Database Management

CS442

CS/CPE Sections A & B

Department of Computer Science

Fall, 2022

Instructor: Wendy Hui Wang

Contact Info: hwang4@stevens.edu

Course Schedule: Tuesdays & Thursdays

Sections:

- Section A (12:30 PM - 1:45 PM): Gateway South 122
- Section B (2:00 PM - 3:15 PM): Gateway South 121

Prerequisite(s): CS182, CS385

Teaching assistants:

- Aughdon Breslin <abreslin@stevens.edu>,
- Sebastian Churion <schurion@stevens.edu>,
- Alexander Rubino <arubino@stevens.edu>,
- Dennis Salmanowitz <dsalmano@stevens.edu>,
- Grace Mattern <gmattern@stevens.edu>

COURSE DESCRIPTION

CS442 provides introduction to the design and querying of relational databases. Topics include: relational schemas; keys and foreign key references; relational algebra (as an introduction to SQL); SQL in depth; Entity-Relationship (ER) database design; translating from ER models to relational schemas and from relational schemas to ER models; functional dependencies; and normalization.

STUDENT LEARNING OUTCOMES

After successful completion of this course, students will be able to…

- **Schema design** - Design a relational database schema with appropriate keys and foreign key references. (BS-CS C design, BS-CyS C design,)
- **Relational algebra** - Write queries in un-extended relational algebra. (BS-CS A apply, BSCyS A apply,)
- **SQL -** Write SQL queries. (BS-CS I currency, BS-CyS I currency,)
- **ER diagram** - Define ER diagrams for new databases. (BS-CS C design, BS-CyS C design,)
- **Redundant FDs** - Identify redundant functional dependencies. (BS-CS A apply, BSCyS A apply,)
- **Normalization** - Explain how to perform normalization once redundancies have been eliminated. (BS-CS A apply, BS-CyS A apply,)

COURSE FORMAT AND STRUCTURE

This course is fully in-person. To access the course, please visit stevens.edu/canvas

Links to an external site. . For more information about course access or support, contact the TRAC by calling 201-380-6599 or 201-216-5500.

Course Logistics

- All lecture notes (in PDF format) will be posted before the class. Some slides will be left blank for in-class exercise and explanations. You need to take notes by yourself for these blank slides.
- When assignments are due, they are due by 11:59 p.m. ET on the due date listed in the course schedule.
- Due dates and delivery time deadlines are defined as Eastern Time (as used in Hoboken, NJ). Students living in distance time zones or overseas must comply with this course time and time and due date deadline policy. Avoid any inclination to procrastinate.
- **Late penalty**:
    - 5% of the total points per day that the assignment is late will be deducted;
    - Assignments received more than 1 week late will receive 0 points.
- An assignment file should be appended by your username, such as "assignment1_kim53.doc". This may make it easier for TAs to manage assignment files.

Instructor's Online Hours

I will be available via email and will respond as soon as I am available (generally within 24-48) hours.

For the online discussions, I will check in at least 3 times per week. Keep in mind that it is not possible for me to respond to every single posting every week (nor is it pedagogically appropriate), but I will be sure to respond to a variety of postings and students each week and attempt to assure equality in terms of responses to students. If you feel you are being neglected in any way, please contact me.

When emailing me, please place in the subject line the course number/section and the topic of the email (i.e. CS442 – Assignment 2 Question). This will help me tremendously in locating your emails quicker when I scan the hundreds of emails that seem to make it into my box each day.

Office Hours

- Instructor office hours will be held at 2pm – 3pm Mondays (Zoom link: https://stevens.zoom.us/j/4758834499).
- TA office hours will be held at the following time slots:
  - Aughdon Breslin: 12pm - 1pm Mondays (In-person: TBA) (Zoom link: https://stevens.zoom.us/my/abreslin

- Links to an external site.)
- Sebastian Churion: 10am - 11am Mondays (In-person: GS226) (Zoom link: https://stevens.zoom.us/j/4784110023)
- Alexander Rubino: 4pm - 5pm Tuesdays (In-person: GS224) (Zoom link: https://stevens.zoom.us/j/2921145949
- Links to an external site.)
- Dennis Salmanowitz: 11am - 12pm Mondays (In-person: GS226) (Zoom link: https://stevens.zoom.us/j/9883106408
- Links to an external site.)
- Grace Mattern: 4pm - 5pm Tuesdays (In-person: GS224) (Zoom link: https://stevens.zoom.us/j/2897023801

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  - Links to an external site.)

TENTATIVE COURSE SCHEDULE

Week	Topic(s)	Readings	Assignment (tentative)
Week 1 (Sept 6 & 8)	Introduction, ER diagram	Chapter 2 of textbook	
Week 2 (Sept 13 & 15)	ER diagram	Chapter 2 of textbook	
Week 3 (Sept 20 & 22)	Relational model	Chapter 3 of textbook	Assignment 1 ER diagram due
Week 4 (Sept 27 & 29)	Translating ER to relational model	Chapter 3 of textbook	

Week 5 (Oct 4 & 6)	Relational algebra and in-class exercise session (I)		Assignment 2 Translating ER to relational model due
Week 6 (Oct 13)	Oct 11: No class due to Monday Schedule Oct 13: Relational algebra in-class exercise session (II)		
Week 7 (Oct 18 & 20)	Oct 18: SQL - simple queries and set operations, Oct 20: SQL - set operations and in-class exercise session for simple queries		Assignment 3 Relational algebra due
Week 8 (Oct 25 & 27)	Oct 25: SQL - nested queries, and aggregation queries. Oct 27: SQL - Group-by and Having queries, in-class exercise session for nested queries (Part I)		
Week 9 (Nov 1 & 3)	Nov 1. in-class exercise session for nested queries (Part II) Nov 3. Midterm exam		Assignment 4 SQL due
Week 10 (Nov 8 & 10)	Nov 8. Midterm exam solution review and JDBC programming Nov 10. In-class SQL programming lab		
Week 11 (Nov 15 & 17)	Nov 15. In-class SQL programming lab (Cont.) Nov 17. Functional dependency		
Week 12 (Nov 22 & 24)	Nov 22: Functional dependency and normal form Nov 24: No class due to Thanksgiving holiday		

Week 13 (Nov 29 and Dec 1)	Nov 29: BCNF decomposition Dec 1: 3NF decomposition		
Week 14 (Dec 6 & 9)	Dec 6: In-class exercise session for schema refinement (Part I) Dec 9: In-class exercise session for schema refinement (Part II) and final review		Assignment 5 Schema refinement due
Week 15 (Dec 13)	Dec 13: Final exam		

COURSE MATERIALS

Textbook(s):   Database Management Systems, 3rd Edition, Raghu Ramakrishnan and Johannes Gehrke, McGraw-Hill, 2002.

Other Readings: N/A

Materials: lecture notes, sample questions and solutions that will be posted on Canvas.

TECHNOLOGY REQUIREMENTS

Baseline technical skills necessary for online courses

- Basic computer and web-browsing skills
- Navigating Canvas

Required Equipment

- Computer: current Mac (OS X) or PC (Windows 7+) with high-speed internet connection

Required Software

- Current or first previous major release of Chrome, Firefox, Edge, or Safari browser
- Acrobat Reader (for PDF review)
- Microsoft PowerPoint

GRADING PROCEDURES

Grades will be based on:

Attendance	5%
Assignment	30%
In-class quizzes	5%
Lab	10%
Midterm exam	20%
Final exam	30%

Late Policy

- 5% of the total points per day that the assignment is late will be deducted;
- Assignments received more than 1 week late will receive 0 points.

Academic Integrity

- Students are bound by the Honor System.

Undergraduate Honor System

Enrollment into the undergraduate class of Stevens Institute of Technology signifies a student's commitment to the Honor System. Accordingly, the provisions of the Stevens Honor System apply to all undergraduate students in coursework and Honor Board proceedings. It is the responsibility of each student to become acquainted with and to uphold the ideals set forth in the Honor System Constitution. More information about the Honor System including the constitution, bylaws, investigative procedures, and the penalty matrix can be found online at http://web.stevens.edu/honor/

Links to an external site.

The following pledge shall be written in full and signed by every student on all submitted work (including, but not limited to, homework, projects, lab reports, code, quizzes and exams) that is assigned by the course instructor. No work shall be graded unless the pledge is written in full and signed.

"I pledge my honor that I have abided by the Stevens Honor System."

Reporting Honor System Violations

Students who believe a violation of the Honor System has been committed should report it within ten business days of the suspected violation. Students have the option to remain anonymous and can report violations online at www.stevens.edu/honor

Links to an external site..

EXAM CONDITIONS

The following procedures apply to quizzes and exams for this course. As the instructor, I reserve the right to modify any conditions set forth below by printing revised Exam Conditions on the quiz or exam.

1. Students may use the following materials during quizzes and/or exams. Any materials that are not mentioned in the list below are not permitted.

Material	Permitted? Yes	No
Handwritten Notes	Yes	
Conditions: i.e. size of note sheet	(1 single-side A4 cheat sheet is allowed)	
Typed Notes		
Conditions: i.e. size of note sheet	No	
Textbooks		
Conditions: i.e. specific books	No	
Readings		
Conditions: i.e. specific documents	No	
Other (specify)	No	

2. Students are not allowed to work with or talk to other students during quizzes and/or exams.

LEARNING ACCOMMODATIONS

Stevens Institute of Technology is dedicated to providing appropriate accommodations to students with documented disabilities. The Office of Disability Services (ODS) works with undergraduate and graduate students with learning disabilities, attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, psychiatric disorders, and other such disabilities in order to help students achieve their academic and personal potential. They facilitate equal access to the educational programs and opportunities offered at Stevens and coordinate reasonable accommodations for eligible students. These services are designed to encourage independence and self-advocacy with support from the ODS staff. The ODS staff will facilitate the provision of accommodations on a case-by-case basis.

For more information about Disability Services and the process to receive accommodations, visit https://www.stevens.edu/office-disability-services

Links to an external site.. If you have any questions please contact: Phillip Gehman, the Director of Disability Services Coordinator at Stevens Institute of Technology at pgehman@stevens.edu or by phone 201-216-3748.

Disability Services Confidentiality Policy

Student Disability Files are kept separate from academic files and are stored in a secure location within the Office of Disability Services. The Family Educational Rights Privacy Act (FERPA, 20 U.S.C. 1232g; 34CFR, Part 99) regulates disclosure of disability documentation and records maintained by Stevens Disability Services. According to this act, prior written consent by the student is required before our Disability Services office may release disability documentation or records to anyone. An exception is made in unusual circumstances, such as the case of health and safety emergencies.

INCLUSIVITY

Name and Pronoun Usage

As this course includes group work and class discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect. This includes the ability for all students to have their chosen gender pronoun(s) and chosen name affirmed. If the class roster does not align with your name and/or pronouns, please inform the instructor of the necessary changes.

Inclusion Statement

Stevens Institute of Technology believes that diversity and inclusiveness are essential to excellence in academic discourse and innovation. In this class, the perspective of people of all races, ethnicities, gender expressions and gender identities, religions, sexual orientations, disabilities, socioeconomic backgrounds, and nationalities will be respected and viewed as a resource and benefit throughout the semester. Suggestions to further diversify class materials and assignments are encouraged. If any course meetings conflict with your religious events, please do not hesitate to reach out to your instructor to make alternative arrangements.

You are expected to treat your instructor and all other participants in the course with courtesy and respect. Disrespectful conduct and harassing statements will not be tolerated and may result in disciplinary actions.

MENTAL HEALTH RESOURCES

Part of being successful in the classroom involves a focus on your whole self, including your mental health. While you are at Stevens, there are many resources to promote and support mental health. The Office of Counseling and Psychological Services (CAPS) offers free and confidential services to all enrolled students who are struggling to cope with personal issues (e.g., difficulty adjusting to college or trouble managing stress) or psychological difficulties (e.g., anxiety and depression). CAPS is open daily from 9:00 am – 5:00 pm M-F. Evening hours are available by appointment in the Fall / Spring semesters and up-to-date information regarding the availability of evening appointments can be found by visiting www.stevens.edu/CAPS

Links to an external site.. To schedule an appointment, call 201-216-5177.

Due to the pandemic, in-person appointments may be limited until further notice. Up-to-date information about the availability of in-person services can be found at www.stevens.edu/CAPS

Links to an external site.. Teletherapy (therapy via secure video platform) is available to registered students physically located in the states of New York or New Jersey. Students located outside of NY / NJ are encouraged to pursue local treatment through their personal health insurance. To learn more about the process of finding a therapist please visit the CAPS webpage on Seeking Help Off-Campus

Links to an external site..

EMERGENCY INFORMATION

In the event of an urgent or emergent concern about the safety of yourself or someone else in the Stevens community, please immediately call the Stevens Campus Police at 201-216-5105 or on their emergency line at 201-216-3911. These phone lines are staffed 24/7, year round. For students who do not reside near the campus and require emergency support, please contact your

local emergency response providers at 911 or via your local police precinct. Other 24/7 national resources for students dealing with mental health crises include the National Suicide Prevention Lifeline (1-800-273-8255) and the Crisis Text Line (text "Home" to 741-741). If you are concerned about the wellbeing of another Stevens student, and the matter is *not* urgent or time sensitive, please email the CARE Team at care@stevens.edu. A member of the CARE Team will respond to your concern as soon as possible.