Rensselaer

Course Syllabus

Course Information

Database Systems		CSCI 4380	Section 01
RPI Fall 2025	4 cr		
Lecture	MR	12:00PM-1:50 PM	Sage 3303

Course Website: https://www.cs.rpi.edu/~sibel/csci4380/fall2025
Homeworks, Exercises and Discussions: https://submitty.cs.rpi.edu/courses/f25/csci4380

Prerequisites or Other Requirements: This is a fourth-year computer science course. As a result, it assumes a level of academic maturity appropriate for a student in their junior or senior year. It also requires good working knowledge of data structures and algorithms, and proficiency in C++ programming or Python (equivalent of CSCI-2300).

Instructor

Professor Sibel Adalı — adalis@rpi.edu
Office Location: JRowl 1C08 — (518) 276-3780
Office Hours: TBA

Teaching Assistant(s)

Name	Office	Office Hours	Email Address
Ron Rattanakornphan	TBA	TBA	dbsta@cs.lists.rpi.edu
Munira Sirajam	TBA	TBA	dbsta@cs.lists.rpi.edu

Course Description

This course introduces database systems, with a special emphasis on data modeling and programming. We will learn the fundamentals of database management systems and discuss how these fundamentals affect the best application design principles for databases. This course assumes no previous background in database systems. You will be expected to learn the use of computing systems on your own.

Course Text(s)

Database Systems: The Complete Book (2nd Edition), by Hector Garcia-Molina, Jeffrey D. Ullman, and Jennifer Widom. ISBN: 0131873253, Prentice Hall.

Resources

This course will use a variety of online resources to share and collect course content. These include:

- Course Website: Basic source for all course notes and other general course information, including this syllabus, course notes, office hours, links to other relevant material and lecture recordings.

- Submitty: All homeworks and lecture exercises will be posted, submitted, and graded here. Submitty is also the preferred discussion forum for all homework/exam questions and answers, and all announcements. You must check the discussion forum regularly. You are already added to Submitty.

- We will add a shared database server that I will configure and make available to the class later in the semester and we may add other tools as well.

You should download the relevant apps for your phone and other devices. If you can't get access to any of these online resources, please send me an email as soon as possible. Please do not hesitate to contact me if events occur that disrupt your access to the internet such as power outages.

Course Goals / Objectives

Student Learning Outcomes

1. apply principles of normalization to design a data model that leads to the development of high-performance data intensive applications
2. write correct and efficient code that implements application logic for high throughput data operations
3. apply understanding of the internals of database management systems to proper tuning of the data model, code and storage methods

Course Assessment Measures

Assessment	Due Date	Learning Outcomes
Homework	About every ten days	1, 2, 3
Exam	2 exams in a semester, final exam during finals week	1, 2, 3
Lecture Exercises	Roughly after most lectures	1, 2, 3

Grading Criteria

Lecture Exercises (30%), Homeworks (26%), Midterms (14% each), Final Exam (16%).

To pass this course, you must get an average of 60 in your midterm and final exams regardless of your homework and exercise grades. This is a firm rule and will be determined by the *weighted test average rounded to the nearest integer*. Exceptions will not be made.

There will be regular lecture exercises, mostly automatically graded after due date. The expected frequency is once or twice a week, often available after a class and due before the next class. Missed exercises cannot be made up even with a valid excuse, but a small number of extra lecture exercises will be made available to substitute for missed or low scoring exercises.

There will be homeworks roughly every ten days, which will be a mix of programming and paper and pencil questions.

I will use the following chart to convert your year-end average to a letter grade (without rounding). Note: I reserve the right to lower these cutoff points, but I will never raise them:

	B+: 87-89	C+: 77-79	D+: 67-69
A: 93-100	B: 83-86	C: 73-76	D: 60-66
A-: 90-92	B-: 80-82	C-: 70-72	F: 0-59

Attendance Policy

The class is in person. You are responsible for all the material covered and announcements made in class, but no attendance will be taken.

Digital Tools Policy

The online tools in the Resources section above provide services designed to assist schools, teachers and other educational partners to improve student learning outcomes. In some circumstances, these online tools may receive personally identifiable information about students ("Student Data") from the instructor in the course providing this service. For example, an instructor will provide a class roster, email addresses of all students in the class, as well as coursework data that may be linked to a particular student. All listed online resource companies used by the instructor consider Student Data to be strictly confidential and have physical, administrative and technical security protections in place to protect such data. They do not use personally identifiable Student Data for any purpose other than to provide the services to the instructor, and they do not share personally identifiable Student Data with any third party except as authorized or required by the instructor. The online tools above may collect, analyze, and share anonymized or aggregated data or data derived from Student Data for certain purposes, but only if the disclosure of such data could not reasonably identify a specific individual or specific School. Collection and use of Student Data provided by the instructor is governed by Terms of Service for each platform and by the provisions of the Family Educational Rights and Privacy Act (FERPA). Student Data is provided and controlled by the instructor. If you have questions about reviewing, modifying, or deleting your personal information, please contact the instructor.

Inclusivity and Accessibility

Rensselaer Polytechnic Institute strives to make all learning experiences as accessible and inclusive as possible. In this course, we will strive to provide an environment that is equitable and conducive for learning for all students. While all lectures will be in person, some office hours may be online. Please contact me as soon as possible if you may need:

1) accommodations for exams with proper documentation,

2) anticipate or experience academic barriers based on a disability, or

3) experience any other difficulties as well any challenges related to your health and safety.

In such cases, please do not hesitate to get in touch to discuss ways we can put you in the best possible position to succeed. To receive any academic accommodation from The Office of Disability Services for Students, you must be appropriately registered with them (dss@rpi.edu). After receiving an accommodation, discuss your situation with me or the appropriate office as soon as possible so that the accommodation can be put in place in a timely fashion.

Other Course Policies

You are responsible for all the information posted in this syllabus including the course policies as well as any announcements made in class or posted on Submitty.

Assignment Submission Policy and Academic Integrity: Any assignment you submit, must be done by you and you alone. This includes homeworks, lecture exercises and needless to say your exam solutions. If human labor is being used to check for correctness (even for writing the program to check it), then you are responsible for showing respect for that labor by submitting your own work.

You are welcome to use any other resources to learn the material, but you must draw a line of submitting an assignment that is your own work. How can you draw this line? The best way to know this is to solve the assignment without looking at an answer provided to you in part or as a whole by another student or program, even if you contributed to it. The main objective of an assignment is to understand the material and gain the ability to master it. Doing the assignment and other exercises allows you to develop the skills and mastery of the material, not reading solutions provided by others. Remember, even the most sophisticated AI tool is prone to mistakes and hallucinations (making stuff up!). Without learning the material, you will not be effective at using these tools for most analytical tasks.

Please note that all assignments created in this course is the intellectual product of your instructor. The access to these is a privilege you have as a student at RPI. By taking these assignments and putting them in an automated system, you are making this intellectual product a part of the AI models. It is your responsibility to understand when this is allowed and ask for permission if it is unclear.

Homework Policy: Homeworks in this class are a mix of required and optional. You may be allowed to skip some parts of a homework (which will be clearly mentioned in each assignment) if you are short of time. Any skipped points in a homework will be added to the next exam's point value. Point value of each question will be clearly marked. If you submit a homework, you accept that the grade for all completed questions will count towards your final grade. You may not ask a homework grade to be excluded from your grade computation once you submit it.

Late Assignment Policy: Late assignments create an extra burden on your TA and delay the discussion of the solutions in class. Late homeworks and lecture exercises will not be accepted. All assignments must be submitted electronically by the given deadline.

Grade Appeal Policy: If you disagree with the grading on a homework, you should appeal to the TAs. If you are not satisfied with the outcome, you should then appeal to the instructor. For exam grading, appeal directly to the instructor. **All grade appeals must be made within one week after the specific grade is returned.**

Accommodations Policy: You are expected to communicate to the instructor any issue regarding your performance in the class ahead of time. This includes absence from exams, late homeworks, inability to perform an assigned task, the need for extra time on exams, etc. You should be prepared to provide sufficient proof of any circumstances on which you are making a special request as outlined in the Rensselaer Handbook of Student Rights and Responsibilities.

Communication Policy: You must use Submitty for any course related questions that is of interest to the class. You must make sure that you do not post answers before an assignment is due even in part which will limit the ability of other students to learn the material. For private matters, please contact the instructor or the TAs as appropriate by email.

A good learning environment requires flexibility, patience, and communication. Remember that your input and participation are crucial to the success of the course and your own success. Please be involved in the class and reach out when things are not working for you as soon as possible. I am here to listen and make any adjustments that are reasonable and can help others in the class. Any changes to the course and policies will be presented to the entire class through designated channels (in lecture, Submitty). One thing that will not change is the grading structure (relative weight of homeworks and exams).

Academic Integrity

Intellectual integrity and credibility are the foundation of all academic work. A violation of Academic Integrity policy is, by definition, considered a flagrant offense to the educational process and a violation of the trust between a student and a teacher. It is taken seriously by students, faculty, and Rensselaer and will be addressed in an effective manner. If found responsible for committing academic dishonesty, a student may be subject to one or both types of penalties: an academic (grade) penalty administered by the professor and/or disciplinary action through the Rensselaer judicial process described in the student handbook. Three relevant academic integrity violations to emphasize include:

Collaboration: Collaboration is defined as deliberately facilitating an act of academic dishonesty in any way or form; for example, allowing another student to observe an exam paper or allowing another student to "recycle" one's old homework or using one another's work in a paper or lab report without citing it as another's work.

Copying: Copying is defined as obtaining information pertaining to a graded exercise by deliberately observing the paper of another student; for example, noting which alternative a neighboring student has circled on a multiple-choice exam.

Plagiarism: Plagiarism is defined as representing the work or words of another as one's own through the omission of acknowledgment or reference. Examples include using sentences verbatim from a published source in a term paper without appropriate referencing, or presenting as one's own the detailed argument of a published source, or presenting as one's own electronically or digitally enhanced graphic representations from any form of media.

AI Use: AI use intersects with many different definitions of collaborations, copying and plagiarism in various ways. Please read through the assignment policy clearly and participate in discussions in the class on the ethical use of AI tools for learning.

The Rensselaer Handbook of Student Rights and Responsibilities defines the full list of forms of Academic Dishonesty and you should make yourself familiar with these. In this class, all assignments that are turned in for a grade must represent the student's own work. In cases where help was received, or teamwork was allowed, a notation on the assignment should indicate your collaboration. If you have any questions concerning this policy before submitting an assignment, please ask for clarification.

Specific examples: Some assignments, like exams, have a clearly marked place on the front page that requires a signature confirming academic integrity. If you forget to sign the document

before submitting it, a TA or instructor will contact you directly to ask you to sign before grading your assignment. We require that you take exams on your own, without interacting with anyone or any other entity. Failure to do so will result in automatic failure for the entire course and may be subject to further disciplinary action. We expect that you will submit your own work for any assignments and any violations will result in a zero on the specific assignment and subsequent violations will result in a penalty of an F in the class, and may be subject to further disciplinary action.

If you have any question concerning this policy before submitting an assignment, please ask for clarification.

Course Calendar

Session	Date	Topic	Readings
Week 1-2	8/28 9/4	Introduction to Database Systems and Relational Data Model (2 classes)	Chapters 1, 2.1, 2.2
Week 2-3	9/5 9/8-	Data Modeling - Normalization (3 classes)	Chapter 2, 3
Week 4-5	9/15-	Entity Relationship Models (3 classes)	Chapter 3, 4
Week 5	9/22	Catch up (1 class)	
Week 6	**9/29**	**Exam #1**	
Week 7	10/2	SQL Language (3 classes)	Chapter 6
Week 8	10/16	Data Definition and Manipulation, Transactions, Advanced Features (1 class)	Chapter 7
Week 8	10/20	SQL in a server environment (2 lectures)	Chapter 8
Week 9	10/27	Views, Data Access and Extended SQL (1 lecture)	Course notes, Chapter 9
Week 10	10/30	Catch up (2 classes)	
Week 10	**11/6**	**Exam #2**	
Week 11	11/10	Secondary Storage Management (1 class)	Chapter 13
Week 11-12	11/13	Index Structures (2 classes)	Chapter 14
Week 13	11/20	Query Execution (1 class)	Chapter 15
Week 13	12/1	Query Optimization (1 class)	Chapter 16
Week 14-15	12/4	Transaction Management (3 classes)	Chapters 17, 18, 19
Finals Week		**Final Exam**	