Web GIS

GEOG - 2800 001

Course Description

Future trends in geospatial technology demonstrates a need for professionals trained in web-based GIS to create dynamic, interactive maps for commercial, public sector, and non-profit organizations. The course will provide students with basic concepts, principles, and techniques in web-based GIS.

Semester(s) Taught: Spring Semester

Course Student Learning Outcomes

- Apply knowledge and skill sets regarding trends in web-based GIS.
- Apply knowledge and skill sets regarding web-based hosting services.
- Apply knowledge and skill sets regarding web app-builders for web-based GIS.
- Apply knowledge and skill sets regarding the uses and benefits of mobile GIS.
- Apply knowledge and skill sets regarding tile layers and map image layers.
- Apply knowledge and skill sets regarding spatial-temporal data and real-time GIS.
- Apply knowledge and skill sets regarding three-dimensional web-scenes.
- Apply knowledge and skill sets regarding image services and online raster analysis.
- Apply knowledge and skill sets regarding web-based GIS programming.

Course Prerequisites

None

Required Text or Materials

Title: Introduction to Web GIS
Authors: R. Adam Dastrup, MA, GISP
Publication Date: August 2025

For more information on textbook accessibility, contact Accessibility & Disability Services at ads@slcc.edu.

Additional Materials

All students will be given a personal license to ArcGIS Pro, along with access to a host of other Esri software including ArcGIS Online, Story Maps, Living Atlas, and more.

Access to a Windows PC, or the ability to run Windows on a Mac is required for the course. If needed, students can access All Access, to gain access to a virtual desktop that contains ArcGIS Pro.

Flipped Classroom

This course emphasizes **learning by doing**. Students are encouraged to explore, make mistakes, and learn through iteration. More time is devoted to interactive engagement and skill-building rather than passive lecture.

What that means is that the course adopts a flipped classroom approach, where you engage with core GIS concepts before class through curated videos, readings, and quizzes. By frontloading foundational content, our in-class time is freed up for hands-on spatial analysis, collaborative problem solving, and real-world GIS applications under the instructor's guidance.

A flipped classroom shifts lectures and core content to pre-class learning, freeing up in-person time for active, collaborative problem-solving. This model boosts engagement, deepens understanding, and lets instructors provide personalized support exactly when students need it.

HOW THE FLIPPED MODEL WORKS IN A GIS COURSE

Pre-Class Preparation | You may watch brief videos (5–10 minutes each), review guided readings, and complete short online quizzes or reflection prompts to check your understanding of topics like coordinate systems, data types, and map projections.

In-Class Active Learning | Class sessions focus on interactive GIS learning activities using ArcGIS Pro or ArcGIS Online, scenario-based challenges (e.g., service-area mapping, suitability analysis), and peer collaboration to apply and deepen your spatial reasoning skills.

Post-Class Reinforcement | After each session, you may submit mini-reports, participate in discussion boards on ethical and practical GIS issues, and begin building a portfolio of maps and dashboards that showcase your mastery of the tools and methods.

STUDENT ROLE AND COURSE BENEFITS

- Come to class prepared, having completed all pre-class materials and ready to dive into labs and discussions.
- Take ownership of your learning by reflecting on feedback, troubleshooting GIS workflows, and sharing insights with peers.
- Gain practical proficiency in key GIS techniques, develop critical spatial thinking, and build a professional portfolio that highlights your ability to tackle real-world geographic challenges.

PRACTICAL IMPACT ON LEARNING

- **Increased Lab Time** | Instead of observing demonstrations during class, participants will dive directly into ArcGIS Pro workflows, such as editing attribute tables, performing spatial joins, and designing dashboards.
- **Real-World Applications** | Scenario-based challenges, such as pinpointing hot spots for urban green spaces, connect abstract concepts to practical, hands-on tasks.
- **Portfolio Development** | Each session produces deliverables like maps, reports, and Python scripts, which participants can compile into a comprehensive professional GIS portfolio.
- **Collaborative Learning** | Small-group problem-solving fosters rapid skill acquisition and mirrors collaborative practices commonly found in workplace environments.

Brief Description of Assignments/Exams

Pre-Class Preparation | These are short, low-stakes assessments designed to reinforce preparation materials and ensure students engage with concepts before class.

In-Class Active Learning | GIS learning activities and serve as the core of in-class and post-class practice. These weekly applied exercises allow students to build technical skills in GIS software while working with real-world datasets.

Post-Class Reinforcement | Reflections provide students with opportunities to consolidate their learning. Through short written responses, students connect technical concepts to broader applications and reflect on the implications of their work.

Midterm GIS Project | The midterm project emphasizes project design, requiring students to propose a research question, acquire and prepare datasets, and conduct preliminary analysis. This milestone ensures students are prepared for the larger final project.

Final GIS Project | Finally, the final project is a comprehensive applied GIS investigation. Students must demonstrate their ability to design and complete an analysis, present results in professional-quality maps, and communicate findings through both a written report and an oral presentation.

Most of the learning activities and points for the course will be through interactive, hands-on assignments using various software from the Esri ArcGIS platform. Every module will have several GIS assignments designed to teach you specific knowledge and skillsets using ArcGIS Pro and ArcGIS Online. Those assignments will come from the Esri Training website, or various other sources. All assignments will be submitted within Canvas.

The GIS final project will challenge students to apply GIS to a real-world problem of their choice. For that project, students will be required to:

- Identify a research question.
- Acquire relevant spatial data.
- Conduct analysis using multiple GIS techniques.
- Present the findings in a professional-quality poster.
- Submit a short-written report discussing the results and limitations.

PROFESSIONAL GIS EPORTFOLIO

Throughout the course, you still begin developing a professional portfolio to showcase your GIS projects and certifications using Esri's Story Maps software. More on this throughout the course.

EXTRA CREDIT

SLCC is partnering with the Salt Lake Area GIS Users Group (SLUG) for GIS Day on Wednesday, November 19th, 2025. While the details are still being worked out, students who attend will be given extra credit. More information coming in the near future...

Engagement Plan

This course is designed around a flipped classroom model, which means that student engagement happens before, during, and after class. To succeed, students are expected to actively participate in each stage of the learning cycle.

Before Class | Students complete short videos, readings, and low-stakes quizzes to build foundational understanding. These activities are essential for making in-class time productive and applied.

During Class | Students work on hands-on labs, collaborative exercises, and discussions that connect GIS concepts to real-world issues, including the United Nations Sustainable Development Goals (SDGs). The classroom is a space for active learning, problem-solving, and peer collaboration rather than passive lecture.

After Class | Students consolidate learning through short written reflections, applied lab submissions, and project milestones. These tasks provide opportunities to connect technical skills to broader applications and to practice communicating spatial insights.

Throughout the semester, students will engage in peer review, group discussions, and debates to strengthen critical thinking and collaboration skills. The final project offers students the opportunity to apply GIS to a topic of their choice, demonstrating both technical proficiency and an understanding of how GIS can support society.

Active participation is a central expectation of this course. By preparing before class, contributing during class, and reflecting afterward, students will gain the full benefit of the

flipped classroom model and develop both technical and applied GIS skills.

Academic Integrity

Understanding that artificial intelligence (AI) can be a powerful tool in your studies is essential. It can quickly compile and present information on the Internet in a clearer and conversational format. However, its use must adhere to academic integrity standards. There is both appropriate and inappropriate use of AI. While AI can facilitate your learning by offering quick insights, it is a relatively new technology and may provide inaccurate information on complex issues, especially when addressing current events.

APPROPRIATE USE OF ARTIFICIAL INTELLIGENCE

- **Research Assistance** | AI can gather background information, summarize complex topics, and identify key themes from publicly available sources.
- **Idea Generation** | AI can help brainstorm topics, provide writing prompts, and assist with outlining essays or projects.
- **Learning Support** | AI can explain concepts, provide tutoring assistance, or clarify geography and regional studies concepts.
- **Data Analysis** | AI can assist in interpreting geospatial data, maps, or statistics relevant to geographic studies.

INAPPROPRIATE USE ARTIFICIAL INTELLIGENCE

- **Plagiarism and Unauthorized Assistance** | Using AI to generate full assignments, essays, or reports without proper citation or instructor approval is considered academic dishonesty.
- **Misrepresentation of Facts** | AI may occasionally provide incorrect or outdated information, especially on complex or rapidly changing global events. Always verify AI-generated content with credible sources.
- **Unapproved AI Use in Assignments** | If an assignment explicitly prohibits AI assistance, ensure your work is original and does not incorporate AI-generated content.

ETHICAL CONSIDERATIONS REGARDING ARTIFICIAL INTELLIGENCE

- **Academic Integrity** | AI tools can assist students in writing and research, but improper use may lead to plagiarism or a decline in critical thinking skills.
- **Bias and Fairness** | AI models are trained on vast datasets, which may contain biases. If not carefully managed, AI-generated content could reinforce stereotypes or provide misleading information.
- **Privacy and Data Security** | AI systems often collect and analyze student data. Without proper safeguards, sensitive information could be misused or exposed in education.
- **Dependency and Critical Thinking** | Over-reliance on AI for learning may reduce students' ability to think independently and solve problems creatively.
- **Environmental Impact** | Training and running AI models require significant energy, contributing to carbon emissions and resource consumption.

ARTIFICIAL INTELLIGENCE AND LEARNING

- **Personalized Learning** | AI can tailor educational content to individual students' needs, helping those who require extra support while allowing advanced learners to progress at their own pace.
- **Language and Accessibility Support** | AI-powered translation and speech-to-text tools assist students with language barriers, disabilities, or learning differences, ensuring they receive equal opportunities to engage with educational materials.
- **Resource Allocation** | AI can help identify underserved communities and allocate resources more effectively, ensuring students in low-income areas have access to quality education.
- **Bias Detection and Mitigation** | AI can analyze educational materials to identify and reduce biases, ensuring fair representation in curricula and assessments.
- **Teacher Support and Training** | AI can assist educators by automating administrative tasks, providing insights into student performance, and offering professional development opportunities.

BEST PRACTICES OF USING ARTIFICIAL INTELLIGENCE

- Always cross-check AI-generated information with academic sources, peer-reviewed articles, or reliable geographical databases.

- Follow your institution's academic integrity policy regarding AI use.
- If unsure about AI use for a particular assignment, ask your instructor for clarification before proceeding.
- Using AI responsibly can be a valuable tool for enhancing learning. However, students must be mindful of when and how they integrate it into their coursework.

COURSE-SPECIFIC ARTIFICIAL INTELLIGENCE

In this course, specific assignments may permit Artificial Intelligence for research or brainstorming, while others may require independent analysis without AI assistance. Activities where AI use is allowed will be clearly stated in the instructions. Those assignments will also be marked if AI use constitutes cheating or plagiarism.

AI-powered tools and software offer valuable support for learning and writing enhancement. As your instructor, I encourage the responsible use of AI technologies such as ChatGPT, Copilot, Apple Intelligence, and Gemini. AI is increasingly integrated into various applications, providing insights into health and fitness, interpreting photos, generating images, and much more. Given its expanding role, dismissing AI's presence in academia would be inaccurate. However, ethical use is essential—students must uphold academic integrity and adhere to the student code of conduct.

COURSE APPROVED AI FOR STUDYING AND LEARNING ACTIVITIES

Students may use Speechify as a useful AI tool to study reading material. Speechify is a text-to-speech (TTS) software that converts written text into natural-sounding audio. It helps users absorb information more efficiently, making it particularly useful for students, professionals, and individuals with dyslexia or ADHD. Speechify has evolved into a widely used productivity tool for learning, accessibility, and multitasking.

Key Features of Speechify

- **Multi-platform support** | Available as a mobile app, Chrome extension, and desktop application.
- **AI-generated voices** | Offers high-quality, lifelike narration, including voices from celebrities.

- **Optical Character Recognition (OCR)** | Can scan physical books and printed text, converting them into audio.
- **Adjustable playback speed** | Users can increase reading speed to enhance productivity.
- **Multi-language support** | Supports over 30 languages, making it accessible to a global audience.
- **Integration with web browsers and apps** | Works seamlessly across various platforms.

Grammarly to an external site. is an AI-powered writing assistant designed to help users improve their grammar, spelling, tone, and clarity in written communication. It provides real-time suggestions to enhance writing quality across various platforms, including web browsers, desktop applications, and mobile devices.

Key Features of Grammarly

- **Grammar & Spell Check** | Identifies and corrects spelling, punctuation, and sentence structure errors.
- **Tone and Clarity Adjustments** | Helps refine writing to match the intended audience and purpose.
- **Plagiarism Detection** | Scans text against a vast database to ensure originality.
- **Generative AI Capabilities** | Assists in drafting content based on prompts.
- **Multi-platform Integration** | Works with Google Docs, Microsoft Word, email clients, and social media platforms.

Keys for Success (how to succeed in the course)

This course involves weekly assignments, including reading, quizzes, earning ESRI Virtual Campus Certificates, improving map interpretation skills, creating or critiquing maps, participating in online discussions, and professional career development activities.

The course focuses on providing discipline-specific knowledge and skills while fostering workplace competencies and lifelong learning strategies. Education goes beyond acquiring facts; it's about using information to enhance one's life meaningfully.

While the course content is significant, true education comes from linking different pieces of information with the ways various disciplines organize human experiences. This course, alongside others, aims to broaden your perspectives, deepen your understanding of the world and your community, and challenge existing assumptions about the world and its people.

Grading Scale

GRADE	SCORE RANGE
A	100 to 94 percent
A-	93 to 90 percent
B+	89 to 87 percent
B	86 to 84 percent
B-	83 to 80 percent
C+	79 to 77 percent
C	79 to 77 percent
C-	76 to 74 percent
D+	73 to 70 percent
D	69 to 67 percent
D-	66 to 64 percent
E	Less than 60 percent

Assignment Schedule

Due Date	Assignment Name	Assignment Type	Points
	0.1 Assignment | ArcGIS Accounts	Assignment	5
9/8/25	1.1 Assignment | ArcGIS Online Basics	Assignment	20

Transfer/Certification/Licensure/Employment Information

According to the U.S. Department of Labor and Bureau of Labor Statistics, geospatial technology stands out as one of the nation's rapidly growing industries. Job opportunities in surveying, mapping technicians, photogrammetrists, and cartography represent key entry points within this dynamic field.

This employment sector exhibits remarkable diversity and interdisciplinary applications, finding relevance in numerous industries such as local, state, and federal agencies; nonprofit organizations; private sector roles; business and marketing; geography; urban planning and transportation; architecture; public utilities; public safety; military and Homeland Security; geospatial intelligence; criminal justice and law enforcement; public health; forestry and agriculture; environmental science and wildlife conservation; energy management; natural resource management; history, archaeology, and anthropology; sociology; military operations; disaster response and mitigation; surveying; computer science and information systems; photography, videography, and more.

For further insights into the expansive scope of geospatial technology applications, click here.

This course is required for those interested in the following programs of study at SLCC:

- Earth and Environmental Science AS
- GIS and Drones AAS
- GIS Certificate of Proficiency
- Small Unmanned Aerial Systems Certificate of Proficiency

How to Navigate to Canvas

Institutional Policies

As members of our academic community, we would like to invite you to review the Institutional Syllabus which covers important policies and procedures. This document contains important links for students on the code of student rights and responsibilities, academic integrity, and grading policies, Title IX and other important acknowledgements.

By familiarizing yourself with this information, you can help us create a safe and respectful environment for everyone.

For more information, navigate to the Institutional Policies tab on the Institutional Syllabus page.

Learning Support and Tutoring Services

We are pleased to offer a range of tutoring and learning support services to help you achieve your academic goals. Whether you need assistance with a specific subject or want to improve your study skills, you have many options for tutoring or other support.

To learn more about the services we offer and how to access them, visit the Institutional Syllabus page under the Tutoring and Learning Support tab. We encourage you to take advantage of these resources to help you succeed in your studies. If you have any questions or would like to schedule a tutoring session, please don't hesitate to reach out to us. We are here to support you in any way we can.

Advising and Counseling Support Services

At our institution, we are committed to supporting your academic and personal growth. That's why we offer a range of advising and counseling services to help you navigate the challenges of college life. To learn more about the resources available to you and how to access them, visit the Institutional Syllabus page under the Advising and Counseling Support Services tab. Our advising team and the support centers across campus are here to support you in achieving your goals and overcoming any obstacles you may face.

Student Academic Calendar

As students you should be aware of all important dates in the semester, such as the day that courses begin and end, as well as the drop date and the last day to withdraw. To learn more about those dates, navigate to the Student Academic Calendar below:

SLCC Student Academic Calendar