in particular relational database systems.

The material covered in Comp 521 can be broken into three areas of emphasis. The first area includes database foundation material such as the relational model, relational algebra, relational calculus, and normal forms. The second area of emphasis is database application programming and includes among others the topics of Structured Query Language (SQL), eXtensible Markup Language (XML), integrating databases into programs, web-based database usage, and triggers and active databases. The third area of emphasis is the systems side of databases, which includes database indexing, efficient query evaluation, the transaction-based model, concurrency, and security.

**Target Audience:**

This course is suitable for computer science majors at both undergraduate and graduate levels. Students who wish to take this course should have some programming experience in a modern language and knowledge of data structures.

**Prerequisites:**

All students are expected to have taken introductory courses in programming languages, data structures, and computer organization equivalent to COMP 401, COMP 410, and COMP411.

**Goals and Key Learning Objectives:**

Comp 521 emphasizes database foundations, applications, design, optimization and implementation. This includes the relational model, relational algebra, relational calculus, and normal forms. Application programming and includes, among others, the topics of Structured Query Language (SQL), eXtensible Markup Language (XML), integrating databases into programs, web-based database usage. The design aspects of databases include indexing, efficient query evaluation, the transaction-based model, database concurrency, and security. Upon completion of Comp 521 students should be able to construct, write queries of, and tune databases. In addition, students should be able to incorporate databases into larger software applications and systems.

### **Course Requirements:**

The textbooks are optional. However, they can be used to supplement lecture materials. Each lecture will roughly correspond to topics from one of the two textbooks. Student will be assigned 6 problem sets. In addition, there will be a midterm, and a final exam.

### **Key Dates:**

Midterm: October 14, 2019 (Monday 6pm-8pm in SN014 and FB007)  
Final Exam: December 7, 2019 (Saturday 12:00pm-3:00pm)

### **Grading:**

The course final grade will be based on the following factors:

6 – Problem Sets/Programming Exercises with the lowest score dropped	30%
N - Unannounced in-class exercises	10%
1 – Midterm Exam	30%
1 – Final Exam	30%

### **Course Policies::**

- Attendance is expected, but no roll will be taken
- Problem sets are submitted on-line and no late problem sets will be accepted, however, the lowest score of the 6 problem sets will not be considered in the final grade.
- Examinations will be given on-line and make-up exams must be pre-arranged with at least two-weeks advance notice.
- The course final is given in compliance with UNC final exam regulations and according to the UNC Final Exam calendar.

### **Honor Code:**

Collaboration on problem sets is encouraged. However, what you hand in must be your own work. Good scholarship requires that all collaboration must be acknowledged. Thus, if you collaborate on the solution of a problem set, I expect that you list your collaborators in your answer as a comment.

Collaboration on examinations (midterm or final) is, of course, a violation of the Honor Code. This includes discussion of questions on a midterm, or final with students that have not yet taken the test.

Using any unauthorized information sources on an exam is a violation of the honor code.

**Course Schedule:**

A course schedule and handouts from each lecture will be posted on the course website.

**Disclaimer:**

“The professor reserves to right to make changes to the syllabus, including lecture topics, problem-set due dates, and examination dates. These changes will be announced as early as possible.”