GEOG 478/678 WebGIS

Course Number: GEOG 478/678
Course Title: WebGIS
Section: 478-500; 478-502; 678-600
Time: Monday, Wednesday, Friday 1:50 – 2:40 pm
Location: CSA 303
Credit Hours: 4

Instructor Details

Instructor: Dr. Zhe Zhang
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Office Hours: Friday 12:30-1:30 pm or by appointment. zoom
https://tamu.zoom.us/j/7322949427
Teaching Assistant: Jikun Liu
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E-Mail: jikun@tamu.edu
Office Hours: Tuesday 12:10-2:10 pm or by appointment. If you are planning to attend remotely, please email me for zoom link.
Lab Sessions:
Tuesday 2:20-4:10 pm
Thursday 9:35-11:25 am

Course Description

Welcome to GEOG 478/678: WEBGIS. This course introduces current developments in web GIS. By utilizing the latest in web GIS technology, students will learn web programming and how that relates to GIS on the web. The lectures will focus on presenting code, methods, and designs of GIS on the web as well as errors and challenges one may face while programming. These may include focus on incorporating new features into a web map such as REST calls, new data types and sources, or Geovisualizations.

Course Prerequisites

GEOG 390 or equivalent, or approval of instructor

Course Learning Outcomes

This course is designed to introduce students to the basics of producing, managing, and consuming web-based Geographic Information Systems (WebGIS) in the context of server-oriented architectures (SOA). Through hands-on experience, students will learn to setup, administer, and utilize industry-standard WebGIS platforms including Esri ArcServer, ArcGIS Online, ArcGIS JavaScript API. This course will provide students with a solid foundation in the installation and use of WebGIS databases and services as well as a basic knowledge of how to utilize these in the development of web maps.
The course will start with an introduction to fundamental Internet architectures used in production-level WebGIS platforms. The course will next cover hands-on installation, publishing,

and management of industry-standard WebGIS platforms, services, and data. Finally, students will learn and employ introductory JavaScript programming to integrate their WebGIS databases and services within custom-developed web-based maps using commercially available and commonly-used web-mapping application programming interfaces (APIs). The course will include a lecture component where theoretical issues are covered and lab-based exercises where students have the opportunity to practice setting up, managing, and implementing these techniques and technologies.

At the end of this class, each student will be able to:
- Identify a set of requirements for implementing WebGIS servers and services;
- Setup and administer industry-standard WebGIS servers;
- Publish and consume data and services to and from WebGIS servers;
- Programmatically access GIS data and services from WebGIS servers and use these in the production of web-based maps; and
- Critically assess design and implementation patterns for deploying WebGIS systems within a larger CyberGIS environment;
- Conceptualize, design, plan, implement, and document a custom WebGIS solution to a real-world problem; and
- Identify a set of requirements for a WebGIS project and lead a team of students in the design, execution, and evaluation of the project.

Textbook and/or Resource Materials
Fu P. and Sun J., 2010. WebGIS principles and applications. ESRI Press.
Development Software: VisualStudio and Git

Grading Policy
This class consists of the following components:
1) Lectures: Instructor will give lectures to introduce the technologies used to program web-based GIS projects. The lecture will be combined with 15-20 min classroom exercise. We will also do random lecture attendance check.
2) **Weekly homework**
Students will create three quizzes each week (see course timetable) based on that week's lecture contents. See example below:
Which of the following is NOT a software developed by ESRI?
1. *ArcGIS Pro*
   B. *Google Docs (Right Answer)*
   C. *ArcMap*
   D. *ArcGIS online*
3) Exams
We will have two exams (mid-term and the final exam), with 200 points for each. The exam consists of 20 quizzes, and most of the questions will come from students' weekly homework.
4) Project Work
- Develop a totally working version of your project that achieves the goals of your proposal
- Fully test your project to ensure that all of the functionality works as expected

- Make sure that you will have a way to demo your working system in class

i) Classroom presentations (2*100 points, see syllabus course schedule)

Project groups will have 10 min presentation in the class to demonstrate their project updates. All group members should present in the presentation.

- Goal - what were you planning to do?
- Motivation - why were you planning to do it, for whom, to solve what problem?
- Approach/Methods/Data - what is the architecture of your project, how did you build it, what technologies/data/api's did you use, who did which part of the project?
- Results - What did you achieve?
- Discussion/Conclusion - Reflect on what you had set out to do, what you actually did, and how it went

ii) Final project work submission

-Submit your code and data into GitHub & Canvas (300 points)

- Make sure that all of your code is in GitHub and Canvas
- Make sure that instructor can access your GitHub repository

Make sure your data layers, maps, and anything else is accessible to "Everyone" - If Applicable

- Log into ArcGIS Online
- Make sure that all of the materials necessary for your project are "Shared" with "Everyone"
- Use Chrome Incognito to browse to your project materials in ArcGIS Online
- Make sure there are no login popup's when using your project

- Make a video demo of your project (working, in action)- submit your demo video (YouTube link) to GitHub and Canvas. (100 points)

- Demonstrate that all of the functionality you proposed works as expected
- Use a screen recording tool to record your team delivering your project presentation
- Upload your recording to YouTube, make sure that instructor and TA can access your presentation video

- Write a 500 - 2500 words report which includes the following contents (200 points)

- Introduction, data description, webGIS methods, results, discussion and conclusion
- Include tables, figures, screenshots, references, citations in your report (as needed)
- Report formatting: Times New Roman 12 single spacing, up to 8 pages including figures and tables.
- These assignments DO require **IN-TEXT CITATIONS** of outside references from scientific journal articles, books, articles, etc. for portions of the assignment. You may use APA or MLA citation styles. Please review how to correctly cite information for these exercises at the links below:
  - https://guides.library.unr.edu/mlacitation/in-textciteLinks to an external site.
  - https://apastyle.apa.org/style-grammar-guidelines/citationsLinks to an external site.

5) Team Evaluation Report (20 points)

Everyone has to submit a team evaluation report where you give 100 points to the team member who has done excellent work. Give less points that reflect their contribution to the project. You will not receive the final grading without submitting the team evaluation report.

Grading	Points
Labs	800 (100 points *8)
Project work	Code and data = 300 Video Demo: 100 Classroom Presentations: 100 * 2 =200 Report: 200
Exams	400 (200 points for each exam, 2 exams)
Homework	100 (10 points/each * 10 assignments)
Lecture Attendance Check	40 points * 5 times = 200 points
Evaluation	20
Total	2320

>90% A, 80-89% B, 70-79 % C, 60-69% D, < 60% F

You can earn additional 3*30 points = 90 points by attending CyberTraining webinar. The date of the webinar and workshop will be announced later.

The HARD DEADLINE for submitting all the assignments for the final grading is April 28th, 2025.

Late Work Policy

- Late assignments will receive a 5% score deduction for each day after the original due date, unless you contact the instructor BEFORE THE DUE DATE ONLINE and provide an excused absence/documented emergency. Documentation is necessary for every case. Excused absences are covered in the TAMU Student Rules (http://student-rules.tamu.edu).

Course Schedule

Week	Day	Dates	Lecture Topic	Homework
1	Mon	13-Jan	Syllabus & Course Expectations Form the project group	-
	Wed	15-Jan	Introduction to Git	
	Fri	17-Jan	Introduction to WebGIS	

	Mon	20-Jan	Martin Luther King Holiday	
2	Wed	22-Jan	Intro to Internet	Homework 1 Lab 1: GitHub Set Up
	Fri	24-Jan	Intro to HTML	
	Mon	27-Jan	HtML+CSS	
3	Wed	29-Jan	ArcGIS Story Map	Homework 2 Lab 2 Resume
	Fri	31-Jan	JavaScript1	
	Mon	3-Feb	CyberTraining Webinar1	
4	Wed	5-Feb	JavaScript 2	Homework 3 Lab 3 Story Map
	Fri	7-Feb	ArcGIS Online	
	Mon	10-Feb	JavaScript 3	
5	Wed	12-Feb	JavaScript 4	Homework 4 Lab 4 ArcGIS Online
	Fri	14-Feb	JavaScript 5	
	Mon	17-Feb	Proposal Presentation	
6	Wed	19-Feb	Proposal Presentation	No homework and lab
	Fri	21-Feb	Proposal Presentation	

	Mon	24-Feb	Leaflet	
7	Wed	26-Feb	Leaflet+JSON	Homework5 Lab 5 Leaflet+ Javascript mapping
	Fri	28-Feb	Exam Review	
	Mon	3-Mar	Exam 1	
8	Wed	5-Mar	ArcGIS API	Homework6 Lab 6: Advanced leaflet Javascript Mapping
	Fri	7-Mar	Advanced ArcGIS API	
9	Mon	10-Mar		
	Wed	12-Mar	Spring Break	No Homework
	Fri	14-Mar		
10	Mon	17-Mar	3D Web Mapping	
	Wed	19-Mar	CyberTraining Webinar 2	Homework 7 Lab 7: Interactive Chart
	Fri	21-Mar	WebApp Builder	

	Mon	24-Mar		
11	Wed	26-Mar	AAG No Class	Homework 8
	Fri	28-Mar		
12	Mon	31-Mar	D3 and HighChart AAG	
	Wed	2-Apr	Open Source WebGIS	Homework 9 Lab 8: Feature layer web editing
	Fri	4-Apr	Google Earth Engine	
13	Mon	7-Apr	ArcGIS Dashboard	-
	Wed	9-Apr	Vector Tiles	Homework 10
	Fri	11-Apr	Insights for ArcGIS	
14	Mon	14-Apr		
	Wed	16-Apr	Final Project Presentation	-
	Fri	18-Apr	Reading Day, No Class	
15	Mon	21-Apr	Final Project Presentation	-
	Wed	23-Apr	Research Talk	

	Fri	25-Apr	CyberTraining Webinar 3	
16	Mon	28-Apr	Exam Review (Last Day of Class)	Hard Deadline
	Wed	30-Apr	Reading Day, No Class	
	Fri	2-May	Final Exam	

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](#).

Texas A&M at Galveston
You can learn more about the Honor Council Rules and Procedures as well as your rights and responsibilities at [tamug.edu/HonorSystem.](#)

Texas A&M at Qatar
You can learn more about academic integrity and your rights and responsibilities at Texas A&M University at Qatar by visiting the [Aggie Honor System](#) website.

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 [https://disability.tamu.edu/](#).

Texas A&M at Galveston
Disability Resources is located in the Student Services Building or at (409) 740-4587 or visit [https://www.tamug.edu/disabilityresources/index.html](#).

Texas A&M at Qatar
Disability Services is located in the Engineering Building, room 318C or at +974.4423.0316 or visit [https://www.qatar.tamu.edu/students/student-affairs/disability-services](#).

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.

Texas A&M at College Station

Students wishing to discuss concerns related to mental and/or physical health in a confidential setting are encouraged to make an appointment with University Health Services or download the TELUS Health Student Support app for 24/7 access to professional counseling in multiple languages. Walk-in services for urgent, non-emergency needs are available during normal business hours at University Health Services locations; call 979.458.4584 for details.

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.

Texas A&M at Galveston

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with the Counseling Office in the Seibel Student Center, or call (409)740-4587. For additional information, visit https://www.tamug.edu/counsel/index.html.

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

Texas A&M at Qatar

Texas A&M University at Qatar students wishing to discuss concerns in a confidential setting are encouraged to visit the Health and Wellness website for more information.

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 influencing a student's academic success and overall wellbeing. Students are encouraged to engage in healthy self-care practices by utilizing the resources and services available through University Health Services. Students needing a listening ear can call the Texas A&M Helpline (979.845.2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends for mental health peer support while classes are in session. The TELUS Health Student Support app provides access to professional counseling in multiple languages anytime, anywhere by phone or chat, and the 988 Suicide & Crisis Lifeline offers 24-hour emergency support at 988 or 988lifeline.org.

Texas A&M College Station

Students needing a listening ear can contact University Health Services (979.458.4584) or call the Texas A&M Helpline (979.845.2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on

weekends while classes are in session. 24-hour emergency help is also available through the 988 Suicide & Crisis Lifeline (988) or at 988lifeline.org.

Texas A&M at Galveston
Students who need someone to talk to can call (409) 740-4736 from 8:00 a.m. to 5:00 p.m. weekdays or visit https://www.tamug.edu/counsel/index.html for more information. For 24-hour emergency assistance during nights and weekends, contact the TAMUG Police Dept at (409) 740-4545. 24-hour emergency help is also available through the 988 Suicide & Crisis Hotline (800-273-8255) or at 988lifeline.org.

Texas A&M at Qatar
Texas A&M University at Qatar students wishing to discuss concerns in a confidential setting are encouraged to visit the Health and Wellness website for more information.

College and Department Policies
College and departmental units may establish their own policies and minimum syllabus requirements. As long as these policies and requirements do not contradict the university level requirements, colleges and departments can add them in this section.
Please remove this section if not needed.

Click ***here*** for more information on Texas A&M University's syllabus requirements.