Course Information

Course Number: GEOG 391 & GEOG 659
Course Title: GeoDatabases
Section: 391-502, 391-503, and 659-600
Credit Hours: 4 for GEOG 391 | 3 for GEOG 659

Lecture Time: 2:20 - 3:35 pm Tuesdays/Thursdays
Lecture Location: Room 104, Halbouty Geosciences Building

Lab Time: 11:30 AM - 1: 20 PM, Friday (391-502) | 11:10 AM - 1: 00 PM, Tuesday (391-503) | 11:10 AM - 01:00 PM, Thursday (391-504)
Lab Location: Room 311, CSA Building

Instructor Details

Instructor: Dr. Lei Zou
Office: CSA 205D
Phone: 979-458-1803
E-Mail: lzou@tamu.edu
Office Hours: 9-11 am on Wednesdays or by appointment

Teaching Assistant: Mr. Jikun Liu
Office: CSA 203A
E-Mail: jikun@tamu.edu
Office Hours: By appointment
Zoom for Office Hours: https://tamu.zoom.us/j/91238470804

Course Description

This class is an introduction to spatial data models, spatial database design and management, and the use of spatial databases and models within Geographic Information Systems. This lab-oriented course covers basic data modeling, techniques, and best practices for designing spatial databases, and the application of spatial databases in GIS analysis and modeling. This course introduces students to database setup, management, and utilization in the development of data-rich GIS applications and services.

Course Prerequisites

Junior or senior classification

Special Course Designation

GEOG391/659 is a stacked course. Each graduate student in the course will lead a team of up to 4 undergraduate students to finish a course project.

Course Learning Outcomes

- Design well-formed simple database models, using appropriate design techniques, and be able to implement such designs using spatial relational database management systems (RDBMS);
- Setup and administer industry-standard database servers;
- Use SQL to establish, connect to, and interrogate spatial databases;
- Use ArcGIS to create, connect to, populate, and utilize simple geodatabases;
- Critically assess the limitations of conventional database structures as a means of storing spatial data;
- Critically assess current advances in database design for geographical phenomena; and
- Develop data models and accompanying spatial RDBMS implementations necessary for managing spatial data in real-world scenarios.

Textbook and/or Resource Materials

This course has no required textbooks. Course readings will include online texts and other videos, resources, and materials provided by the instructor.

Optional Textbooks:

- Yeung A, Hall G, 2007. Spatial Database Systems: Design, Implementation and Project Management. 1st ed, Springer. 554 pp.
- Zeiler M, 2010. Modeling Our World. 2nd ed, Esri Press. 308 pp.
- Shekhar S, Chawla S, 2003. Spatial Databases: A Tour. http://www.spatial.cs.umn.edu/Book/

Grading Policy

Your grade in this class will be based on the following:

Component	**Weight**	**Activity**	**Weight**
Lectures	30%		
		Midterm Exam	15%
		Final Exam	15%
Labs	30%		
		6 Lab Assignments	6*5%
Project	35%		
		Proposal Presentation	7.5%
		Proposal Report	7.5%
		Final Project Presentation	10%
		Final Project Report	10%
Participation	5%	Class Participation, Quizzes, and Activities	5%
Total	100%	-	-

** We will have in-class quizzes and activities for you to earn participation points and extra points!*

Grading Scale:

%	Grade
≥ 90%	A
80-89%	B
70-79%	C
60-69%	D
<60%	F

** An average performance in the class will earn a satisfactory grade*

Late Work Policy

- Late assignments receive a 10% deduction for each day they are late unless covered by a University excused absence. The maximum deduction will be 50% if you submit before the hard deadline. Late submissions (penalty or not) are not accepted after the hard deadline. It is your responsibility for keeping up with assignments. You should talk to your TA and or the instructor BEFORE late assignments become a problem.

Course Schedule

The tentative course schedule is listed below.

Weeks	Tuesday		Thursday		Labs
1	08/20	Introduction to Course	08/22	Introduction to GeoDatabases	*No Lab*
2	08/27	Data Modeling	08/29	Spatial Data Formats	Lab 1
3	09/03	Relational Database	09/05	Spatial Relational Database	Lab 2
4	09/10	E-R Diagram 1	09/12	E-R Diagram 2	
5	09/17	**Proposal Presentation 1**	09/19	**Proposal Presentation 2**	Lab 3
6	09/24	Normalization 1	09/26	Normalization 2	
7	10/01	Midterm Exam Review	10/03	**Midterm Exam, 2:20-3:35 pm, Online**	*No Lab*
8	10/08	*Fall Break, No Class*	10/10	Spatial Database Management System 1	Lab 4
9	10/15	Spatial Database Management System 2	10/17	SQL Basics 1	
10	10/22	SQL Basics 2	10/24	SQL Joins 1	Lab 5
11	10/29	SQL Joins 2	10/31	Guest Lecture	
12	11/05	Spatial Query 1	11/07	Spatial Query 2	Lab 6
13	11/12	Introduction to MongoDB	11/14	The Road Ahead	
14	11/19	**Final Project Presentation 1**	11/21	**Final Project Presentation 2**	*No Lab*
15	11/26	Final Exam Review	11/28	*Thanksgiving Holiday, No Class*	Q&A
16	12/10	**Final Exam, 1:00 - 3:00 pm, Online**			*No Lab*

Lectures

The lectures will be delivered by the course instructor, Dr. Lei Zou. We will meet every Tuesday/Thursday at 2:30 - 3:35 pm.

Labs

The labs will be instructed by our TA, Mr. Jikun Liu - a Ph.D. student in GIScience in the Department of Geography at TAMU. During lab hours, Jikun will be in CSA 311 to give a brief tutorial for each lab assignment and help you solve lab-related questions. If you need additional assistance on lab assignments, please attend Office Hours or send an email to Jikun or Dr. Zou to schedule individual meetings.

Lab hours

Section 502: 11:30 am – 1:20 pm, Friday

Section 503: 11:10 am – 1:00 pm, Tuesday

Section 504: 11:10 am – 1:00 pm, Thursday

Section 600: Graduate students are not required to attend the lab sessions

Important Dates

1.

1. Project Reports – Reports are due at **11:59 pm on Fridays** of presentation weeks
    1. Proposal Report: Sept 20
    2. Final Report: Nov 22
2. Labs – All labs are due at **11:59 pm on Fridays**
    1. Lab 1: Aug 30
    2. Lab 2: Sept 13
    3. Lab 3: Sept 27
    4. Lab 4: Oct 18
    5. Lab 5: Nov 1
    6. Lab 6: Nov 15
3. Exams
    1. Midterm exam: 2:20 - 3:35 pm, Online, Oct 3
    2. Final Exam: 1:00 – 3:00 pm, Online, Dec 10

Optional Course Information Items

GIS Software

This course will utilize the ArcGIS™ suite of software developed by ESRI including ArcMap and ArcServer. Installable copies may be obtained from the TAMU Library - http://php.library.tamu.edu/arcgis/arcgis.php. You can also download a copy of ArcGIS Pro through the link: https://drive.google.com/file/d/1CD5QJp0k-xP7FHPnoFxPWjm3m5RcQTAk/view?usp=sharing. You can download and install ArcGIS Pro on your Windows computer/laptop and log in using your TAMU NetID. More information on accessing and installing GIS Software could be found on Campus GIS Support website: https://geosat.tamu.edu/service/support/.

Database Software

This course will utilize the Microsoft SQL Server™ suite of software. Installable copies may be downloaded from the Microsoft Dream Spark program available to TAMU students - https://www.dreamspark.com. This course will also utilize VMWare, which will be provided to the students.

Development Software

This course will utilize the SQL programming language which can be developed with basic text editing software as well as within Microsoft SQL Server.

University Policies

This section outlines the university level policies. The TAMU Faculty Senate established the wording of these policies.

***NOTE**: Faculty members should not change the written statements. A faculty member may add separate paragraphs if additional information is needed.*

Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments.

Please refer to **Student Rule 7** in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.

Please refer to **Student Rule 7** in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor" **(**Student Rule 7, Section 7.4.1**).**

"The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" **(**Student Rule 7, Section 7.4.2).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. **(**See Student Rule 24**).**

Academic Integrity Statement and Policy

"An Aggie does not lie, cheat or steal, or tolerate those who do."

"Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to

authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" (Section 20.1.2.3, Student Rule 20).

Texas A&M at College Station

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at **aggiehonor.tamu.edu.**

Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact Disability Resources office on your campus (resources listed below). Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

Texas A&M at College Station

Disability Resources is located in the Student Services Building or at (979) 845-1637 or visit ***disability.tamu.edu.***

Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions **(**see University Rule 08.01.01.M1):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or

paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, a person who is subjected to the alleged conduct will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University's goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

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Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with ***Counseling and Psychological Services*** *(CAPS).*

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's ***Title IX webpage*****.**

Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in healthy self-care by utilizing available resources and services on your campus.

Campus-Specific Policies

Statement on the Family Educational Rights and Privacy Act (FERPA)

FERPA is a federal law designed to protect the privacy of educational records by limiting access to these records, to establish the right of students to inspect and review their educational records and to provide guidelines for the correction of inaccurate and misleading data through informal and formal hearings. Currently enrolled students wishing to withhold any or all directory information items may do so by going to **howdy.tamu.edu** and clicking on the "Directory Hold Information" link in the Student Records channel on the MyRecord tab. The complete **FERPA Notice to Students** and the student records policy is available on the Office of the Registrar webpage.

Items that can never be identified as public information are a student's social security number, citizenship, gender, grades, GPR or class schedule. All efforts will be made in this class to protect your privacy and to ensure confidential treatment of information associated with or generated by your participation in the class.

Directory items include name, UIN, local address, permanent address, email address, local telephone number, permanent telephone number, dates of attendance, program of study (college, major, campus), classification, previous institutions attended, degrees honors and awards

received, participation in officially recognized activities and sports, medical residence location and medical residence specialization.