# University of Oklahoma University of Oklahoma Polytechnic Institute CYBS 3913: Database Fundamentals Spring 2025

## Course Format/Meeting Time: Tuesdays & Thursdays 5-6:20 PM

## Location: OU Tulsa Campus, Building 3, Room 3102

**Instructor: Dr. Muhammad Sajid Riaz**

**Contact:** [**riazsajid@ou.edu**](mailto:riazsajid@ou.edu)**, Admin Building, Room 1H08**

### Student/Office Hours: Mondays & Wednesdays 10:30 – noon and by appointment

### Learning Management System/website: All Materials will be available on Canvas

## Course Prerequisite: CYBS 3213

## Course Description: This course will introduce students to the concepts behind relational database systems. We will introduce students to modeling with Entity-Relationship diagrams and show how these are used for data design. In this course, we will use Structured Query Language (SQL) to define, manipulate, and test the database, programmatic access to a database, and practical issues that database developers must handle. The course will also cover a strong foundation in database security and auditing principles, practices, and methodologies. Topics include database application security models, security architecture, access controls, database and database auditing, trust management, privacy, threat vectors, and attack methods.

## Course Goals:

## Students learn to use a relational database management system (DBMS) to design a database system.

## Students learn to model a database by using Entity Relationship Modeling.

## Students learn to be proficient in Structured Query Language (SQL).

## Students learn to develop a database, including tables, queries, forms, and reports.

## Students demonstrate skills in areas of database performance tuning and query optimization

## Students understand issues related to database security and management

## Learning Outcomes: Upon successful completion of the course, the student will be able to:

## Analyze application needs and be able to provide database designs.

## Explain relational database systems and the development process.

* Implement a relational database system for a particular application.

## Explain the use and performance of SQL queries for database updates and queries.

## Competent in database administration and security issues.

## Texts and Materials:

## Teaching Philosophy & Inclusion Statement: Learn by Doing

## Fundamentals Of Database System, 7Th Ed. by Elmasri Ramez and Navathe Shamkan, 2021, ISBN-13: 9780137502523.

## Expectations: Students are expected

* to be present in all class meetings and inform the instructor of a brief e-mail to explain their absence in advance
* to participate actively in class discussions
* to spend an adequate amount of time on homework each week and projects, solving and understanding each problem
* to seek help from the instructor and/or teaching assistant when needed

## Learning Activities, Assignments, and Assessments

## Assessments: Subject to Change:

Homework: 15%

Projects: 25%

Quizzes: 10%

Exams: 50%

## Assigning Grades:

## The final letter grades will be assigned as follows: 90-100% A; 80-89% B; 70-79% C; 60-69% D; and below 60, F.

## Additional Support for Learning: W3Schools

## Course Policies:

### Academic Integrity and Plagiarism: OU Policies

### Make-up Policy: Makeup tests are given only if solid evidence of a medical or serious emergency prevents the student from participating in the exam. The final exam will not have a makeup test and must be taken.

### Absences: Students must attend classes to keep up with the course material—attendance policy TBD.

### Technology:

### Group/Lab Partner Work Policies: TBD

### Other Policies: All assignments are due at 11:59 pm on the due date. Late assignments will lose 10% of the total points, or each day they are late, and they will not be accepted after three days. However, appropriate accommodations will be made for students with valid medical excuses. Failure to take the final exam will result in an automatic F. Unless there exists evidence of a medical or emergency situation, incomplete grades will not be given.

## Land Acknowledgement Statement Provided by OU’s Tribal Liaison office

Long before the University of Oklahoma was established, the land on which the University now resides was the traditional home of the “Hasinais” Caddo Nation and “[Kirikirʔi:s](http://www.wichitatribe.com/media/18910/wichita.mp3)” (audio available when opened in Chrome) Wichita & Affiliated Tribes. We acknowledge that this territory once also served as a hunting ground, trade exchange point, and migration route for the Apache, Comanche, Kiowa, and Osage nations.  Today, 39 tribal nations dwell in the state of Oklahoma due to settler and colonial policies designed to assimilate Native people. The University of Oklahoma recognizes our university's historical connection with its indigenous community. We acknowledge, honor and respect the diverse Indigenous peoples connected to this land. We fully recognize, support, and advocate for the sovereign rights of all of Oklahoma’s 39 tribal nations. This acknowledgment is aligned with our university’s core value of creating a diverse and inclusive community. It is an institutional responsibility to recognize and acknowledge the people, culture, and history that make up our entire OU Community.

## University Policies

In this section, include the mandatory and recommended University policies.

### Copyright Syllabus Statement for In-Person Courses

Sessions of this course may be recorded or live-streamed. These recordings are the intellectual property of the individual faculty member and may not be shared or reproduced without the explicit, written consent of the faculty member. In addition, privacy rights of others such as students, guest lecturers, and providers of copyrighted material displayed in the recording may be of concern. Students may not share any course recordings with individuals not enrolled in the class or upload them to any other online environment.

### Academic Integrity

Academic honesty is incredibly important within this course. Cheating is strictly prohibited at the University of Oklahoma, because it devalues the degree you are working hard to get. As a member of the OU community, it is your responsibility to protect your educational investment by knowing and following the rules. For specific definitions on what constitutes cheating, review the [Student’s Guide to Academic Integrity](http://integrity.ou.edu/students_guide.html).

To be successful in this class, all work on exams, quizzes, home works, and projects must be yours and yours alone, unless specifically told otherwise for each. You may not receive outside help on assessments. On examinations and quizzes, you will never be permitted (unless specifically told) to use your notes, textbooks, calculators, or any other study aids. Should you see someone else engaging in this behavior, I encourage you to report it to myself or directly to the Office of Academic Integrity Programs. I encourage this because when someone else cheats, it can negatively impact the reputation of our entire program. It is my professional obligation to report academic misconduct, which I will not hesitate to do. Sanctions for academic misconduct can include expulsion from the University and an F in this course, so don’t cheat. It’s simply not worth it.

### Religious Observance

It is the policy of the University to excuse the absences of students that result from religious observances and to reschedule examinations and additional required classwork that may fall on religious holidays, without penalty. [[See Faculty Handbook 3.15.2]](https://apps.hr.ou.edu/FacultyHandbook/#3.15.2)

### Reasonable Accommodation Policy

The Accessibility and Disability Resource Center is committed to supporting students with disabilities to ensure that they are able to enjoy equal access to all components of their education.  This includes your academics, housing, and community events.  If you are experiencing a disability, a mental/medical health condition that has a significant impact on one or more life functions, you can receive accommodations to provide equal access.  Possible disabilities include, but are not limited to, learning disabilities, AD(H)D, mental health, and chronic health.  Additionally, we support students with temporary medical conditions (broken wrist, shoulder surgery, etc.) and pregnancy.  To discuss potential accommodations, please contact the ADRC at 730 College Avenue, (ph.) 405.325.3852, or [adrc@ou.edu](mailto:adrc@ou.edu).

### Title IX Resources and Reporting Requirement

Anyone who has been impacted by gender-based violence, including dating violence, domestic violence, stalking, harassment, and sexual assault, deserves access to resources so that they are supported personally and academically. The University of Oklahoma is committed to offering resources to those impacted, including: speaking with someone confidentially about your options, medical attention, counseling, reporting, academic support, and safety plans. If you would like to speak with someone confidentially, please contact [OU Advocates](https://www.ou.edu/gec/gender-based-violence/advocates) (available 24/7 at 405-615-0013) or another confidential resource (see [“Can I make an anonymous report?”](https://www.ou.edu/gec/gender-based-violence/learn-more)). You may also choose to report gender-based violence and discrimination through other means, including by contacting the [Institutional Equity Office](http://www.ou.edu/eoo) (ieo@ou.edu, 405-325-3546) or police (911). Because the University of Oklahoma is committed to the safety of you and other students, I, as well as other faculty, Graduate Assistants, and Teaching Assistants, are mandatory reporters. This means that we are obligated to report gender-based violence that has been disclosed to us to the Institutional Equity Office. This includes disclosures that occur in: class discussion, writing assignments, discussion boards, emails and during Student/Office Hours. For more information, please visit the [Institutional Equity Office](http://www.ou.edu/eoo).

### Adjustments for Pregnancy/Childbirth Related Issues

Should you need modifications or adjustments to your course requirements because of documented pregnancy-related or childbirth-related issues, please contact your professor or the Accessibility and Disability Resource Center at 405/325-3852 as soon as possible. Also, see the Institutional Equity Office [FAQ on Pregnant and Parenting Students’ Rights](http://www.ou.edu/eoo/faqs/pregnancy-faqs.html) for answers to commonly asked questions.

### Final Exam Preparation Period

Pre-finals week will be defined as the seven calendar days before the first day of finals. Faculty may cover new course material throughout this week. For specific provisions of the policy please refer to OU’s [Final Exam Preparation Period policy](https://apps.hr.ou.edu/FacultyHandbook#4.10).

### Emergency Protocol

During an emergency, there are official university [procedures](https://www.ou.edu/campussafety/emergency-management-department/procedures) that will maximize your safety.

**Severe Weather:** If you receive an OU Alert to seek refuge or hear a tornado siren that signals severe weather.

1. Look for severe weather refuge location maps located inside most OU buildings near the entrances
2. Seek refuge inside a building. Do not leave one building to seek shelter in another building that you deem safer. If outside, get into the nearest building.
3. Goto the building’s severe weather refuge location. If you do not know where that is, go to the lowest level possible and seek refuge in an innermost room. Avoid outside doors and windows.
4. Get in, Get Down, Cover Up
5. Waitfor official notice to resume normal activities.

Additional [Weather Safety Information](https://www.ou.edu/campussafety/university-meteorologist/weather) is available through the Department of Campus Safety.

**Armed Subject/Campus Intruder**

If you receive an OU Alert to shelter-in-place due to an active shooter or armed intruder situation or you hear what you perceive to be gunshots:

1. *Avoid*: If you believe you can get out of the area WITHOUT encountering the armed individual, move quickly towards the nearest building exit, move away from the building, and call 911. 2. *Deny*: If you cannot flee, move to an area that can be locked or barricaded, turn off lights, silence devices, spread out, and formulate a plan of attack if the shooter enters the room. 3. *Defend*: As a last resort fight to defend yourself.

For more information, visit [OU’s Emergency Preparedness site](https://www.ou.edu/campussafety/emergency-management-department/procedures).

[Shots Fired on Campus Procedure – Video](https://www.youtube.com/watch?v=BsEOhGJIdI8)

**Fire Alarm/General Emergency**

If you receive an OU Alert that there is danger inside or near the building, or the fire alarm inside the building activates: *1. LEAVE* the building. Do not use the elevators. *2. KNOW* at least two building exits *3. ASSIST* those that may need help *4. PROCEED* to the emergency assembly area *5 ONCE safely outside, NOTIFY first responders of anyone that may still be inside building due to mobility issues. 6. WAIT* for official notice before attempting to re-enter the building.

[*OU Fire Safety on Campus*](https://vimeo.com/125093634)

### Mental Health Support Services

If you are experiencing any mental health issues that are impacting your academic performance, counseling is available at the University Counseling Center (UCC). The Center is located on the second floor of the Goddard Health Center, at 620 Elm Rm. 201, Norman, OK 73019. To schedule an appointment call (405) 325-2911. For more information, please visit [University Counseling Center](https://www.ou.edu/ucc).

### Dead Week and Pre-Finals Week Policies

During pre-finals week, all normal class activities will continue; however, no assignment, test, or examination accounting for more than 3% of the course grade may be assigned, unless it is assigned in advance of pre-finals week and worth less than 10%, or scheduled at least 30 days prior if worth more than 10%. No activity or field trip may be scheduled that conflicts with another class. There are some exceptions and nuances, so please review the [Final Exam Policies](https://www.ou.edu/registrar/academic-calendars/final-exam-policies) prior to designing your course schedule.

## Tentative Schedule (Subject to Change):

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| Week | Topic |
| 1 | Database Systems Concepts and Architecture; Homework 1 Assigned |
| 2 | The Relational Data Model; Project 1 Assigned |
| 3 | Basic SQL; Homework 1 Due; Homework 2 Assigned |
| 4 | Relational Algebra |
| 5 | Entity-Relationship Modeling; Homework 2 Due; Homework 3 Assigned; Project 1 Due; Project 2 Assigned; Quiz 1 |
| 6 | Database Design with UML diagrams; Exam 1 |
| 7 | Introduction to SQL Programming Techniques; Homework 3 Due; Homework 4 Assigned; |
| 8 | Web database programming; Project 2 Due; Project 3 Assigned |
| 9 | Database Design Theory and Normalization; Quiz 2; |
| 10 | Files, Indexing, and Hashing; Homework 4 Due; Homework 5 Assigned; |
| 11 | Database Recovery Techniques; Project 3 Due; Project 4 Assigned |
| 12 | Database Security; Exam 2 |
| 13 | Database Security; |
| 14 | Data Warehousing and OLAP; Homework 2 Due; Homework 3 Assigned |
| 15 | Distributed Databases; Project 4 Due; Quiz 3 |
| 16 | Advanced Topics; Final exam |