UCONN
UNIVERSITY OF CONNECTICUT

GEOG 5500
Fundamentals of Geographic Information Science
Department of Geography, Sustainability, Community, and Urban Studies

Syllabus – Fall 2025

Excluding materials for purchase, syllabus information may be subject to change. The most up-to-date syllabus is located within the course in HuskyCT.

Course Materials

Required course materials should be obtained before the first day of class.

Required textbooks are available for purchase through the UConn Bookstore (or use the Purchase Textbooks tool in HuskyCT). Textbooks can be shipped (fees apply).

Required Materials:
Bolstad, P. **2022**. *GIS Fundamentals: A First Text on Geographic Information Systems, Seventh Edition*. White Bear Lake, MN: Eider Press.

Course Software:
ArcGIS Pro, version 3.x. Environmental Systems Research Institute, Redlands, CA.

This course was developed by Dr. Amy C. Burnicki, former faculty member in the Geography Department at the University of Connecticut.

Additional course readings and media are available within HuskyCT, through either an Internet link or Library Resources

Course Description

Course Catalog:
An introduction to the theory and methods for acquiring, representing, storing, manipulating, displaying, and analyzing geographic features in relation to the surface of the earth.

Course Description:
Making the most of geographic information, whether it be for investigating a scientific hypothesis or managing spatially distributed resources, requires an appreciation of the unique characteristics of geospatial data, the ability to think about spatial relationships, an understanding of the technical capabilities of computer-based information systems, and geographic information systems (GIS) software skills. This course introduces students to the fundamental concepts and principles of GIS and demonstrates how GIS can be applied to solve geospatial problems. The course introduces students to the ways in which geographic information is measured, managed, analyzed, and visualized with GIS.

The course is taught using ArcGIS Pro (ESRI, Inc.). However, students must understand that this is not a class on ArcGIS or any specific GIS software. The intent of this course is to introduce students to the concepts and components of Geographic Information Systems (GIS). The understanding of these concepts will allow you to use any GIS software effectively and correctly.

Course Objectives

By the end of the semester, students should be able to:
1. Characterize the organization and structure of spatial databases in GIS
2. Compare and contrast vector and raster data models, evaluating the advantages of each modeling approach
3. Differentiate between geographic and projected coordinate systems and relate their role in GIS applications
4. Evaluate sources of geospatial data, and generate and modify existing geospatial data
5. Create map layouts that effectively communicate geospatial information, honoring basic cartographic principles
6. Perform basic spatial analyses, including querying, overlay operations, distance operations, neighborhood operations, and terrain analysis
7. Construct cartographic models that combine spatial analyses to address more complex spatial questions

Course Outline

This course is conducted using weekly modules. Each module includes readings from the textbook, videos, a quiz or discussion post, and a laboratory assignment using the ArcGIS Pro software. Two sessions are dedicated to course exams, which consist of an exam (to assess your understanding of GIS concepts and theories) and a lab exam (to evaluate your ability to apply GIS techniques and tools to address a spatial problem).

Course Requirements and Grading

Your grade is based on your performance on a series of online quizzes and discussion posts, a series of laboratory assignments, two lecture exams, and two lab exams.

Summary of Course Grading:

Course Components	Weight
Quizzes	5%
Discussion Posts	5%
Lab Assignments	50%
Lab Exams	20%
Exams	20%

Quizzes

You will complete online quizzes that gauge your understanding of presented material. Quizzes are based on posted videos and textbook readings and consist of multiple choice, true-false and short answer questions. Quizzes are due at the time noted in the Course Schedule. Late quizzes will be accepted with penalty; see Due Dates and Late Policy.

Discussion Posts

You will complete online discussions that encourage you to share ideas and questions with other members of the class. You will be asked to both post an original response and respond to the post of another student(s). You will be graded on the accuracy and thoughtfulness of your responses. Your initial, original post is due by end of day on the Thursday of each Learning Module, and your response post is due by end of day on the Sunday of each Learning Module; see Course Schedule. Late posts will not be accepted.

Lab Assignments

You will complete a series of laboratory assignments that evaluate your ability to put learned concepts into action using GIS software. I recommend you keep a lab notebook (digital or hardcopy), as later lab assignments and lab exams will require you to perform tasks that were described in detail in previous lab assignments. Specific submission deadlines are listed in the assignment and posted to the Course Schedule. Late lab assignments will be accepted with penalty; see Due Dates and Late Policy.

Lab assignments use ArcGIS Pro, version 3.x. You can access course software using one of two options: 1. You can download and install ArcGIS Pro 3.x on your personal computer (*Windows-based machines only*); website: https://s.uconn.edu/arcpro. **This option is highly recommended**. Please note that you will receive an invitation via email in the first week of classes with more detailed instructions on how to download, install, and activate ArcGIS Pro using your net ID and password.
2. ArcGIS Pro is available on the UCONN Anyware platform, which allows for remote access to university licensed software.

Lab Exams
You will complete two lab exams that evaluate skills learned during the practical application of GIS software (i.e., lab assignments). Lab exams are open-book / open-notes and are not timed. You will have one week to complete work on your lab exam; see Course Schedule. Late submissions are not allowed.

Exams
You will complete two, non-comprehensive lecture exams that assess your understanding of the concepts presented in lecture videos and associated readings. Exams will include short-answer, multiple choice, and true/false questions. Late submissions are not allowed.

Grading Scale (per the Registrar):
Graduate

Explanation	Letter Grade
Distinction	A
	A-
Good Quality	B+
	B
	B-
Below Expected Standard	C+
	C
	C-
Unsatisfactory Quality	D+
	D
	D-
Failure	F

Due Dates and Late Policy
All course due dates are identified in the Course Schedule and in the text of the individual assessment. Deadlines are based on Eastern Time; if you are in a different time zone, please adjust your submittal times accordingly. *The instructor reserves the right to change dates accordingly as the semester progresses. All changes will be communicated in an appropriate manner.*

Late submissions are allowed for lab assignments and quizzes. Late submissions are penalized **10%** per day up to 5 days after the submission deadline. Quizzes and assignments submitted more than **5 days** late **will not** be accepted. If you have extenuating circumstances (e.g., extended illness or family emergency), you must contact Dr. Wanyama prior to the submission deadline.

Make-up exams may be scheduled in the event of personal illness or extraordinary circumstances. If you know you will miss an exam due to a scheduled conflict (e.g., conference, University event), please contact me no later than two weeks prior to the scheduled exam date to schedule a make-up exam.

Feedback and Grades
I will make every effort to provide feedback and grades within one week of the assessment's submission deadline. To keep track of your performance in the course, refer to My Grades in HuskyCT.

Weekly Time Commitment
This is a foundational GIS course that introduces new software and techniques. Learning new software takes time and the course itself will require a substantial amount of work. You should expect to dedicate 9 to 12 hours a week to this course. This expectation is based on the various course activities, assessments, and the University of Connecticut's policy regarding credit hours. More information related to hours per week per credit can be accessed at the Online Student website.

Changes to the schedule may be necessary based, but it is my intention to keep changes to a minimum. All changes will be announced via email and posted on the course website. It is your responsibility to stay apprised of changes to the course schedule.

Module	Topic	Reading	Activity	Due Date & Time
Module 1 Aug 25–Aug 31	Course Orientation		Practice Quiz Practice Assignment: Introduction	Aug 31, 11:59pm
	Introduction to GIS	Ch1	Quiz 1 Discussion Post 1	Initial Post: Aug 28, 11:59pm Response Post & Quiz: Aug 31, 11:59pm
Module 2 Sep 1–Sep 7	Maps as Models & Measuring Geospatial Data	Ch2: 25-38, 67-68 & Ch4: 147-151	Quiz 2 Lab Assignment 1	Sep 8, 11:59pm
Module 3 Sep 8–Sep 14	Spatial Data Models: Vector versus Raster	Ch2: 39-59	Discussion Post 2 Lab Assignment 2	Initial Post: Sep 11, 11:59pm Response Post & Lab: Sep 14, 11:59pm
Module 4 Sep 15–Sep 21	Geographic and Projected Coordinate Systems	Ch3	Quiz 3 Lab Assignment 3	Sep 21, 11:59pm
Module 5 Sep 22–Sep 28	Attribute Data Structures & GIS and Cartography	Ch8: 325-334, 340-346 & Ch4: 168-175 & Ch9: 375-382	Discussion Post 3 Lab Assignment 4	Initial Post Sep 25, 11:59pm Response Post & Lab: Sep 28, 11:59pm
Module 6 Sep 29–Oct 5	Geospatial Collections, Part 1: Creating Data & Data Collections	Ch4: 154-165, 176-182 & Ch7	Quiz 4 Lab Assignment 5	Oct 5, 11:59pm
Module 7 Oct 6–Oct 12	Geospatial Collections, Part 2: GPS & Remote Sensing	Ch5 & Ch6	Discussion Post 4 Lab Assignment 6	Initial Post: Oct 9, 11:59pm Response Post & Lab: Oct 12, 11:59pm
Exam Week 1 Oct 13–Oct 19	**Exam Week 1**		**Exam 1** **Lab Exam 1**	Oct 19, 11:59pm
Module 8 Oct 20–Oct 26	Data Query and Description & Map Overlay	Ch8: 335-339 & Ch9: 363-375, 384-387, 394-409 & Ch10: 435-451	Quiz 5 Lab Assignment 7	Oct 26, 11:59pm

| Module 9
Oct 27–Nov 2 | Distance Operations & Neighborhood Operations | Ch9: 388-393 & Ch10: 452-464 | Quiz 6
Lab Assignment 8 | Nov 2, 11:59pm |
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| Module 10
Nov 3–Nov 9 | Overlay for Decision Support & Cartographic Modeling | Ch13: 565-581 | Discussion Post 5
Lab Assignment 9 | Initial Post: Nov 6, 11:59pm
Response Post & Lab: Nov 9, 11:59pm |
| Module 11
Nov 10–Nov 16 | Terrain Analysis | Ch11 | Quiz 7
Lab Assignment 10 | Nov 16, 11:59pm |
| Module 12
Nov 17–Nov 22 | Spatial Data Quality & Metadata | Ch14 | Discussion Post 6
Lab Assignment 11 | Initial Post: Nov 20, 11:59pm
Response Post & Lab: Nov 22, 11:59pm |
| *Nov 23-29 Thanksgiving Recess* | | | | |
| Module 13
Dec 1–Dec 7 | None | None | None | Exam 2 Start: Dec 4 |
| **Exam Week 2**
Dec 8–Dec 14 | **Exam Week 2** | | **Exam 2**
Lab Exam 2 | Dec 10, 11:59pm |

Student Authentication and Verification

The University of Connecticut is required to verify the identity of students who participate in online courses and to establish that students who register in an online course are the same students who participate in, complete the course activities and assessments, and receive academic credit. Verification and authentication of student identity in this course will include:

1. Secure access to the learning management system using your unique UConn NetID and password
2. Practice Assignment, which requires presentation of your Student ID (or an equivalent) and a video recording
3. Lab Exams 1 & 2, which require a video recording

Student Responsibilities and Resources

As a member of the University of Connecticut student community, you are held to certain standards and academic policies. In addition, there are numerous resources available to help you succeed in your academic work. Review these important standards, policies and resources, which include:

- The Student Code
  - o Academic Integrity
  - o Resources on Avoiding Cheating and Plagiarism
- Copyrighted Materials
- Credit Hours and Workload
- Netiquette and Communication
- Adding or Dropping a Course
- Academic Calendar
- Policy Against Discrimination, Harassment and Inappropriate Romantic Relationships
- Sexual Assault Reporting Policy

Students with Disabilities

The University of Connecticut is committed to protecting the rights of individuals with disabilities and assuring that the learning environment is accessible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, please let me know immediately so that we can discuss options. Students who require accommodations should contact the Center for Students with Disabilities, Wilbur Cross Building Room 204, (860) 486-2020, or http://csd.uconn.edu/.

Blackboard measures and evaluates accessibility levels using two sets of standards: Section 508 of the Rehabilitation Act issued from the United States federal government and the Web Content Accessibility Guidelines (WCAG 2.1) issued by the World Wide Web Consortium (W3C). (Retrieved August 13, 2025 from Blackboard's website)

Software/Technical Requirements (with Accessibility and Privacy Information)

The software/technical requirements for this course include:
- HuskyCT/Blackboard (HuskyCT/ Blackboard Accessibility Statement, HuskyCT/ Blackboard Privacy Policy)
- Adobe Acrobat Reader (Adobe Reader Accessibility Statement, Adobe Reader Privacy Policy)
- Microsoft Office (free to UConn students through https://software.uconn.edu/) (Microsoft Accessibility Statement, Microsoft Privacy Statement)
- Dedicated access to high-speed internet with a minimum speed of 1.5 Mbps (4 Mbps or higher is recommended).
- WebCam

For information on managing your privacy at the University of Connecticut, visit the University's Privacy page.

NOTE: This course has NOT been designed for use with mobile devices.

Technical and Academic Help provides a guide to technical and academic assistance.

This course is completely facilitated online using the learning management platform, HuskyCT. If you have difficulty accessing HuskyCT, you have access to the in person/live person support options available during regular business hours through the Help Center. You also have 24x7 Course Support including access to live chat, phone, and support documents.

Minimum Technical Skills

To be successful in this course, you will need the following technical skills:
- Use electronic mail with attachments
- Save files in commonly used word processing program formats
- Copy and paste text, graphics or hyperlinks
- Work within two or more browser windows simultaneously
- Open and access PDF files
- Create presentations using presentation software
- Record video presentations

Evaluation of the Course

You will be provided an opportunity to evaluate instruction in this course using the University's standard procedures, which are administered by the Budget, Planning and Institutional Research (BPIR) office.

Additional informal formative surveys may also be administered within the course as an optional evaluation tool.