THE OHIO STATE UNIVERSITY

GEOG 5210

Fundamentals of Geographic Information Systems (21296) Autumn 2026

Syllabus - Instructor Information

Tammy Parece

Professional Qualifications

- BS in Interdisciplinary Studies (Virginia Commonwealth University)
- Graduate Certificate in GIS (Virginia Commonwealth University)
- MS in Geography (Virginia Tech)
- PhD in Geospatial and Environmental Analysis (Virginia Tech).
- She has been teaching since 2004 (at Universities since 2011).

Syllabus - Required or Recommended Readings

Shellito, Bradley A. Discovering GIS and ArcGIS Pro, 3rd edition. Macmillan Publishers. (link to each Module is in each week's Lab assignments).

Bolstad, Paul & Steven Manon. 2022. GIS Fundamentals: A First Text on Geographic Information Systems, 7th Edition. ISBN 978-0-9717647-5-0. Ebook or printed copy available through various vendors.

Buckley AR; Kimerling AJ; Kennelly PJ. 2026. Map Use, Volume 1, Map Reading and Design. (link to the ebook is within each week's reading

page).

Federal Data Field Guide. 2026. UC Berkeley. (link is within each week's reading page).

Websites (links available within each week's reading page):

- Esri ArcGIS Pro Information About GIS and Geoprocessing
- QGIS Information about GIS and Geoprocessing
- Minnesota Department of Natural Resources. 2014. Digital Terrain Analysis Manual.
- Minnesota Department of Natural Resources. 2014. Field Assessment Manual.
- Buckley AR, Kimerling AJ and Kennelly PJ. 2026. Map Use: Map Reading and Design, Volume 1. Esri Press. ISBN: 9781589487765
- US Geological Survey: What is Remote Sensing.
- NASA: The Electromagnetic Spectrum
- NASA & USGS: Landsat
- NASA: Earth Observing Systems
- USGS: What is Georeferencing?
- The Library of Congress: What files make up a shapefile?
- GIS Geography - Spatial Data Types
- Tulane University Spatial Analysis and Geoprocessing.
- Penn State: The Geospatial Revolution

Syllabus - Course Schedule

- Week 1 Course Introduction, Introduction to Geospatial Technologies, GIS data
- Week 2 Geodesy, Datums and Map Projections
- Week 3 Coordinate Systems
- Week 4 Map Design, Types of Maps, Attribute Tables
- Week 5 Thematic Maps
- Week 6 Vector Model, Creating and Editing Vector data
- Week 7 Vector Spatial Data Analysis, Geocoding

- Week 8 Raster Data Models
- Week 9 Raster Data Models continued & Terrain Analyses
- Week 10 GIS Data Sources, Data Standards, Ethics, Georeferencing
- Week 11 Aerial and Satellite Images
- Week 12 Global Navigation Satellite Systems, Displaying x, y data
- Week 13 Spatial Modeling and Database Management
- Weeks 14 - 16 Final Projects

Course Details - Instructor Contact Details

email: parece.1@osu.edu

Office Location: Derby Hall Room 1189 (westside of the building, across the hall from the elevator)

Teaching Assistant:

Mahnoush Mostafavisabet

email: mostafavisabet.1@osu.edu

Office Location: Derby Hall Room 1155

Course Details - Office Hours

Dr Parece: Tuesdays 11 - Noon; Wednesdays 2 - 3 pm; Fridays 9 - 10 a.m.

Mahnoush Mostafavisabet: Mondays and Wednesdays 2:15 - 3:15 pm (in-person); Fridays 11 - Noon (Online)

zoom link: https://osu.zoom.us/j/92757652548?pwd=JCwzk5RZcL5Rb8nwuNfayP4u63jWNP.1&from=addon

Availability

We are available for meetings in person or via zoom, during this time or, upon request and my availability, outside of those hours.

Please email and include GEOG 5210 - Appointment request. Include several options for your availability. We will arrange to meet at our earliest convenience (including through zoom).

Excuses, emergencies (including, but not limited to personal/family health, military service, jury duty, employment, homelessness) that interfere with your ability to complete coursework/assignments: please email us as soon as you can.

Discussion boards: You can generally expect a reply to Q&A posts within 48 hours on business days. Although you might receive replies outside of those hours, please do not expect this. The determination of urgency is ultimately at the discretion of the instructor. If you wait until the day an assignment is due to post a question, a reply by the due date is not guaranteed.

Course Details - Class Meeting Details

Class Meeting Details: TBA - Online - Lectures

Recitation, Monday or Wednesday, Derby Hall 0140, 12:45 - 2:05 p.m.

Course Details - Course Description

Basic principles of geographic and land information systems and their use in spatial analysis and information management. Prereq: Not open to students with credit for 5220, CRPlan 5001, or CivilEn 5001.
Prerequisite(s) / Corequisites: Prereq: Not open to students with credit for 5220, CRPlan 5001, or CivilEn 5001.

Course Details - More About This Course

Course technology

You must have working knowledge of a PC, especially your own.

Hardware

- Computer: current PC (Windows 7+). ArcGIS Pro does not work on Apple operating systems unless you have a dual operating system option.
- Other: a mobile device (smartphone or tablet) to use for BuckeyePass authentication

Software

Please keep in mind that you are NOT required to purchase any software for this class. You will use a word processing program, a spreadsheet program, Adobe reader and ArcGIS Pro.

Course Details - Course Learning Outcomes

By the end of this course, students should successfully be able to:

- Understand the fundamentals of cartography and Geographic Information Systems
- Demonstrate practical skills using ArcGIS Pro

Course Details - Course Supplies

Hardware

- Computer: current PC (Windows 7+). ArcGIS Pro does not work on Apple operating systems unless you have a dual operating system option.
- Other: a mobile device (smartphone or tablet) to use for BuckeyePass authentication

Software

Please keep in mind that you are NOT required to purchase any software for this class. You will use a word processing program, a spreadsheet program, Adobe reader and ArcGIS Pro.

Course Details - Detailed Course Schedule

- Week 1 Course Introduction, Introduction to Geospatial Technologies, GIS data
  - Module 1 and Introductory Discussion Post due
- Week 2 Geodesy, Datums and Map Projections
  - Module 2 due
- Week 3 Coordinate Systems
  - Module 3, Discussion Post and Quiz due
- Week 4 Map Design, Types of Maps, Attribute Tables
  - Module 8 due
- Week 5 Thematic Maps
  - Module 6, Quiz, and Discussion Post due
- Week 6 Vector Model, Creating and Editing Vector data
  - Modules 5 and 7 due
- Week 7 Vector Spatial Data Analysis, Geocoding
  - Modules 9 & 10, Discussion Post, and Quiz due
- Week 8 Raster Data Models
  - Module 12 due
- Week 9 Raster Data Models continued & Terrain Analyses
  - Module 15, Discussion Post, and Quiz due
- Week 10 GIS Data Sources, Data Standards, Ethics, Georeferencing
  - Module 14, Georeferencing Lab, and Discussion Post due
- Week 11 Aerial and Satellite Images
  - Module 13, and Discussion Post due
- Week 12 Global Navigation Satellite Systems, Displaying x, y data
  - Quiz, Discussion Post, and Final Project Proposal due
- Week 13 Spatial Modeling and Database Management
  - Module 20 and Quiz due
- Weeks 14 - 16 Final Projects
  - Final projects or final exam are due

Course Details - Canvas Assignment Schedule

Date	Name	Assignment Type	Points
	General Course Q&A	Discussion	0
	Lab Q&A	Discussion	0
8/29/26	Shellito Module 1	Quiz	15
9/5/26	Graded - Introduction Discussions	Discussion	2
9/5/26	Shellito Module 2	Quiz	15
9/12/26	Graded Discussion - Datums, Coordinate Systems and Map Projections	Discussion	2

Date	Name	Assignment Type	Points
9/12/26	Quiz Introduction to GIS, Geodesy, Datums, Coordinate Systems and Map Projections	Quiz	20
9/14/26	Shellito Module 3	Assignment	20
9/19/26	Shellito Module 8	Quiz	35
9/26/26	Shellito Module 6	Quiz	40
10/3/26	Shellito Module 5	Quiz	25
10/3/26	Shellito Module 7	Quiz	30
10/10/26	Shellito Module 10	Assignment	25
10/10/26	Shellito Module 9	Quiz	20
10/14/26	Shellito Module 12	Quiz	20
10/21/26	Shellito Module 15	Quiz	20

Date	Name	Assignment Type	Points
10/28/26	Shellito Module 14	Assignment	50
11/2/26	Georeferencing Lab	Assignment	30
11/7/26	Shellito Module 13	Quiz	30
11/20/26	Shellito Module 20	Assignment	50

Course Details - Grading Policy

Credit hours and work expectations:

This is a 3-credit-hour course. According to The Ohio State University , an average student should expect around 3 hours per week of time spent on direct instruction (instructor content and Carmen activities, for example) and up to 6 hours of homework (reading and assignment preparation, for example) to receive a grade of (C) average for a regular semester course.

Grade Breakdown:

Grade Breakdown

Assignment or category	Percentage
Labs	60
Final Project/Final Exam	15
Weekly Quizzes (6)	15
Graded Weekly Discussions (8)	10
Total	100

Instructor feedback and response time

Grades and feedback

You can generally expect grades and feedback to be returned within 1 week once the assignment's deadline has passed, depending on the complexity of the assignment. If you have questions about your grade, you must address them to Dr. Parece within 48 hours of posting of that grade. For quizzes that are automatically graded, answers will be posted after the due date and available for 1 week only.

Assignment Details

Failure to follow the instructions on any assignment will result in a grade reduction for that specific answer (it might result in an incorrect answer). Any assignment includes quizzes, labs, discussions, and the final project. As an example: references for data are not included in map creation or in discussion posts.

Quizzes (15% of total grade)

6 quizzes. Each quiz is ...

- Worth 20 points each
- If you forget to take it, I do not accept a late submission.
- 30 minutes, timed. (Exceptions for SLDS time alterations)
- You cannot get assistance with quizzes; these are required to be your own work.
- Collaboration with any other person is considered academic misconduct.
- The lowest of your 6 quiz grades is dropped (if you forget to take a quiz, that will result in a zero grade and your lowest grade).
- Check the schedule and Canvas for the due date and topics. The quizzes are approximately every other week.
- Use of AI is not permitted on any quiz (or any other assignment). If it comes to light that anyone (whether or not specifically identified) has used some type of AI to complete a quiz, all quizzes will become in-person and taken during your scheduled recitation times.

Required Online Graded Discussions (10% of total grade)

You will participate in 8 online discussions.

1st Discussion, we introduce ourselves. As part of this requirement, you need to respond to other students' posts finding something in common or interesting or intriguing. This allows you to connect with other students (3 reply posts are required).

Thereafter, we have 7 additional discussions related to course topics. A question is posted; you research it, post on the topic and include a reference. You will not receive credit for any discussion post that duplicates another student's post. The best way to avoid this is to post early, otherwise you will need to read all posts before adding your own. Check the syllabus and Carmen Canvas for the due dates on the discussion – these are not held every week.

Labs (60% of total grade)

Lab assignments are completed every week. Be careful as the deliverables vary, as are the due dates. In some instances, you answer questions posed in the Shellito Lab Book. Some require that you submit a map document, screenshots, or a written report. Read the Carmen Canvas instructions carefully for the deliverables. Lab assignments can be submitted as many times as you want up to the due date and time. Resubmissions (or redos) after the due date to get a better grade are not accepted.

Remember that completing any given GIS assignment may not go as smoothly as planned; unexpected challenges arise. Set a goal to submit each lab in advance of the due date, then if unexpected challenges do arise, you have time to deal with them. Some questions are graded automatically & some require manual grading. There is a question and answer (Lab Q&A) area in Canvas for questions about Lab assignments. Posting comments about the labs in the graded discussions will not count towards your discussion grade.

Final Project/Final Exam (15% of total grade)

You have a final project. No late submissions. Watch due dates – there are 2 for the final project. A timely proposal is 1% of your final grade. The final project is 14%.

If you are an undergraduate student, you can opt to take a final exam in lieu of completing a final project. To notify us that you want to take this option, upload a statement to this effect into the final project proposal folder and you will be exempted from the proposal and project, and a final exam will appear during the exam window (see the schedule below). The final exam is 15% of your final grade.

Course Details - Grading Scale

Grading scale:

This course adheres to The Ohio State University Grading Scale

- 92.5–100: A
- 90.0–92.49: A-
- 86.5–89.99: B+
- 82.5–86.49: B
- 80.0–82.49: B-
- 76.5–79.99: C+
- 72.5–76.49: C
- 70.0 –72.49: C-
- 66.5 –69.99: D+
- 60.0 –66.49: D
- Below 59.99: E

Note – I do not round up. An 89.99 does not round up to a 90%. If you want an A/A-, then you must achieve 90% or better.

Course Details - Other

Course Learning Outcomes by Week

Week 1:

- Summarize Course Requirements
- Identify and explain the 3 geospatial technologies
- Explain how to setup of ArcGIS Pro
- Differentiate between Layout View and Map View in ArcGIS Pro
- Generate and export a complete and final map document in ArcGIS Pro
- Identify Geospatial Data and Databases

Week 2:

- Describe a datum and explain the differences in projection systems
- Identify characteristics of a specific projection system

Week 3:

- Explain and identify different coordinate systems
- Differentiate between a datum, projection and coordinate system

Week 4

- Explain the elements of a map
- Identify which specific elements are required in different maps
- Explain attribute tables
- Demonstrate how to construct a query
- Identify the 5 different types of maps

Week 5

- Describe the differences between qualitative and quantitative maps
- Demonstrate how to generate a specific thematic map
- Explain normalization of data

Week 6:

- Identify and describe the components of vector models
- Explain what type of data should be modeled as a vector file
- Demonstrate how to edit a vector file with GIS

- Identify how to locate & download geospatial data
- Demonstrate use of the National Map Viewer for locating geospatial data

Week 7:

- Differentiate between types of spatial analyses
- Identify the appropriate GIS tool to use in a specific spatial analysis
- Demonstrate the geocoding process
- Review the accuracy of a geocoded dataset

Week 8:

- Describe the components of raster models
- Identify and explain what type of data should be modeled as raster data
- Differentiate between types of resolution

Week 9:

- Demonstrate basic geoprocessing of raster data
- Explain interpolation and metadata
- Identify different interpolation methods
- Create different terrain models

Week 10:

- Demonstrate how to adequately cite geospatial data
- Identify Ethical Situations
- Demonstrate the georeferencing process

Week 11:

- Describe remote sensing
- Explain the electromagnetic spectrum
- Demonstrate remote sensing techniques using ArcGIS Pro
- Demonstrate how to digitize data within ArcGIS Pro

Week 12

- Explain GNSS
- Utilize Boolean Operators in performance of a suitability analysis

Week 13:

- Utilize Boolean Operators in performance of a suitability analysis

Course Details - Instructor Policies

LATE WORK POLICY

Late submissions for any assignments are not accepted. Accommodation for religious holidays will be considered. A request must be submitted prior to any assignment due date that conflicts with such holidays. Please provide information on the holiday and its date and the number of days requested in the extension.

Additionally, in case of personal and family emergencies, please notify me as soon as possible so that we can work out a submission timeline. Extensions are not granted after the fact, e.g., you can't ask for an extension on an assignment that was due two weeks before or wait until the end of the semester to submit assignments you missed.

To request an extension for one of these situations, you must put the request in writing to Dr. Parece and the email must contain the following information:

- Course Name and Code (GEOG 5210 Fundamentals of GIS)
- Reason for the extension request:
- The specific assignment:
- Specific extension requested:
- Attach documentation of the reason for the extension

Any emails requesting extensions without this information will be returned with a request to provide this information. Such extensions may or may not be granted, it is decided on a case-by-case basis.

Course Academic Integrity Policy

Turnitin (https://www.turnitin.com/Links to an external site.) is a plagiarism and AI verification platform. This check is set to automatically review any written documents submitted in an assignment folder. Please note that any assignments with a score of 25% or more may result in reporting a code of conduct violation to OSU's Committee on Academic Misconduct (please see the Academic Integrity Policy below). Please note that when you use quotes or repeat the assignment instructions within a written report, it increases the Turnitin and AI score. Avoid these when at all possible.

To maintain a culture of integrity and respect, generative AI tools should not be used in the completion of course assignments, quizzes, discussion posts, and exams unless specifically authorized by Dr. Parece.

Course Details - Course Policies

Student participation requirements

The following is a summary of student's expected participation:

- All work in this class must be your own.
- There are no joint assignment submissions for this class for any assignment! ·

- Participating in discussion forums: Every week, there is a graded discussion board, and there is also a discussion forum for lab questions or general course questions. Please post your questions to the appropriate discussion board. Posting questions to discussion boards is helpful as other students may have the same or similar questions.
- Logging in: Be sure you are logging in to the course in Carmen regularly. During most weeks you will probably log in many times. If you have a situation that might cause you to miss an entire week of class, discuss it with me as soon as possible.

Confidential Questions: Don't post questions online that may indicate answers to graded assignments and questions regarding your own grades. The former is an academic integrity concern, and the latter is a privacy concern.

Discussion and communication guidelines

The following are expectations for how we should communicate in an online forum. Please remember to be respectful and thoughtful.

Writing style: While there is no need to participate in class discussions as if you were writing a research paper, you should remember to write using good grammar, spelling, and punctuation. (Note: Excessive grammar, spelling, or punctuation errors in discussions or any other assignment submissions will be penalized at the discretion of the instructor) A more conversational tone is fine for non-academic topics.

Tone and civility: Maintain a supportive learning community where everyone feels safe and people can disagree amicably. Remember that sarcasm doesn't always come across online. Be respectful to other students and the instructor. Treat others as you would want yourself treated.

Citing your sources: When we have academic discussions, please cite your sources to back up what you For the textbook or other course materials, list at least the title and page numbers. For online sources, include a link.

Backing up your work: Consider composing your academic posts in a word processor, where you can save your work, and then copying into the Carmen discussion.

Course Details - AI Use Policy

Study Assistance Only

GenAI can fabricate information (for example, creating citations to sources that do not exist) or omit key information. You are ultimately responsible for the accuracy and integrity of your submitted work. Unless explicitly permitted below, representing AI-generated content as your own work is a violation of the Code of Student Conduct. Please check with your instructor if you have questions.

These levels may apply to the entire course or specific assignments, as indicated by the instructor:

- Permitted: You may use GenAI as a virtual tutor to explain concepts, quiz you on course topics, or summarize content you have personally authored (e.g., your own class notes).
- Prohibited: The materials in this course may be subject to copyright protection. Do not input or allow AI to access external or instructor-created course materials (e.g., assigned readings, slides) without explicit instructor permission. **Do not use GenAI to outline, draft, translate, or write any part of an assignment this includes quizzes, maps, exams and discussion posts.**

Syllabus - University Policies

Office of Undergraduate Education - Standard Syllabus Statements

- Academic Misconduct
- Religious Accommodations
- Accommodations for Disability and Illness

- Intellectual Diversity
- Grievances and Solving Problems
- Creating an Environment Free from Harassment, Discrimination, and Sexual Misconduct
- Copyrights
- Content Warnings
- Mental Health Support
- Resources for Military-Connected Students
- Campus-wide Class Cancellations