

**GEOG431**  
**Web-based Online Mapping**  
**Using ArcGIS API for JavaScript**

**Summer 2024**

Course Syllabus

**Department of Geography**  
**Southern Illinois University Edwardsville**

Course number and name: GEOG431-500 Web-based Online Mapping  
Using ArcGIS API for JavaScript

Number of Credits: 3  
Time of Class: May 28 – August 2, 2024  
Room and Location of Class: Online, Asynchronous  
Instructor's Name: Shunfu Hu, Professor  
Instructor's Office Location: Online  
Instructor's Virtual Office Hours: appointment only

Instructor's Contact Information: E-mail: [shu@siue.edu](mailto:shu@siue.edu)

Preferred method of communication is via email.  
I will respond to your e-mail within 24 to 48 hours.

Course web site address: <http://bb.siue.edu>  
(log in with your SIUE E-mail account's e-id and password)

Prerequisites: Student needs to be knowledgeable about how to use Blackboard;

**No computer programming experience is required.**

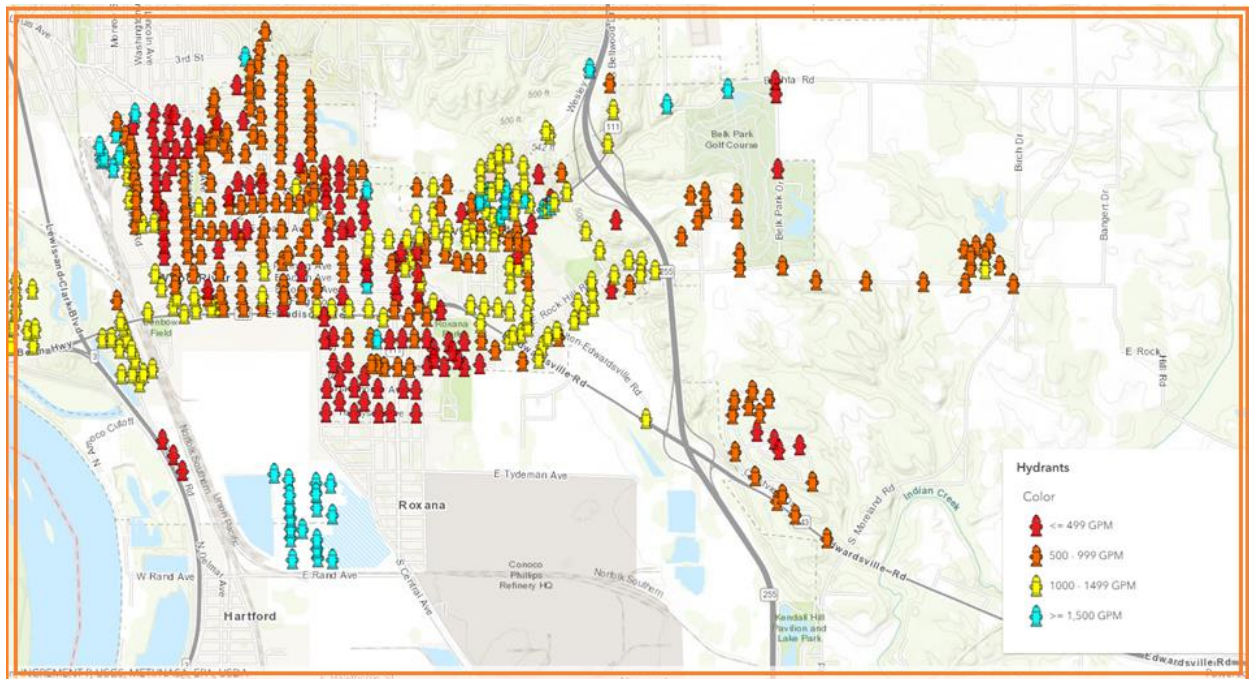
**Background and Course Objective**

Introduced in 2005, Google Maps has transformed the online mapping. No longer dependent on server-client relationship, Google Maps uses a more interactive, tile-based system based on Asynchronous JavaScript and XML (AJAX ) to present an online map that allows

for highly interactive panning and zooming. In 2006, the Google Maps Application Programmer Interface (API) was introduced that facilitated the creation of map mashups – the mapping of spatial data from custom sites. Map mashups have had a major impact on how spatial information is communicated on the Internet. Other Maps APIs are also available for online mapping, including ArcGIS API for JavaScript, Yahoo! Maps API, Microsoft Bing Maps API, and Nokia Ovi Maps API.

Another new development in the online mapping is the use of REST (**R**epresentational **S**tate **T**ransfer) ArcGIS Map Services that are available throughout the federal, state, and county level government agencies as well as private sectors. Those map services, along with ArcGIS Online (arcgis.com) are useful for developing online-based mapping applications. In addition, the online maps allow to incorporate multimedia information in photographs, digital video clips and audio sound formats.

The objective of this course is to introduce students with the concepts and practices of online mapping, including HTML, CSS, JavaScript, and Maps API. Specific examples are presented using the ArcGIS API for JavaScript that involve the mapping of points, lines, and polygons as well as map mashups. HTML/JavaScript scripting and various routines using ArcGIS API for JavaScript will be introduced through hands-on lab exercises.



## Textbooks and Technology Requirements

1. **Required textbook:** none  
Dr. Hu will provide online resources and tutorials

### 2. Technology Requirements

Because this is an online course, you are expected to have reliable Internet access on a regular basis. It is your responsibility to address any computer problems that might occur. Such problems are not an excuse for delays in meeting expectations or for missing course deadlines. Support for using Blackboard is available by calling 618-650-5500, or by visiting the SIUE web pages that provide information about Blackboard, e.g. <http://www.siu.edu/its/bb/>

At a minimum, you will need the following software/hardware to participate in this course:

- computer with an updated operating system (e.g. Windows, Mac, Linux)
- updated Internet browser (Apple Safari, Internet Explorer, Google Chrome, Mozilla Firefox)
- DSL or Cable Internet connection or a connection speed no less than 6 Mbps. A secure, encrypted Wifi (requiring a login and password) is acceptable. Note that some Blackboard components will not work properly on free wifi from places like Starbucks, Panera's or McDonalds.
- Microsoft Office (SIUE Students can now get Free Office 365 at <http://www.siu.edu/its/students/software-hardware.shtml>)
- any other specialized software or basic software such as Adobe Reader, Media Players, FileZella, Notepad++ (See: <http://www.siu.edu/its/software/index.shtml>)

## Instructional Methods

There is a **misconception** about online courses. That is, many people think it is easier to take online courses. But in fact it is harder. Since this is a semester course, as adult learners, you will have to spend a fair amount of time studying every week in order to successfully complete this online course. Based on the features of online courses and research findings in this area, the **constructivist learning theory** is the major theoretical foundation of instructional methods used in this course. This theory focuses on learners' active learning, self-guidance, and peer interaction. Specifically, a variety of online instructional methods will be involved in this course, including, but are not limited to the following:

1. **Individual chapter reading and comprehension.** It is absolutely your responsibility to read and comprehend the online structured chapter overview in the form of PowerPoint presentation (PPT) on Blackboard and prior to completing all chapter assignments. It is expected that the structured chapter overview will help you better understand the content of each chapter.
2. **Individual online quizzes.** In order to assess your mastery of the major concepts in HTML, CSS and JavaScript, the online quizzes will be available on Blackboard. These are objective, open-book, and individual quizzes. Your online quizzes will be automatically

graded and **highest score will be recorded. No make-up quizzes will be available after the due date (see the class schedule on page 7).** It is possible that different students may get different formats of the test items because the test items will be randomized. It is reported that from 2-6 AM the SIUE online system may be randomly under backup and maintenance. So please avoid taking quizzes during that period.

3. **Individual lab exercises.** The lab exercises, with step-by-step instructions, are given, in coincidence with Dr. Hu's lecture, to help you understand the major components of the scripting using the ArcGIS API. In addition, completing those lab exercises is the key to successfully complete class projects and the final project.
4. **Individual projects.** The projects, with specific requirements, allows you to practice what you have learned in both lectures and lab exercises, in related but new circumstances. They are designed to test your ability of applying the existing scripting skills as well as develop new skills.
5. **E-mail communication.** If you have any other *non-content* related questions, please e- mail the instructor at [shu@siue.edu](mailto:shu@siue.edu)
6. Online chat (Blackboard) with the class and/or your group members.
7. Zoom meeting if needed
8. Additional announcements will be posted on Blackboard if needed.
9. Most of the time, the instructor will monitor and observe your group discussions on Blackboard although you will not see his posting and responses sometimes.
10. You can expect the instructor's feedback for your project, such as your personal web page and interactive online maps within one week from its due date.
11. **Service for students needing accommodations**

It is the policy and practice of Southern Illinois University Edwardsville to create inclusive learning environments. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or to accurate assessment of achievement—such as time-limited exams, inaccessible web content or the use of non-captioned videos—please contact Accessible Campus Community and Equitable Student Support (ACCESS) as soon as possible. In order to properly determine reasonable accommodations, students must register with ACCESS either online at [siue.edu/access](http://siue.edu/access) or in person in the Student Success Center, Room 1203. You can also reach the office by sending emails to [myaccess@siue.edu](mailto:myaccess@siue.edu) or by calling 618-650-3726.

If you feel you would need additional help in the event of an emergency situation, please notify your instructor to be shown the evacuation route and discuss specific needs for assistance.

## 12. Diversity and Inclusion

SIUE is committed to respecting everyone's dignity at all times. In order to learn, exchange ideas, and support one another, our virtual and physical classrooms must be places where students and teachers feel safe and supported. All students and faculty have the responsibility to co-create a classroom that affirms inclusion, equity, and social justice, where racism, sexism, classism, ableism, heterosexism, xenophobia, and other social pathologies are not tolerated. Violations of this policy will be enforced in line with the SIUE Student Conduct Code.

The Hub <https://www.siu.edu/csdi> is an excellent resource for students for support and community. Any person who believes they have experienced or witnessed discrimination or harassment can contact Ms. Jamie Ball, Director in the Office of Equal Opportunity, Access and Title IX Coordination at (618) 650-2333 or [jball@siue.edu](mailto:jball@siue.edu). There is also an online form for reporting bias incidents at [https://cm.maxient.com/reportingform.php?SIUEdwardsville&layout\\_id=10](https://cm.maxient.com/reportingform.php?SIUEdwardsville&layout_id=10).

### Course Requirements

- 1. Individual online quizzes.** Students will take three online quizzes on HTML5, CSS and JavaScript, respectively (25 questions in multiple-choice format; 0.4 point each question). Total points = 30
- 2. Lab Exercises.** Students will complete a total of nine (9) lab exercises assigned throughout the semester. These lab exercises provide students with detailed instruction on how to use ArcGIS API for JavaScript to 1) create online maps that contains points, lines and polygon features; 2) create an online interactive map that provides Web Style Symbols and pop-up information; and 3) create Choropleth maps. Each lab exercise is assigned 10 points. Total points = 90
- 3. Project 1.** Students will use ArcGIS API for JavaScript to create an online map that contains point, line and polygon features from the REST Map Services. Total points = 20
- 4. Project 2.** Students will use ArcGIS API for JavaScript to create an online interactive map that provides Web Style Symbols and pop-up information. Total points = 20
- 5. Project 3.** Students will use ArcGIS Online Map Service to create a Choropleth map. Total points = 20
- 6. Final Project.** Students will use ArcGIS API for JavaScript to develop online maps with specific requirements. Total points = 100
- 7. Graduate Student Paper.** Each graduate student must complete a research paper on a pre-approved topic of any online or web-based mapping application. This paper may be a survey paper of an application, or, a research paper based on his/her own interest in online mapping applications (but not based on assigned labs/projects). If you want to incorporate required

student final project (see #6 above) with this graduate student paper, you need to do a thorough literature review on the topic. This paper must be at least **10 pages** in length (double space), and include a bibliography of at least 10 references. **The paper is due on Saturday, August 5th, 2023.** The paper should be submitted to a designated folder (e.g. Final\_Research\_Paper) on Blackboard. Total points = 50

### Academic Honesty and Disability

Plagiarism and cheating are serious offenses and may be punished by failure on assignments, tests, or projects. Please refer to the SIUE policy on plagiarism: <http://www.siue.edu/policies/li6.shtml>

If you are a student with a disability that requires curricular or co-curricular accommodations, please go to Disability Support Services for coordination of these accommodations. All accommodations are individualized and require documentation of the functional impacts of the disability and severity. DSS is located in the Student Success Center, Room 1270; you may contact them to make an appointment by calling (618) 650-3726 or sending an email to [disabilitysupport@siue.edu](mailto:disabilitysupport@siue.edu). Please visit the DSS website located online at [www.siue.edu/dss](http://www.siue.edu/dss) for more information.

### Evaluation and Grading Policy

General criteria for the following grading components are described below:

1. Grade Type: Letter Grade (A–F): Specifically, final grades will be assigned based on the performances of **all work** described below. The specific grading standards are: A=90-100%, B=80-89.9%, C=70-79.9%, D= 60-69.9%, F=0-59.9%.
2. Grade Components:
 

a. Online quizzes (3 quizzes, 10 points each) .....	30 points
b. Lab Exercises (9 labs x 10 points each).....	90 points
c. Projects (3 projects x 20 points each) .....	60 points
d. Final Project .....	100 points
e. Graduate Student Paper .....	50 points

**Undergraduate student total .....280 points**

**Graduate student total .....330 points**

Grades:	Undergraduate	Graduate
A	>= 252	>=297
B	222 - 251	264 - 296
C	196 – 221	<=263
D	168 – 195	
F	<= 167	

## Class Schedule and Assignments

Week	Topics	Readings and Tutorials
Week 1 (May 28 - Jun. 2)	<b>Introduction to the Course (PPT)</b> <b>Chapter 1: Introduction to HTML (PPT)</b> Chapter 1 quiz due at 11:59 p.m., June 2nd	(PPT = PowerPoint slides; available on Blackboard) <a href="http://www.w3schools.com/html/default.asp">http://www.w3schools.com/html/default.asp</a> Complete <b>HTML Quiz</b> on Blackboard
Week 2 (Jun. 3 – 9)	<b>Chapter 2: Introduction to CSS (PPT)</b> Chapter 2 Quiz due at 11:59 p.m., June 9 <sup>th</sup> <b>Chapter 3: Introduction to JavaScript (PPT)</b> Chapter 3 Quiz due at 11:59 p.m., June 9 <sup>th</sup>	<a href="http://www.w3schools.com/css/default.asp">http://www.w3schools.com/css/default.asp</a> Complete CSS Quiz on Blackboard  <a href="http://www.w3schools.com/js/default.asp">http://www.w3schools.com/js/default.asp</a> Complete JavaScript Quiz on Blackboard
Week 3 (Jun. 10 – 16)	<b>Chapter 4: Introduction to the ArcGIS API for JavaScript (PPT)</b> <b>Lab Exercise 1:</b> Create MyFirstMap.html and MyFirstMapstl.html; Publish them online  <b>Chapter 5: 3D Map Visualization (PPT)</b> <b>Lab Exercise 2:</b> Create a MyFirst3DMap.html and MyFirst3DMaps.html; publish them online  Both Lab 1 and Lab 2 are due at 11:59 p.m., Sunday, June 16th.	
Week 4 (Jun. 17 – 23)	<b>Chapter 6: Add Additional Layers to the Basemap (PPT)</b> <b>Lab Exercise 3:</b> Add Point, Line, and Polygon Feature Layers to the Basemap and publish them online  <b>Project 1:</b> Create an online map that contains points, lines and polygon features from the REST Map Services Both Lab 3 and Project 1 are due at 11:59 p.m., Sunday, June 23rd.	
Week 5 (Jun. 24 - 30)	<b>Chapter 7: Making Styled Symbol Map (PPT)</b> <b>Lab Exercise 4:</b> Create a styled symbol map and publish it online  <b>Chapter 8: Create an interactive map with pop-up information</b> <b>Lab Exercise 5:</b> Create a COVID19 online map with pop-up information  Both Lab 4 and Lab 5 are due at 11:59 p.m., Sunday, June 30th.	
Week 6 (Jul. 1 – 7)	<b>Chapter 9: Making a Web Style Symbols (2D) map with pop-up information</b> <b>Lab Exercise 6:</b> Create a Web Style Symbols (2D) map with pop-up information  <b>Project 2: Create an online interactive map that provides Web Style Symbols and pop-up information</b> Both Lab 6 and Project 2 are due at 11:59 p.m., Sunday, July 7th.	
Week 7 (Jul. 8 - 14)	<b>Chapter 10: Use of ArcGIS Online Map Service in ArcGIS API for JavaScript (PPT)</b> <b>Lab Exercise 7:</b> Use of ArcGIS Online Map Service in ArcGIS API for JavaScript  <b>Chapter 11: Online Choropleth Mapping in ArcGIS API for JavaScript (PPT)</b> <b>Lab Exercise 8:</b> Mapping Poverty in the United States. Both Lab 7 and Lab 8 are due at 11:59 p.m., Sunday, July 14th.	

<p>Week 8 (Jul. 16 - 21)</p>	<p><b>Chapter 12: Visualizing Point-density with a Heatmap in ArcGIS API for JavaScript</b>  <b>Lab Exercise 9:</b> Create a Heatmap to Visualize Earthquakes of the World.</p> <p><b>Project 3:</b> Use of ArcGIS Online to create and publish an interactive map with customized map symbols and pop-up information</p> <p>Both Lab 9 and Project 3 are due at 11:59 p.m., Sunday, July 21st.</p> <p>Final project proposal due on July 22nd</p>
<p>Week 9 (Jul. 22 – 28)</p>	<p><b>Final Project</b></p>
<p>Week 10 (Jul. 29 - Aug. 2)</p>	<p><b>Final Project is due</b> on Saturday August 3rd. (submit your URL in a Word document to Blackboard)</p> <p><b>Graduate student research paper</b> is due on Saturday August 3rd.</p>