Welcome to INLS 523 – Database Systems I

Class Times: Mondays & Wednesdays 9:05am - 10:20am

Class Location: Manning 01

Instructor: Rob Capra (he/him/his)
E-mail: rcapra@unc.edu
Office: Manning 210
Office hours: by appointment via Zoom, https://go.unc.edu/rcapra-officehours

Teaching Assistant: Hanlin Zhang (hanlin.zhang@unc.edu)


Please note: Used versions of both the 6th and 7th edition are commonly available at online resellers for <$20.

Introduction

This course will introduce the basic concepts and applications of relational database management systems, including semantic modeling and relational database theory. Topics include: user requirements and specifications, semantic data modeling relational model, SQL, normalization and data quality, relation topics and emerging technologies.

Attendance and participation in the class sessions is an expected part of this course. If you are looking for an asynchronous course, some semesters there is an “online” asynchronous section of INLS 523 taught by another instructor.

Learning objectives

During this course, you will:

- Develop an understanding of databases and of the relational database model.
- Gain experience with theoretical and practical aspects of database design and implementation.
- Be able to weigh, discuss, and justify database design decisions.
• Learn about concepts involved in database operation
• Gain an understanding of important ideas for databases in the future.

Learning community

My goal for this semester is for us to have a rich, supportive, interactive learning community. In addition, I want us to get to know each other as a class, so we will do some activities designed to help us not only learn course material, but also to build learning relationships.

I have designed the class to allow for flexibility and adjustment as needed. If you face personal challenges this semester, I encourage you to be in contact with me and I will be happy to talk through options (e.g., for turning in an assignment late, etc.).

Course Structure

This course has been designed as an in-person course, meeting twice a week. Attendance and participation in the class discussions and activities is an essential part of this course. I am NOT planning to make recordings or host Zoom sessions for this class.

• We will use the Canvas learning management system.
• Everything in this syllabus will appear in its own module in Canvas.
• Detailed instructions, requirements, and success criteria for all project work will appear in the Assignments area of Canvas, and this is where you will submit assignments as well.

Technology

• **Database**: We will use a database system for this course that is hosted on a UNC server. You will be assigned an account on this database server. In class, I will show you software that you can install on your Mac, PC, or Linux computer that will allow you to connect to the server to access your database.

• **UNC VPN**: To access the UNC database server, you will need to install UNC’s VPN client. See help.unc.edu for details.

• **Diagramming tools**: You will need to use a diagramming tool to create your E/R diagrams and database models. No specific tool is required. However, your diagrams must look professional and use good formatting (the ER diagrams in the textbook are good examples). Many online tools for creating ER diagrams are available (e.g., LucidChart, Gliffy, Google Slides).

• **In-class exercises**: We will do in-class exercises that will require a computer, so you are expected to bring your computer to class.

Amazon Web Services

The database server that UNC uses for this course uses Amazon Web Services (AWS) for some of its underlying technology. The specific server used in this course operates in a UNC-managed AWS virtual
private cloud. While the course server is not physically located on campus, it uses a private IP address that is not accessible through the public internet. Further, connections to the course server are restricted to campus and UNC VPN, and login access is only available to students, the course instructor, and UNC information technology support staff.

By remaining enrolled in this course, students acknowledge and consent to the following:

1. Students must use this AWS environment to complete required course assignments.
2. Students must agree not to upload or publish any sensitive data in this specific AWS environment.

Graded Work

Your grade will be based on in-class participation, exercises, homework, a project, and a midterm and final exam. These will be weighted as shown on the table listed under “Grade Weighting” on the first page.

- **Participation (5%)**: Participation is especially important in this course.
  - Students are expected to regularly attend and actively participate in class activities.
  - Your participation grade will be based on regularly attending and being prepared for class, asking and responding to questions, and actively engaging in class activities and exercises.

- **Exercises (5%)**: During many class periods, there will be one or more in-class exercises to give you hands-on experience applying concepts we discuss in class. You will often work on these exercises in pairs or small groups. In-class exercises will often include a component that will be turned in via Sakai.

- **Homework (40%)**: Developing proficiency in database concepts requires practice. As such, this course includes homework assignments designed to give you practice applying the concepts that are discussed in class. Homework assignments are to be completed individually.

- **Database Project (20%)**: Later in the semester, students will work on an assignment to design and implement a database project. Based on a provided description of the database requirements, students will create: 1) a completed model and design, and 2) a final implemented database, loaded with data, and 3) a demonstration of the database using a set of queries.

- **Exams (30%)**: There will be a mid-term exam (15%) and a comprehensive final exam (15%).

In order for you to receive credit for an assignment, it must be submitted to the appropriate Canvas “Assignment”. In my experience, Canvas is a reliable method to submit assignments. It is the responsibility of each student to make sure they have access to Canvas and can submit assignments when they are due. You should also verify that each assignment you submit has uploaded correctly.

If for some reason you are unable to submit an assignment to Canvas, as a last resort you may email it to the instructor along with a note about the problem you encountered. **Then, as soon as you are able to, it is your responsibility to submit the exact same assignment to Canvas.** The email serves as a
record that you tried to submit the assignment on time, but to receive credit, your assignment must be uploaded to Canvas.

**Grading Policies**

The following grade scale will be used AS A GUIDELINE (subject to any curve) for undergraduate students:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
<th>Definition*</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90-100%</td>
<td>Mastery of course content at the highest level of attainment that can reasonably be expected of students at a given stage of development. The A grade states clearly that the students have shown such outstanding promise in the aspect of the discipline under study that he/she may be strongly encouraged to continue.</td>
</tr>
<tr>
<td>B</td>
<td>80-89.9%</td>
<td>Strong performance demonstrating a high level of attainment for a student at a given stage of development. The B grade states that the student has shown solid promise in the aspect of the discipline under study.</td>
</tr>
<tr>
<td>C</td>
<td>70-79.9%</td>
<td>A totally acceptable performance demonstrating an adequate level of attainment for a student at a given stage of development. The C grade states that, while not yet showing unusual promise, the student may continue to study in the discipline with reasonable hope of intellectual development.</td>
</tr>
<tr>
<td>D</td>
<td>60-69.9%</td>
<td>A marginal performance in the required exercises demonstrating a minimal passing level of attainment. A student has given no evidence of prospective growth in the discipline; an accumulation of D grades should be taken to mean that the student would be well advised not to continue in the academic field.</td>
</tr>
<tr>
<td>F</td>
<td>0-59.9%</td>
<td>For whatever reason, an unacceptable performance. The F grade indicates that the student’s performance in the required exercises has revealed almost no understanding of the course content. A grade of F should warrant an advisor’s questioning</td>
</tr>
</tbody>
</table>
whether the student may suitably register for further study in
the discipline before remedial work is undertaken.

* Definitions are from:  http://registrar.unc.edu/academic-services/grades/explanation-of-grading-system/
(underlining is my emphasis)

The following grade scale will be used AS A GUIDELINE (subject to any curve) for graduate students:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Definition*</th>
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</thead>
<tbody>
<tr>
<td>H</td>
<td>High Pass</td>
</tr>
<tr>
<td>95-99%</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>Pass</td>
</tr>
<tr>
<td>80-94.9%</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>Low Pass</td>
</tr>
<tr>
<td>70-79.9%</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Fail</td>
</tr>
<tr>
<td>0-69.9%</td>
<td></td>
</tr>
</tbody>
</table>

* Definitions are from:  http://registrar.unc.edu/academic-services/grades/explanation-of-grading-system/

These scales will be used as a GUIDELINE ONLY. The final grade scale may differ.

**Due Dates and Late Work**

Late work causes problems, both in this class and in professional environments. When you turn something in late, you affect other people whose work is dependent on your own. It also makes the
course more difficult for you because we will move on to the next project immediately.

That said, I understand that we all occasionally encounter things in life that create scheduling difficulties. If you need an extension on an assignment, I will be happy to discuss it with you. However, I would like as much advance notice as possible. **There is no need to be anxious about this; just send me an e-mail that explains your situation and proposes a reasonable due date for you.**

Each assignment will have a due date and time and will include instructions for submission. A late penalty of 10% per day may be applied **unless prior arrangements have been made with the instructor.**

One final note: late work will receive fewer comments than work submitted on time. Excessively late work may receive no comments at all.

## Requests for Extensions and Absences

Any request for an extension must be made, preferably by email, at least 24 hours prior to the due date. Written documentation is required for illness. If a serious illness prevents you from taking any of the tests, send your instructor an e-mail message, or a friend with a note, describing your condition before the scheduled test.

## Statute of Limitations

Any questions or complaints regarding the grading of an assignment or test must be raised within one week after the score or graded assignment is made available (not when you pick it up).

## Asking for help

It is sometimes difficult for me to know when you are confused, and this course can sometimes be very confusing. Unfortunately, this means that you will often need to ask for help when you don’t understand something about course content, expectations, or logistics. Please know that it is not a sign of weakness to be confused. Rather, questions indicate an engaged mind. All questions are welcome.

There will also be time during class sessions to ask questions, both of me and of your classmates. We may experiment with different modalities for this, such as anonymous polls.

## Course Communication
I will often use the Canvas "Announcements" feature to send announcements to the class. Usually these announcements will also be sent via email to each student's email address of record. However, it is the responsibility of every student to check the Canvas site regularly for announcements and messages. If something the instructor says in class conflicts with information posted by the instructor on Canvas, then the information posted on by the instructor on Canvas takes precedence. Verbal instructions are easily mis-interpreted, and they do not leave a documentation trail.

Contacting me

For specific, concrete questions, e-mail is the most reliable means of contact for me. Please start your email subject line with “INLS 523.” During the academic year, I do receive a large amount of email, so it may take me a few days to reply. If you don’t receive a response after 3 or 4 days, please follow up.

If you need a response sooner than email may afford, you may wish to talk to me before or after class. It’s very difficult to explain course material via email. If you need help with course content, assignments, or complex questions, the first step is to make an appointment for office hours, which are always online, and can be made here: https://go.unc.edu/rcapra-officehours. I am always happy to talk with students, and no meeting is a waste of time. Please feel free to make appointments with me in this way.

Honor Code

The UNC Honor Code is in effect for all work in this course. The "Instrument of Student Judicial Governance" gives examples of actions that constitute academic dishonesty:

http://instrument.unc.edu/instrument.text.html#academicdishonesty

Student often ask what is okay to talk about with other students and what is not. I do encourage you to help each other learn the course material – your fellow students can often be a great resource. However, you should NOT discuss the details of a solution to a particular assignment with other students, and should never copy or share answers for an assignment with other students. It is okay to talk about course material with other students, but you should not discuss detailed solutions to pending assignments. All work you submit should be your own. One way to help insure this is that if you do discuss course material with other students, do not take any written notes.

Academic honesty and trustworthiness are important to all of us as individuals and are encouraged and promoted by the honor system. More information is available at http://www.unc.edu/depts/honor/honor.html. The web site identified above contains all policies and
procedures pertaining to the student honor system. We encourage your full participation and observance of this important aspect of the University.

### AI Policy

ChatGPT and other Generative Artificial Intelligence (AI) can produce text, images, and other media. These tools can assist with brainstorming, finding information, and even reading and creating materials; however, they must be used appropriately and ethically, and you must understand their limitations. For this class, the guidelines for generative AI developed by the UNC Campus committee in the summer of 2023 will be in effect: [Syllabus Guidelines for Generative AI 2023.pdf](https://uncch.instructure.com/courses/52099/files/6401864?wrap=1). In other words, it is okay to use AI tools, but your use of these tools should follow the guidelines in the document.

### Services and Student Support

Please utilize me as a resource if you are having difficulty with the course material or there are outside circumstances impeding your ability to learn (for example, housing insecurity, food insecurity, emotional insecurity, or need physical or mental health services). You should also know that I am a mandatory reporter if you choose to confide in me.

- **Mental Health**: CAPS is strongly committed to addressing the mental health needs of a diverse student body through timely access to consultation and connection to clinically appropriate services, whether for short or long-term needs. Go to their website: [https://caps.unc.edu/](https://caps.unc.edu/) or visit their facilities on the third floor of the Campus Health Services building for a walk-in evaluation to learn more. *(source: Student Safety and Wellness Proposal for EPC, Sep 2018)*

- **Basic needs security.** Any student who faces challenges affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live, and believes this may affect their performance in this course, is encouraged to contact the Office of the Dean of Students. Furthermore, please notify me if you are comfortable in doing so. This will enable me to provide other resources I may know of. Other resources you may find helpful:
  - [Student Support: Office of the Dean of Students](https://dos.unc.edu/student-support/)
  - [Carolina Cupboard: Community Food Pantry (on-campus)](https://carolinacupboard.web.unc.edu/)
• **Groceries for Neighbors in Need** [](https://www.ifcweb.org/services/food-pantry)

- **Accommodations**: The University of North Carolina at Chapel Hill facilitates the implementation of reasonable accommodations, including resources and services, for students with disabilities, chronic medical conditions, a temporary disability, or pregnancy complications resulting in barriers to fully accessing University courses, programs, and activities. Accommodations are determined through the Office of Accessibility Resources and Service (ARS) for individuals with documented qualifying disabilities in accordance with applicable state and federal laws. See the ARS Website for contact information: [https://ars.unc.edu](https://ars.unc.edu) or email [ars@unc.edu](mailto:ars@unc.edu).

- **Title IX**: Any student who is impacted by discrimination, harassment, interpersonal (relationship) violence, sexual violence, sexual exploitation, or stalking is encouraged to seek resources on campus or in the community. Please contact the Director of Title IX Compliance (Adrienne Allison – [allison@unc.edu](mailto:Adrienne.allison@unc.edu)), Report and Response Coordinators in the Equal Opportunity and Compliance Office ([reportandresponse@unc.edu](mailto:reportandresponse@unc.edu)), Counseling and Psychological Services (confidential), or the Gender Violence Services Coordinators ([gvsc@unc.edu](mailto:gvsc@unc.edu); confidential) to discuss your specific needs. Additional resources are available at safe.unc.edu.

- **Diversity & Inclusion**: My intention as an educator is to provide a safe and inclusive environment for all learners. I work to include course materials and activities that promote diversity but Information & Library Science (and most disciplines in the academy) were founded by those from a privileged background. As a straight, white, able-bodied man, my standpoint may exclude important points of view. It is also possible that I will make unintentional mistakes. If this happens, please come, and speak to me directly. Likewise, I’m always looking for new scholarship by women, BIPOC, LGBTQ+, and non-Western thinkers – please share resources you think would be useful. Suggestions and improvements are encouraged and appreciated.

### Tentative Schedule

*(Subject to change)*

- Jan 10 -- First day / Introduction
- Jan 15 -- Holiday -- no class
- Jan 17 -- Introduction
- Jan 22 -- Database Concepts
- Jan 24 -- Modeling and ER (Hw1 assigned)
- Jan 29 -- Modeling and ER
Jan 31 -- Modeling and ER

Feb 5 -- Enhanced ER

Feb 7 -- Relational Concepts (Hw1 due)

Feb 12 -- Well-being day, no class

Feb 14 -- Relational Concepts (Hw2 assigned)

Feb 19 -- ER to Relational Mapping

Feb 21 -- ER to Relational Mapping (Hw2 due)

Feb 26 -- Review for mid-term

Feb 28 -- In-class mid-term exam

Mar 4 -- SQL DDL (Hw3 assigned)

Mar 6 -- Installing MySQL Workbench

Mar 11 -- SPRING BREAK, no class

Mar 13 -- SPRING BREAK, no class

Mar 18 -- SQL DML Introduction

Mar 20 -- SQL Joins (Hw3 due)

Mar 25 -- More SQL

Mar 27 -- SQL Correlated and Nested Queries (Homework 4 assigned)

Apr 1 -- SQL Set Operations

Apr 3 -- SQL Aggregation

Apr 8 -- Relational Algebra

Apr 10 -- Functional Dependencies and Normalization (Homework 4 due)

Apr 15 -- Normal Forms, 2NF (DB Project assigned, optional Homework 5 assigned)

Apr 17 -- BCNF

April 22 -- Database project in class work day (optional Homework 5 due)

Apr 24 -- Research talk

Apr 29 -- Review for exam

May 2, 12:00noon -- Final Exam (in-person)