CSCI 4380 section 01 Syllabus

DATABASE SYSTEMS

Course Information

Course Information:

CSCI 4380 01 : DATABASE SYSTEMS

(4 Credits)

2025_Spring Term | Computer Science | School of Science

Course Schedule:

2025_Spring Term [202501]
Term Start Date: Monday, 6-Jan-2025 **Term End Date:** Wednesday, 18-Jun-2025

ADD TO CALENDAR

Location and Schedule:

CRN: 33533

RPI Institute LMS Link:

https://lms.rpi.edu/

Other LMS Information:

Submitty LMS (homework assignments, exercises, and discussions): https://submitty.cs.rpi.edu/courses/s25/csci4380
Course Website: https://www.cs.rpi.edu/academics/courses/spring25/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).

Additional Information for Course Information Section:

Lectures

Tuesdays and Fridays

12:00 pm - 1:50 pm

Russell Sage Laboratory 3510

Instructor Information

Course Instructors and TAs:

Instructor

Lei Yu
yul9@rpi.edu

Additional Instructor Details:

Lei Yu
Assistant Professor, Department of Computer Science

Office Hours: TBA

Office: MRC 330B
Telephone: +1(518)276-8543

Teaching Assistant(s)

Teaching Assistant Information:

Name	Office	Office Hours	Email Address
Sirajam Munira	TBA	TBA	munirs@rpi.edu
Ronnakorn Rattanakornphan	TBA	TBA	rattar@rpi.edu
Qitong Wang	TBA	TBA	wangq19@rpi.edu

Course Description

Additional Course Description :

This course provides an introduction to 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)

Text Details:

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

Learning Outcomes

Course (Student) Learning Outcomes (CLOs):

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

Course (Student) Learning Outcomes Assessment Measures:

Assessment	Due Date
Homework	Approximately every ten days
Exam	Two tests during the semester, final exam during finals week

Class Exercises	Roughly every lecture

Grading Criteria

Criteria Details:

Class Exercises (20%), Homework Assignments (40%), Tests (12% each), Final Exam (16%).

To pass this course, you must get an average of 60.00 in your tests and the final exam 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 0.01 using bankers' rounding method. Exceptions will not be made.

There will be regular exercises, mostly automatically graded. The expected frequency is typically twice a week. Three lowest exercise grades will be dropped. The exercises will count for 20% of your final grade. There will be assignments roughly every ten days. The homework assignments will count for 40% of your total grade. Some homework assignments will be programming projects.

I will use the following chart to convert your semester-end average (rounded to the nearest 0.01 using bankers' rounding method) to a letter grade:

	B+: 87.00-89.99	C+: 77.00-79.99	D+: 67.00-69.99
A: 93.00-100.00	B: 83.00-86.99	C: 73.00-76.99	D: 60.00-66.99
A-: 90.00-92.99	B-: 80.00-82.99	C-: 70.00-72.99	F: 0.00-59.99

All grades are rounded only before applying the cutoffs. Rounding is performed to the nearest 0.01 using the bankers' rounding method. Cutoffs may end up lower than this but will not be raised from here. Thus, for example, if you earn 92.9950 it is rounded to 93.00. After applying the cutoff of 93, you are assured of earning an A, regardless of what other students earn. If your average grade is 92.9949, it is rounded to 92.99. If the cutoff for an A is 93, you will get an A-.

Course Calendar

Calendar Details:

The schedule is tentative and subject to change.

Session	Date	Topic	Readings
Week 1	1/7/2025	Introduction to Database Systems and Relational Data Model (2 classes)	Chapters 1, 2.1, 2.2
Week 2-3	1/14/2025	Data Modeling - Normalization (3 classes)	Chapter 2, 3
Week 3-4	1/21/2025	Entity Relationship Models (3 classes)	Chapter 4
Week 5	2/4/2025	Catch up (1 class)	
Week 5	2/7/2025	Test #1	
Week 6-7	2/11/2025	SQL Language (3 classes)	Chapter 6
Week 8	2/25/2025	Constraints and Triggers (1 class)	Chapter 7
Week 8	2/28/2025	Views and Indexes (1 class)	Chapter 8
Week 9	3/4/2025	Spring Break	
Week 10	3/11/2025	SQL in a server environment (2 lectures)	Course notes, Chapter 9
Week 11	3/18/2025	Catch up (1class)	
Week 11	3/21/2025	Test #2	
Week 12	3/25/2025	Secondary Storage Management (1 class)	Chapter 13
Week 12-13	3/28/2025	Index Structures (2 classes)	Chapter 14
Week 13	4/4/2025	Query Execution (1 class)	Chapter 15

Week 14	4/8/2025	Query Optimization (1 class)	Chapter 16
Week 14-15	4/11/2025	Transaction Management (3 classes)	Chapters 17, 18, 19
Week 16	4/22/2025	Catch up (1 class)	
Finals Week		Final Exame	

Policies

Attendance Policy:

The class is in person. Attendance is required. You are responsible for all the material covered and announcements made in class.

After each lecture, there will be some lecture exercises on Submitty. Most of these will be automatically graded. Each lecture exercise must be completed individually, but you are welcome to work on them with a small group (2 people) of other students in the class. Missed lecture exercises cannot be made up even with a valid excuse. If you have an extended absence, talk to the instructor. Each lecture exercise will be available for about two days, starting with the end of class.

Other Course Policies:

Digital Tools Policy

The online tools outlined in the Online Resources section 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 as possible. In this course, we will strive to provide an environment that is equitable and conducive for learning for all students. Please contact me as soon as possible if you:

1) anticipate or experience academic barriers based on a disability. Please let me know of such issues immediately so that we can discuss your options. To establish reasonable accommodations, please register with The Office of Disability Services for Students. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. To receive any academic accommodation, you must be appropriately registered with DSS (dss@rpi.edu; 518-276-8197, 4226 Academy Hall).

2) experience any other difficulties that are not mentioned above as well any challenges related to your health and safety, please do not hesitate to get in touch to discuss ways we can put you in the best possible position to succeed.

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. You must use Submitty for any course-related questions.

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 homework assignments, inability to perform an assigned task, problems with your group members, 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.

As part of the course material, you are expected to learn how to use a number of software products and frameworks. You will be given sufficient advance notice of such expectations and links to the appropriate study material. You are responsible for learning the software needed for the class.

Late Homework Policy: Assignments are due at 11:59pm EST/EDT on the due date. You have seven late days for the entire semester with a maximum of five late days per homework assignment. You can use your late days at any time during the entire semester if you need extra time to work on your homework assignment for any reason, including sickness and other excused absences. Requests for extensions beyond the limits specified above will only be considered in cases of prolonged excused absence backed by a request from the Student Success Office or other school authority. If you have a case of documented repeated or prolonged excused absences, please reach out to the instructor to discuss your specific circumstances. Note that late days are only applicable to homework assignments but no other assessments.

Grade Inquiry Policy: If you disagree with the grading on a homework, test, or exam, you should first file a grade inquiry to the TA who graded your work originally to maintain consistency in grading. Grade inquiries must be made within one week after the specific grade is returned. If you are not satisfied with the outcome, you should then appeal to the instructor.

Academic Policies:

Academic Integrity

Student-teacher relationships are built on trust. For example, students must trust that teachers have made appropriate decisions about the structure and content of the courses they teach, and teachers must trust that the assignments that students turn in are their own. Acts that violate this trust undermine the educational process. The Rensselaer Handbook of Student Rights and Responsibilities and The Graduate Student Supplement define various 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.

Violations of academic integrity may also be reported to the appropriate Dean (Dean of Students for undergraduate students or the Dean of Graduate Education for graduate students, respectively).

If you have any question concerning this policy before submitting an assignment, please ask for clarification. In addition, you can visit the following site for more information on our Academic Integrity Policy: Students Rights, Responsibilities, and Judicial Affairs.

Disability Services

Rensselaer Polytechnic Institute strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on a disability, please let me know immediately so that we can discuss your options. To establish reasonable accommodations, please register with The Office of Disability Services for Students. After registration, make arrangements with the Director of Disability Services as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. DSS contact information: dss@rpi.edu; +1-518-276-8197; 4226 Academy Hall.

Disability Services for Students

Support Services

RPInfo - contains various resource links for students, academic resources, support services, and safety & emergency preparedness.

Academic Assistance	ALAC—Advising and Learning Assistance Center	518.276.6269	https://info.rpi.edu/advising-learning-assistance/
Student Health and Wellness	Counseling Center	518.276.6479	https://studenthealth.rpi.edu/list-services/counseling-center
	Student Health Center	518.276.6287	https://studenthealth.rpi.edu/list-services/student-health-center
Student Support Services	Class Deans, Undergraduate Dean, Graduate Experience Dean, Student Success Dean, First Year Experience	518.276.8022	https://success.studentlife.rpi.edu/
RPI Info	Central Information Hub for the campus		https://info.rpi.edu
DOTCIO (IT Services)	Help Desk	518.276.7777	
	Submit a ticket to IT Services and Support Center		https://itssc.rpi.edu/hc/en-us

Diversity, Equity and Inclusivity

RPI policy is that students from all backgrounds and perspectives should be well-served by their experiences both in and out of class. As a community we value the diversity that students bring to their classes and view such diversity as a resource, strength, and benefit. Please review the Institute's Diversity, Equity, and Inclusion policy for further information.

Additional Academic Integrity Course Policy and Penalty Information:

Individual programming assignments in this course must be the sole work of the individual student, though your instructor, TAs, and undergraduate mentors may help in figuring out how to solve the given problems. For team-based work (though working in a team is optional), work must be the sole work of the individual team members, though your professor, TAs, and fellow classmates may help in figuring out how to solve the given problems.

Sharing of code or submitting code which is not yours, even partially, is strictly forbidden and will not be tolerated. Students may not share or copy code or pseudocode. Homework files or file excerpts should never be shared electronically (by email, text, LMS, Dropbox, GitHub, etc.) Homework solution files from previous years (either instructor or student solutions) should not be used in any way. Students must not leave their code (either electronic or printed) in publicly-accessible areas. Students may not share computers in any way for the duration of this course. Each student is responsible for securing their homework materials using all reasonable precautions. These precautions include students applying a password lock to the screen when they step away from their computer. Homework files should only be stored on private accounts/computers with strong passwords. Homework notes and printouts should be stored in a locked drawer/room.

The software you write for your Database Systems homework assignments may never be published in a public repository on GitHub or on any other software sharing site. Contributing to open source projects and publishing personal software projects are excellent ways to demonstrate your skills to future employers. We encourage you to join the Rensselaer Center for Open Source Software (RCOS) and build an online portfolio of amazing work. However, your Database Systems homework assignments may not be part of that portfolio.

If found in violation of academic dishonesty policy, students will be subject to two types of penalties: (1) the instructor administers an academic (grade) penalty; and/or (2) the student may be subject to the procedures and penalties of the student judicial system outlined in the Rensselaer Handbook of Student Rights and Responsibilities.

Students found in violation of the Academic Integrity Policy will receive a grade of zero for the lecture exercise, assignment, test, or exam in question in addition to receiving a five percentage points deduction from their final grade. A second violation will lead to an automatic "F" grade and referral to the Academic Dean's office for disciplinary action.

Scholastic dishonesty means plagiarism;cheating on assignments or examinations, including the unauthorized use of online learning support and testing platforms; engaging in unauthorized collaboration on academic work, including the posting of student-generated coursework on online learning support and testing platforms not approved for the specific course in question; taking, acquiring, or using course materials without faculty permission, including the posting of faculty-provided course materials on online learning and testing platforms.

Specific examples: Some assignments, like tests and 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 tests and exams without communicating to other students via any communication channels. We expect you to use any permitted material just like you would in class. You cannot interact with Chegg.com or any other online/Internet assignment sharing system for any graded assignment. Interaction with it results in an automatic failure for the entire course. A result of the violation using online resources to assist in graded assignments will result in a formal report. As a warning, there are ways that we can easily detect your use of these online resources that compromise academic integrity.

Artificial intelligence (AI) language models, such as ChatGPT, and online assignment help tools, such as Chegg®, are examples of online learning support platforms: they can not be used for course assignments except as explicitly authorized by the instructor. The following actions are prohibited in this course:

- Submitting all or any part of an assignment statement to an online learning support platform;
- Incorporating any part of an AI generated response in an assignment;
- Using AI to brainstorm, formulate arguments, or template ideas for assignments;
- Using AI to summarize or contextualize source materials;
- Submitting your own work for this class to an online learning support platform for iteration or improvement.

If you are in doubt as to whether you are using an online learning support platform appropriately in this course, I encourage you to discuss your situation with me.

Any assignment content composed by any resource other than you, regardless of whether that resource is human or digital, must be attributed to the source through proper citation. Unattributed use of online learning support platforms and unauthorized sharing of instructional property are forms of scholastic dishonesty and will be treated as such.

Other Course-Specific Information

Additional Course Information:

Online Resources

This course will use some online resources to share and collect course content. These include:

- Course Website for course notes and basic course information, including this syllabus. It can be accessed here: https://www.cs.rpi.edu/academics/courses/spring25/csci4380/
- Submitty: All homework assignments and lecture exercises will be posted, submitted, and graded here. This is also the preferred discussion forum for asynchronous chat and threads about specific homework or test/exam questions. You are already added to Submitty:https://submitty.cs.rpi.edu/courses/s25/csci4380
- We may add other tools along the way.
- Please check the appropriate sources for the appropriate content: Submitty (assignment info and questions) first and Course Website (links and course notes) second.

The instructor and TAs will add you to these various sites using your RCS email before the start of class, and you should download the various 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.