

Syllabus

INLS 523_02W, Fall 2016, Database Systems I Online, Stephanie W. Haas

Instructor

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Acknowledgements

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Course Description

INLS 523: Database Systems I: Introduction to Databases (3 credits)

Prerequisite:

Undergraduates: INLS 161 (formerly 261) or equivalent.

Graduates: Satisfactory completion of the SILS Information Technology Competency

Requirement (https://sils.unc.edu/programs/graduate/msis/curriculum-new#Technology_Requirement) OR INLS 161.

Design and implementation of database systems. Semantic modeling, relational database theory, including normalization, query construction, and SQL.

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, the relational model, SQL, normalization and data quality, and emerging technologies.

Course Outline

Startup
Introduction and Database Concepts
Entity-Relationship Models
Relational Theory and Concepts
SQL
Good Design
Functional Dependencies and Normalization
Data Quality
Wrapping up and Looking ahead

Learning Objectives

- Understand the basic concepts of databases, with emphasis on the relational model
- Gain experience with both the theoretical and practical aspects of database design and implementation.
- Develop proficiency with entity-relationship modeling.
- Be able to weigh, discuss, and justify database design decisions.
- Learn how to use SQL to create, manipulate and query databases
- Apply practical techniques for improving database design quality

- Gain an understanding of important ideas for databases in the future

Textbook

There is no required textbook for this course. Readings or links to readings will be included in the Sakai modules. The Tools and Resources document gives information about tools and resources you need for this course. I have suggested chapters from one textbook for those who would like to see additional examples or explanations of concepts and processes: Elmasri, R. & Navathe, S. (2011). *Fundamentals of Database Systems, Sixth Edition*, Addison-Wesley. We will use some examples from this textbook in the course.

The file [E&NChapters.pdf](#) in the Sakai/Resources/Official Documents folder contains suggestions for readings for each course module, as well as a crosswalk between chapters in the 4th, 5th, and 6th editions.

Policies on Academic Integrity and Diversity

Chapel Hill has had a student-administered honor system and judicial system for over 100 years. Because academic honesty and the development and nurturing of trust and trustworthiness are important to all of us as individuals, and are encouraged and promoted by the honor system, this is a most significant University tradition. More information is available at <http://studentconduct.unc.edu/honor-system>

The UNC Honor Code is in effect for all work in this course. Section II. B. of the "Instrument of Student Judicial Governance" gives examples of actions that constitute academic dishonesty: <https://studentconduct.unc.edu/sites/studentconduct.unc.edu/files/documents/Instrument.pdf>

Students often ask what is okay to talk about with other students and what is not. There are some specific guidelines for this course.

- I do encourage you to help each other learn the course material – your fellow students can often be a great resource for learning. For example, you could watch one of the videos together, and discuss the material it presents. However, you should not discuss the details of a solution to an ongoing 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 solutions to pending assignments.
- All work you submit should be your own.
- You may give and receive assistance regarding the use of hardware and software. For example, you may ask or answer a question such as "how do I [fill in the blank] in SQLite?". A question such as "Should I have a separate table to represent cats and their information?" should be addressed to me.
- Individual homework assignments are to be done **individually**. You may consult the course materials, your notes, and even other print or web sources. (Keep in mind, however, that what you find in other sources may not be consistent with what I want you to do.) You may not consult your classmates or other people; all questions should be addressed to me.
- You must sign (check) the honor statement when you submit each assignment. This confirms that you and the work conforms to the Honor Code.

In support of the University's diversity goals and the mission of the School of Information and Library Science, SILS embraces diversity as an ethical and societal value. We broadly define diversity to include race, gender, national origin, ethnicity, religion, social class, age, sexual orientation and physical and learning ability. As an academic community committed to preparing our graduates to be leaders in an increasingly multicultural and global society we strive to:

- Ensure inclusive leadership, policies, and practices;
- Integrate diversity into the curriculum and research;
- Foster a mutually respectful intellectual environment in which diverse opinions are valued;
- Recruit traditionally underrepresented groups of students, faculty and staff; and
- Participate in outreach to underserved groups in the State.

The statement represents a commitment of resources to the development and maintenance of an academic environment that is open, representative, reflective and committed to the concepts of equity and fairness.

Grading Policies

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

Grade Range	Definition*
A 90-100%	Mastery of course content at the <u>highest level of attainment</u> that can reasonably be expected of students at a given stage of development. The A grade states clearly that the students have shown such <u>outstanding promise</u> in the aspect of the discipline under study that he/she may be strongly encouraged to continue.
B 80-89.9%	<u>Strong performance</u> 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.
C 70-79.9%	A <u>totally acceptable</u> 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.
D 60-69.9%	A <u>marginal performance</u> 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.
F 0-59.9%	For whatever reason, an <u>unacceptable performance</u> . 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 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:

Grade Range	Definition*
H 95-99%	High Pass
P 80-94.9%	Pass
L 70-79.9%	Low Pass
F 0-69.9.9%	Fail

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

Due Dates and Late Work

Each assignment has a due date and time and includes instructions for submission. A late penalty of 5% per day will be applied unless prior arrangements have been made with the instructor. Assignments submitted more than 5 days after the due date will receive no credit and will not be graded.

Requests for Extensions

If you have a real problem submitting an assignment on time, please contact me *before* the due date. Getting a late start on an assignment does not count as a real problem. Any request for an extension must be made, preferably by email, at least 24 hours prior to the due date. If an emergency arises that prevents you from contacting me in advance, you must do so as soon as possible.

Grade Components

- Graded exercises, 4% of final grade
- Discussion contributions, 4% of final grade
- Tests, 30% of final grade
- Assignments, 40% of final grade
- Project, 22% of final grade

The Assignment Overview provides additional information about the work for this course.

Course Communications

Course announcements

Announcements will be posted on Sakai. Announcements may include information about the week's work, or other timely information.

Messages

I may use the message tool to send individual messages to you; I may also copy the message to your email address. You can also use the tool to send a message to me.

Email

Email is the best way to contact me.

Note that I receive a large amount of email and while I try to reply to student emails within 48 hours, there are times that it may take me 2-3 days to reply. Therefore, it is important that you get started on assignments early, so there is time for me to respond to any questions you may have. I cannot guarantee that I will be able to answer last-minute questions (e.g., within 2 days of the assignment due date).

Sakai

All enrolled students should have access to the UNC Sakai site for this course: <http://sakai.unc.edu/>
We will use Sakai for almost all course activities.

Course Materials

All materials can be found in Sakai. The course syllabus, schedule, and information about tools and other resources will be there at the beginning of the semester.

Materials for each week are located in the **Modules** section of the Sakai site. I recommend that you work through each week's materials in the order they are listed. Unit materials, including videos and slides, exercises, and discussion topics will be published Tuesday mornings at 8:00 a.m. Once published, they will be available for you to study through the end of the semester.

Discussion Forum

We will use the Sakai discussion forum for a variety of interactions and exchanges. I will start some topics, for example, to pose questions or puzzles for you to discuss. You can also start topics, for example, to start a discussion about current issues or news involving databases, or asking a question of general interest about course content of technology.

The Discussion Overview provides additional information about the discussions for this course.

Assignments

All Graded Exercises, Assignments, and Project Deliverables must be submitted using the Sakai Assignments tool. In my experience, Sakai is a reliable method for submitting assignments. It is the responsibility of each student to make sure they have access to Sakai and can submit assignments when they are due.

If for some reason you are unable to submit an assignment to Sakai, as a last resort you may email it to me 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 Sakai. 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 Sakai.

Drop Box

You each have a drop box in Sakai that is accessible only to you and me. You may store work in progress here. If you have a question about an assignment, and it would be helpful for me to see your work, you may store the draft in your drop box, and refer to it in your emailed question. I will look at only that file to respond to your question.

Do NOT submit homework by putting it into your drop box; all assignments should be submitted in the assignment.

Tests

Tests will be administered using the Tests & Quizzes Tool. Each of the 5 tests covers material from 1 major topic area:

1. Database Concepts
2. Entity-Relationship Models
3. Relational Concepts and Mapping
4. SQL
5. Design, Functional Dependencies, and Normalization.

Tests will be published Sunday at 8:00 a.m. and must be completed by Tuesday 6:00 p.m. You may take the test at any time during that period, but once you have started, you must complete it in one sitting. To help your planning, I will post the approximate amount of time I expect each test to require, but remember that this is only a rough estimate – everyone works at a different pace.

Schedule Overview

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This draft schedule outlines the major topics and events planned for the semester. See the Unit Modules in the Sakai site for details.

1. Tuesday 8/23/16. Startup and Introduction; Database Concepts

Material: Video, slides, transcripts

Self-Check Exercises

Required Discussions, due Monday 8/29/16, 6:00 p.m.

Database Experience Survey (ungraded), due Monday 8/29/16, 6:00 p.m.

Assignment: Assign A1, Startup due Monday 8/29/16, 6:00 p.m.

Graded Exercise, due Monday 8/29/16, 6:00 p.m.

Test 1: DB Concepts, opens Sunday 8/28/16 8:00 a.m., due Tuesday 8/30/16, 6:00 p.m.

Project: Assign P1 (requirements, use cases, questions), due Monday 9/12/16, 6:00 p.m.

Due Monday 8/29/16, 6:00 p.m.: 2 Discussions, Database Experience Survey, A1, Graded Exercise

Due Tuesday 8/30 16, 6:00 p.m.: Test 1

2. Tuesday 8/30/16. Entity-Relationship Models (1)

Material: Video, slides, transcripts. reading

Self-Check Exercise

Required Discussion due Tuesday 9/6/16, 6:00 p.m. (NOT Labor Day)

Optional Discussion due Tuesday 9/6/16, 6:00 p.m. (NOT Labor Day)

Graded Exercise due Tuesday 9/6/16, 6:00 p.m. (NOT Labor Day)

Due Tuesday 9/6/16, 6:00 p.m.: Discussion, Graded Exercise

3. Tuesday 9/6/16. Entity-Relationship Models (2)

Material: Video, slides, transcripts

Self-Check Exercise

Optional discussion, due Monday 9/12/16, 6:00 p.m.

Graded Exercise, due Monday 9/14/15, 6:00 p.m.

Assignment: Assign A2, ER model, due Monday 9/26/16, 6:00 p.m.

Due Monday 9/12/16, 6:00 p.m.: Discussion, Graded Exercise, P1

4. Tuesday 9/13/16. Extended ER Models

Material: Video, slides, transcripts

Self-Check Exercise

Optional Discussion, due Monday 9/19/16, 6:00 p.m.

Test 2: ER & EER, opens Sunday 9/18/16, 8:00 a.m., due Tuesday 9/20/16, 6:00 p.m.

Due Monday 9/19/16, 6:00 p.m.: Discussion

Due Tuesday 9/20/16, 6:00 p.m.: Test 2

5. Tuesday 9/20/16. Relational Concepts

Material: Video, slides, transcript, reading

Self-Check Exercise

Graded Exercise, due Monday 9/26/16, 6:00 p.m.

Project: Assign Project P2 (ER), due Monday 10/17/16, 6:00 p.m.

Due Monday 9/26/16, 6:00 p.m.: Graded Exercise, A2

6. Tuesday 9/27/16. ER-DB Mapping

Material: Video, slides, transcripts

Self-Check Exercises 1

Graded Exercise, due Monday 10/3/16, 6:00 p.m.

Test 3: Relational Concepts & ER-DB Mapping, opens Sunday 10/2/16, 8:00 a.m., due Tuesday 10/4/16, 6:00 p.m.

Assignment: Assign A3 Mapping, due Monday 10/10/16, 6:00 p.m.

Due Monday 10/3/16, 6:00 p.m.: Graded Exercise

Due Tuesday 10/4/16, 6:00 p.m.: Test 3

7. Tuesday 10/4/16. SQL (1)

Material: Video, slides, transcripts

Self-Check Exercises

Optional Discussion, due Monday 10/10/16, 6:00 p.m.

Graded Exercise, due Monday 10/10/16, 6:00 p.m.

Due Monday 10/10/16, 6:00 p.m.: Optional Discussion, Graded Exercise, Assignment A3

8. Tuesday 10/11/16. SQL (2)

Material: Video, slides, transcripts

Self-Check Exercises 1

Graded Exercise, due Monday 10/17/16, 6:00 p.m.

Due Monday 10/17/16, 6:00 p.m.: Graded Exercise, Project P2

9. Tuesday 10/18/16. SQL (3) (Fall Break Thursday & Friday)

Material: Video, slides, transcripts, reading

Self-Check Exercise

Graded Exercise, due Monday 10/24/16, 6:00 p.m.

Assign A4 SQL: due Monday 10/31/16

Due Monday 10/24/16, 6:00 p.m. Graded Exercise

10. Tuesday 10/25/16 SQL (4)

Material: video, slides, transcripts, reading

Self-Check Exercise

Optional Discussion, due Monday 10/31/16, 6:00 p.m.

Assign P3 Mapping: due Monday 11/7/16, 6:00 pm

Due Monday 10/31/16, 6:00 p.m.: Optional Discussion, Assignment A4

11. Tuesday 11/1/16. More SQL Practice; Good Design

Material: video, slides transcripts, reading.

Self-Check Exercise

Graded Exercise, due Monday 11/7/16, 6:00 p.m.

Optional Discussion, due Monday 11/7/16, 6:00 p.m.

Test 4: SQL, opens Sunday 11/6/16 8:00 a.m., due Tuesday 11/8/16, 6:00 p.m.

Due Monday 11/7/16, 6:00 p.m.: Optional Discussion, Graded Exercise, Project P3

Due Tuesday 11/8/16, 6:00 p.m.: Test 4

12. Tuesday 11/8/16. Functional Dependencies, Normalization (1)

Material: videos, slides, transcripts, reading

Self-Check Exercise

Discussion, due Monday 11/14/16, 6:00 p.m.

Graded Exercise, due Monday 11/16/15, 6:00 p.m.

Due Monday 11/14/16, 6:00 p.m.: Discussion, Graded Exercise

13 & 14. Tuesday 11/15/16 & Tuesday 11/22/16. Functional Dependencies, Normalization (2)

Note: this Unit covers 2 weeks, including the week of Thanksgiving Break. Pay attention to the due dates!

Material: video, slides, transcript, reading.

Self-Check Exercises

Graded Exercise, due Monday 11/21/16, 6:00 p.m.

Assignment: Assign A5, Functional Dependencies and Normalization, due Monday 11/28/16, 6:00 p.m.

Project: Assign Project P4, Implementation: due Thursday 12/15/16, 8:00 a.m.

Due Monday 11/21/16, 6:00 p.m.: Graded Exercise

Due Monday 11/28/16, 6:00 p.m.: Assignment A5

15. Tuesday 11/29/16. Data Quality and Wrap-up

Material: Video, slides, transcript

Self-Check Exercise

Required Discussion, due Monday 12/5/16, 6:00 p.m.

Test 5: Good Design, Functional Dependencies, and Normalization, opens Sunday 12/4/16, 8:00 a.m., due Tuesday 12/6/16 6:00 p.m.

Due Monday 12/5/16, 6:00 p.m.: Required Discussion

Due Tuesday 12/6/16, 6:00 p.m.: Test 5

Thursday 12/15/16, 9:00 a.m.

Project deliverable 4 due.

Assignment Overview

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Assignments for this course are intended to provide opportunities for:

- practice working with database concepts and skills,
- interaction with your student colleagues to discuss issues in database design and implementation,
- experience building a database from initial conception to final testing, and
- assessment of your learning.

Graded exercises (4% of final grade)

These brief exercises provide practice for you, and an opportunity for me to give you feedback. Exercises will be assigned on Tuesday of most weeks, and due the following Monday at 6:00 p.m.

Discussion topics (4% of final grade)

The discussion topics pose questions that explore database issues, puzzles, or design decisions. Topics will usually be posted on Tuesdays, along with the rest of the materials. Some topics are required; everyone must contribute to the discussion. Other topics are optional, but you must contribute to at least 2 of the optional discussions to receive full credit for the discussion portion of your grade. Contributions must be posted no later than Monday of the following week at 6:00 p.m. See the Discussion Overview for details.

Tests (30% of final grade)

Each of the 5 tests covers material from 1 major topic area:

1. Database Concepts: opens Sunday 8/28/16, 8:00 a.m., due Tuesday 8/30/16, 6:00 p.m.
2. Entity-Relationship Models: opens Sunday 9/18/16, 8:00 a.m., due Tuesday 9/20/16, 6:00 p.m.
3. Relational Concepts and Mapping: opens Sunday 10/2/16, 8:00 a.m., due Tuesday 10/4/16, 6:00 p.m.
4. SQL: opens Sunday 11/6/16, 8:00 a.m., due Tuesday 11/8/16, 6:00 p.m.
5. Good Design, Functional Dependencies, and Normalization: opens Sunday 12/4/16, 8:00 a.m., due Tuesday 12/6/16, 6:00 p.m.

Tests will be published in the Sakai test tool Sunday at 8:00 a.m. and must be completed no later than Tuesday 6:00 p.m. You may take the test at any time during that period, but once you have started, you must complete it in one sitting. To help your planning, I will post the approximate amount of time I expect each test to require, but remember that this is only a rough estimate – everyone works at a different pace.

Assignments (40% of final grade, 10% each)

There are 5 assignments. The first assignment lets you practice submitting assignments through Sakai, and is ungraded. The other 4 assignments each cover a major topic/skill in database design and development.

- Assignment 1, Start-up (ungraded): Assigned Tuesday 8/23/16, due Monday 8/29/16, 6:00 p.m.
- Assignment 2, Entity-Relationship Model: Assigned Tuesday 9/6/16, due Monday 9/26/16, 6:00 p.m.
- Assignment 3, DB Mapping: Assigned Tuesday 9/27/16, due Monday 10/10/16, 6:00 p.m.
- Assignment 4, SQL: Assigned Tuesday 10/18/16, due Monday 10/31/16, 6:00 p.m.
- Assignment 5, Functional Dependencies and Normalization: Assigned Tuesday 11/15/16, due Monday 11/28/16, 6:00 p.m.

Database Project (22% of final grade: P1 4%, P2 4%, P3 4%, P4 10%)

The semester-long database project covers the whole process of database design and development, from initial conceptualization to running queries.

Deliverable P1: Given a general description of the purpose of the database, write more specific requirements. Describe the users of the database, along with their information needs. Also write 2 use cases, including the specific question(s) the database must be able to answer.

Deliverable P2: Based on the requirements you wrote in Deliverable 1, and any feedback from the instructor, design the entity-relationship diagram for the database.

Deliverable P3: Revise the ER based on instructor feedback (if needed). Then map the ER to the database schema, and create a data dictionary for the DB. Write at least 10 specific questions that you will pose as queries to the database in Deliverable P4. The questions should reflect the information needs of the users you described in Deliverable P1, and demonstrate that your database supports their needs.

Deliverable P4: Revise the schema and/or data dictionary based on instructor feedback (if needed). Implement the database, populate it with records, and write and run the queries. Reflect on your "lessons learned".

Project Schedule

- Assign P1 Tuesday 8/23/16, due Monday 9/12/16, 6:00 p.m.
- Assign P2 Tuesday 9/20/16, due Monday 10/17/16, 6:00 p.m..
- Assign P3 Tuesday 10/25/16, due Monday 11/7/16, 6:00 p.m.
- Assign P4 Tuesday 11/15/16, Thursday 12/15/16, 9:00 a.m. (at the scheduled time of the final exam*)

*There is no final exam for this course.