CSE 4020/5260 – Database Systems

Syllabus for Spring 2023

Instructor: Fitzroy D. Nembhard
Class Hours: Monday, Wednesday, and Friday: 10:00am - 10:50am
Classroom: Frederick C. Crawford (420CRF), Room 403
Office Hours: Tuesday and Thursday: 7:45am to 9:00am, 3:00pm - 4:00pm
Office: L3Harris Center for Science and Engineering (504LSA), Room 325
Email: fnembhard@fit.edu | **Website**: https://www.drfitz.fit | **Appointments:** https://calendly.com/dr_fitz

I. About the Course

Course Description

An introduction to the analysis and design of typical database systems. Includes theoretical and practical aspects of designing database systems. A substantial project is included.

This course will focus on the theory underlying databases and, in particular, relational databases. This will include the entity-relationship model, the relational model, Structured Query Language (SQL), integrity constraints, and relational database design. As a bonus, students will be introduced to NoSQL databases by completing real-world exercises.

Prerequisite: CSE 2010.

Students are expected to have a working knowledge of data structures (stacks, queues, linked-lists, trees, graphs), and discrete math (relations, functions, bijections, propositional logic, truth tables). If you do not satisfy the prerequisites, then taking the class is at your own risk. Students will also be expected to execute queries in a popular programming language such as Python, C/C++, or Java.

Course Objectives

By the end of the course, students will have theoretical knowledge of and hands-on experience with database systems. More specifically, they will be prepared to:

1. Understand and apply the entity-relationship model

2. Understand concepts related to the relational model

3. Write and execute queries using SQL via a popular programming language

4. Specify integrity constraints on databases

5. Design databases using relational database design

6. Explore the NoSQL model

Textbook

- **Required:** *Database Systems Concepts, 7th Edition*, Abraham Silberschatz, Henry F. Korth, and S. Sudarshan, 2020.

Grading and Components

- 3 in-class Quizzes: 30%

- In-class Activities: 30%

- Final Project: 40%

Grading Scale

- 😊 A: 90 - 100
- 😊 B: 80 - 89
- ☺ C: 70 - 79
- ☹ D: 60 - 69
- 🔴 F: Below 60.

(I may choose to vary this for borderline grades, but only to the student's benefit.)

II.   Instructor's Expectations

1. Students enrolled in this course are expected to do the following throughout the duration of the semester:

   a.) Be punctual. Tardiness is discouraged;

   b.) Silence all electronic devices (cellular phones, tablet PCs, iPads, etc.) before entering the classroom/lab;

   c.) If engaging in remote learning, practice virtual meeting etiquette by ensuring that your background is noise-free and your environment is appropriate; mute your microphone unless you are participating in a discussion or asking a question;

   d.) All students are expected to be engaged and actively participating in class;

   e.) Check their Canvas and Florida Tech email account on a daily basis;

   f.) Have access to a computer equipped with reliable Internet access, speakers, a Web browser (i.e., Chrome, Firefox, Safari, Edge, etc.), Python 3, Python IDLE, PyCharm IDE, Adobe Reader, Adobe Flash Player, Microsoft Word (or other compatible word processing software), and Microsoft PowerPoint (or other compatible presentation software) on a regular basis;

   g.) Submit all assignments in the document format specified by the instructor by their respective due dates;

2. **Attendance** Attendance is expected in all lectures. Lectures will contain materials often outside the scope of the assigned reading but will be included in the midterm and final exam. Missing lectures could result in missing key material relevant to the exam. Course exercises will be assigned during the class period. Missing a course exercise will result in the instructor assigning a 0 for the specific assignment.

III. Policies

Lecture Materials: Will be available on Canvas in PDF format. Presentation slides will usually be available in the week of the lecture, after the material for that section is complete. Any such material is provided for educational purposes only and cannot be further reproduced or distributed without possible violation of copyright laws.

Quiz Policies: Three Quizzes will be given in the course. These will test students' grasp of concepts and help to broaden the assessment of performance. Quizzes will be closed book and closed notes, and all will be in-class. All lecture slides and other materials that will be included on quizzes will be posted to the course Canvas page, but each quiz can include questions drawn from the textbook, in-class activities, or classroom discussions.

In-class Activities: Students will complete multiple in-class assignments during the course. These may be given at the end of each chapter or topic. This may include performing CRUD operations on databases using code and displaying results. Late submissions will not be accepted without prior approval.

Make-up Assignments, Classwork and Exam: Make-ups will only be given in extreme circumstances when a valid letter from the dean of students is provided.

Use of Canvas: We will be using Canvas as the course management tool to assist in the administration of this course. You will be required to use this tool throughout the semester, since most of the times, your assignments, exams and other course materials will be delivered via Canvas. More information about the use of Canvas will be provided to you as the semester wears on. If there are any questions about Canvas, please feel free to ask about it.

Printing of Work: This course will engage in the practice of "green/sustainable" computing. Green computing is the study and practice of using computing resources efficiently and considers the so-called triple bottom line of people, planet, and profit. As such, students will be required to submit their work electronically.

It is your responsibility to track all assignments and due dates as everything appears on Canvas

IV. Additional Information

1. **Where to go for Help:**

   There are a number of resources that are available to you if and when you need them. The instructor is the first line of help. Please don't hesitate to see me. Some other resources include, but are not limited to:

   - Sign up and post questions related to the course/assignments, etc., on
     https://piazza.com/fit/spring2023/cse40205260
   - Advising and Counseling
     https://www.fit.edu/counseling-and-psychological-services/
   - Location and hours of other computer labs
     https://it-faq.fit.edu/it_faq/category/32/computer-labs.html
   - Internet and other computer resources for after-hours use; YouTube, Wikipedia, and https://docs.python.org/3/, can serve as great supplemental resources
   - Use of Canvas
   - Tutoring - https://www.fit.edu/academic-support-center/tutoring/
   - Technology Lending Service
     https://lib.fit.edu/using-the-library/technology-lending-service/

2. **Irregularities:**
   Cheating, plagiarism, copying, and unauthorized collaboration are unacceptable and are subject to disciplinary actions, including a grade of "F" for the course and a letter of fact in the student's record, according to the rules of the University and the Department of Computer Science. (See special instructions about Copyright Infringement.)

3. **Academic Honesty Definitions & Procedures**
Academic Honesty Definitions & Procedures is located in the student handbook at https://www.fit.edu/policies/student-handbook/standards-and-policies/academic-honesty/

The purpose of assignments and exams are to develop your skills and measure your progress in the course. Thus, all assessed coursework must be your own work. In the case that you are assigned a partner for an activity, you may share the same results as your partner. However, your report must be in your own words. You may discuss assignments with other students. However, you may not partially or completely duplicate the work of others and claim it as your own. In order to deter and detect plagiarism, online tools and other resources may be used in this class. Department and University policies allow severe penalties for plagiarism up to and including an F in the course, and/or expulsion from the University.

4. **Title IX Statement**
The university's Title IX policy is available at https://www.fit.edu/policies/title-ix/

Title IX of the Education Amendments of 1972 is a federal civil rights law that prohibits discrimination on the basis of sex in federally funded education programs and activities. Florida Institute of Technology policy also prohibits discrimination on the basis of sex.

Florida Tech faculty are committed to helping create a safe learning environment for all students that is free from all forms of discrimination and sexual harassment, including sexual assault, domestic violence, dating violence, and stalking. If you, or someone you know, have experienced or is experiencing any of these behaviors, know that help and support are available.

Florida Tech strongly encourages all members of the community to take action, seek support, and report any incident of sexual harassment or gender discrimination to the Title IX Coordinator at 321-674-7153 or TitleIXCoordinator@fit.edu.

Please note that as your professor, I am required to report any incidents to the Title IX Coordinator. If you wish to speak to an employee who does not have this reporting responsibility, please contact the Student Counseling Center at 321-674-8050.

5. **Academic Accommodations**
Florida Tech is committed to equal opportunity for persons w/disabilities in the participation of activities operated/sponsored by the university. Therefore, students w/documented disabilities are entitled to reasonable educational accommodations. The Office of Accessibility Resources (OAR) supports students by assisting w/accommodations, providing recommended interventions, and engaging in case management services. It is the student's responsibility to make a request to OAR before any accommodations can be approved/implemented. Also, students w/approved accommodations are encouraged to speak w/the course instructor to discuss any arrangements and/or concerns relating to their accommodations for the class. Office of Accessibility Resources (OAR): Telephone: 321-674-8285 / Email: accessibilityresources@fit.edu Website: https://www.fit.edu/accessibility-resources.

6. **Recording Disclosure (Privacy Waiver)**
This course may be recorded for use by students and/or faculty. Enrolled students are subject to having their images and voices recorded during the classroom presentations, remote access learning, online course discussions, and remote office hours/meetings. Course participants should have no expectation of privacy regarding their participation in this class. Recordings may not be reproduced, shared with those not registered in the courses, or uploaded to other online environments. All recordings will be deleted at the conclusion of the academic term.

7. **Changes to syllabus:**

The instructor reserves the right to make changes to the syllabus as necessary. You will be notified in writing or by word of mouth if and when a change is made to the syllabus.

V. Anticipated Weekly Subject Matter and Assignment Schedule*

Week	Topic	Text
1	Administrivia	
	Environment Set-Up: IDEs, Online Editors, Jupyter Overview	Handout
	Introduction to Database Systems	Chapter 1
2	Entity-Relationship Modelling Part 1	Chapter 6
	Jan. 16 Holiday (Martin Luther King Jr. Day)	
3	Entity-Relationship Modelling Part 2	Chapter 6
4	The Relational Model Part 1	Chapter 2
5	The Relational Model Part 2	Chapter 2
6	SQL - Data Definition Language (DDL) Part 1	Chapter 3
7	SQL - Data Definition Language (DDL) Part 2 **(Midterm grade entry begins)**	Chapter 1, 3
8	SQL - Data Manipulation Language (DML) – CRUD Part 1	Chapter 1, 3
9	SQL - Data Manipulation Language (DML) – CRUD Part 2	Chapter 1, 3
10	**Spring Break** **(Mar 13 -17)**	
11	Advanced SQL **Last day to withdraw with a W (Mar 24)**	Chapter 5
12	Relational Database Design Part 1	Chapter 7
13	Relational Database Design Part 2	Chapter 7
14	Intro to NoSQL Part 1	Chapter 10
15	Intro to NoSQL Part 2	Chapter 10
16	Intro to NoSQL Part 3	Chapter 10

*This schedule is subject to change at the instructor's discretion