Introduction to GIS
GEOG 2500 / CE 2500 – Spring 2020

Meets	Lecture:	Online after Spring Break
	Lab:	
	Section 001	Online after Spring Break
	Section 002	Online after Spring Break
Professor	Dr. Amy C. Burnicki	email: amy.burnicki@uconn.edu
	Office Hours: by appt.	

Teaching Assistants

TA: Sadia Sharmin email: sadia.sharmin@uconn.edu

Course Description

Making the most of geographic information, whether it be for investigating a scientific hypothesis or managing spatially distributed resources, requires the ability to think about spatial relationships, an understanding of the technical capabilities of computer-based information systems, and GIS software skills. This course introduces students to the fundamental concepts and principles of geographic information systems (GIS) and demonstrates how GIS can be applied to solve geospatial problems. The course introduces students to the ways in which geographic information is collected, managed, analyzed, and visualized with GIS. This requires both a discussion of basic concepts (i.e., lecture) and practice implementing these concepts using GIS software (i.e., lab).

The laboratory portion of the course is taught using ArcGIS Desktop (ESRI, Inc.). However, students must be clear 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 GIS software effectively and correctly.

Course Objectives

At the completion of this course, students will be able to:

- Describe how geographic features are represented in a GIS using vector and raster data models
- Summarize the role of coordinate systems in GIS and differentiate between geographic and projected coordinate systems
- Generate and edit geospatial data and identify sources of geospatial data
- Create maps that communicate geospatial information and honor basic cartographic principles
- Perform basic spatial analyses (e.g., queries, overlay, distance calculations)
- Construct cartographic models by linking several spatial operations to address spatial questions

Course Prerequisites

The course is designed so that students without a GIS background can succeed. Although not required for this course, courses in the following areas can be helpful background work in GIS: remote sensing and image interpretation, statistics, cartography, geomatics, and computer programming.

Readings

The textbook required for this course is:

Bolstad, P. **2016**. *GIS Fundamentals: A First Text on Geographic Information Systems, Fifth Edition*. White Bear Lake, MN: Eider Press.

The textbook is available for purchase at the UConn bookstore ($38) or direct from the publisher (XanEdu; $40 for ebook).

There are several good texts covering introductory GIS and ArcGIS Desktop, including:

Introductory GIS:

Clarke, K.C. **2011**. *Getting Started with Geographic Information Systems, Fifth Edition*. Pearson-Prentice Hall.

Jensen, J.R. and Jensen, R.R. **2013**. *Introductory Geographic Information Systems*. Pearson.

ArcGIS Desktop:

Law, M. and Collins, A. **2018**. *Getting to Know ArcGIS for Desktop, Fifth Edition.* Esri Press.

Price, M. **2019**. *Mastering ArcGIS, Eighth Edition*. McGraw-Hill.

Additional Resource

The class webpage is accessible through HuskyCT [http://huskyct.uconn.edu]. This website will be used for all class announcements and to distribute course materials, including copies of syllabus and course schedule, lecture notes and lecture videos (after Spring Break all lectures will be provided online in short video format), lab assignments and data, online quizzes and discussions, and other documents of interest.

Course Expectations

Students are expected to attend and participate in all class meetings, watch all posted lecture videos, complete course readings prior to discussion, attend all laboratory sessions and watch all posted lab overview videos, complete all laboratory assignments, and complete all online learning quizzes and discussions. Planned absences must be brought to the instructor's attention prior to the missed class.

Attendance and engaged participation are essential to your understanding of and performance in both lecture and lab. From my experience, the single best predictor of performance in class is consistent attendance. This course utilizes several active learning techniques in lecture meetings – active attendance and participation in these activities is key to understanding GIS concepts and principles and connecting these principles to practical applications. In addition, with the transition to an online learning environment after Spring Break, it is essential that students remain actively engaged with course materials. I understand online learning is a more self-directed endeavor and requires more dedication from students to stay engaged with course materials. To encourage active engagement, additional course evaluation components – online quizzes and discussions – will be added to this course (see below). Points will be assigned to these components, which will count towards your overall course grade.

This course requires a ***substantial amount of work***. Lab assignments will require work outside of regularly scheduled class time. The computer lab utilized in this course has open hours for student use. Please check the posted lab schedule for available hours. The software used in the course is also available through UCONN AnyWare (https://software.uconn.edu/uconn-software-online/; log in under the UCONN domain [not Library] and select the AnyWare Desktop icon). In addition, students can obtain a one-year, student copy of the GIS software (ArcGIS Desktop 10.7) for their personal use. Interested students should email Dr. Burnicki to receive download instructions and an authorization code. Please note: ArcGIS runs on any Windows-based computer.

Course Evaluation

Your grade will be based on your performance on twelve laboratory assignments, two lecture exams, two lab exams, and a series of online assessments (quizzes and discussions). ***There will be no extra credit.***

Lab assignments: Lab assignments will be posted Monday morning at 8am and are due by end of day the following Sunday. Specific submission deadlines can be found in the lab assignment and HuskyCT. All lab assignments will be submitted and returned via HuskyCT.

I recommend you keep a lab notebook (digital or hardcopy), as later labs and the lab exams will require you to perform tasks that were described in detail in previous lab assignments.

Late submissions are penalized **10%** per day up to 3 days after the submission deadline. Assignments submitted more than **3 days** late **will not** be accepted. If you have extenuating circumstances (e.g., extended illness or family emergency), you must contact Dr. Burnicki prior to the submission deadline. Note: University Senate regulations require students anticipating a religious observance conflict to inform their instructor in writing within the first three weeks of the semester.

Lab exams: Students will complete two lab exams that cover skills learned during the lab portion of the course. Lab exams are take-home exams that allow for open-book and open-notes. In addition, students will be given two lab periods / one week to complete work on their exam.

Lecture exams: There are two, non-comprehensive lecture exams. Lecture exams will focus on your understanding of the concepts presented in class. If you have a conflict (e.g., religious observation, scheduled conference, scheduled athletic team event) with the date/time of an exam, you need to notify Dr. Burnicki within the first three weeks of the term so a make-up exam can be scheduled. If you miss an exam without prior notification, you will need to provide proof (e.g., medical emergency). If you have a conflict with the final exam period, you must obtain official permission to schedule a make-up exam with the *Office of Student Support and Advocacy* (OSSA). If permission is granted, OSSA will notify the instructor.

The second lecture exam will be conducted online using tools within HuskyCT to ensure a similar testing environment (e.g., timed, no material allowed). The second lecture exam will be posted at 8am the Monday of Final Exam Week. Students can complete the exam at their preferred time during Final Exam Week, but 1) the exam must be completed by end of day Saturday, May 9th and 2) the exam must be completed in a single 2-hour session.

Grade Calculation

Component	Grade %
Lab Assignments	45%
Exam 1	15%
Lab Exam 1	10%
Exam 2	15%
Lab Exam 2	10%
Online Assessments	5%

Overall %	Grade
93 or above	A
90 – 92.9	A-
87 – 89.9	B+
83 – 86.9	B
80 – 82.9	B-
77 – 79.9	C+
73 – 76.9	C
70 – 72.9	C-
67 – 69.9	D+
60 – 66.9	D
below 60	F

Additional Information

- Clarifying questions related to the presented material will be addressed by Dr. Burnicki during lecture; however, specific questions or concerns should be discussed with Dr. Burnicki after class or during office hours. Please include the course number (i.e., GEOG/CE 2500) in all email correspondence.
- Every effort will be made to accommodate the needs of students with hearing, visual, or other impairments and/or learning disabilities. Please notify your instructor and provide necessary documentation.
- A note on student work. Group discussion during lab sessions is expected and encouraged. However, lab assignments must be completed individually by each student. It is expected that work submitted by a student reflects his or her original ideas and responses. Submissions that reflect substantially similar work by more than one student or submissions that contain text taken directly from published materials and not properly cited will be dealt with as an act of scholarly dishonesty and a failing grade will be issued. Students are expected to be familiar with the university policies on academic misconduct as detailed in the UCONN student code: http://www.community.uconn.edu/student_code.html Consequences of misconduct can include one or more of the following: a score of zero on the exam or assignment, a grade of F in the course, or possibility of expulsion from the University.

Course Schedule
Changes to the schedule may be necessary based on class progress, weather, or global pandemic, but it is my intention to keep changes to a minimum. All changes will be announced in class and posted on the course website. It is your responsibility to stay apprised of changes to the course schedule.

All weeks highlighted will be conducted fully online.

Date	Topic	Reading	Lab
Week 1 Jan 21 – Jan 24	Introduction to GIS & GIS Applications	Ch1	Examining GIS in Action
Week 2 Jan 27 – Jan 31	Maps as Models & Measuring Geospatial Data	Ch2: 29-41 & 69-72 and Ch4: 147-156	Organizing and Visualizing Data with ArcGIS
Week 3 Feb 3 – Feb 7	Spatial Data Models: Vector and Raster	Ch2: 42-68 & 72-76	Modeling Geospatial Data: Data Structures
Week 4 Feb 10 – Feb 14	Projections and Coordinate Systems	Ch3	Working with Projections and Coordinate Systems
Week 5 Feb 17 – Feb 21	Data Collection 1: Secondary sources & Existing data	Ch4: 156-182 and Ch7	Creating and Editing Data
Week 6 Feb 24 – Feb 28	Attribute Data Structures & GIS and Cartography	Ch8: 331-344 and Ch4: 183-190 and Ch9: 385-392	Exploring Attribute Tables
Week 7 Mar 2 – Mar 6	Data Collection 2: GPS & Remote Sensing	Ch5 and Ch6	Creating Map Displays
Week 8 Mar 9 – Mar 13	**Exam 1**		**Lab Exam 1**
Spring Break Week		*March 16 – March 20*	
Week 9 Mar 23 – Mar 27	Data Query and Description & Map Overlay, Part 1	Ch9: 373-384 & 394-395 and Ch10: 444-446 & 448-459	Querying Spatial Data
Week 10 Mar 30 – Apr 3	Map Overlay, Part 2 & Distance Operations, Part 1	Ch9: 396-419	Exploring Land-Use Patterns: Vector Analysis, Part 1
Week 11 Apr 6 – Apr 10	Distance Operations, Part 2 & Neighborhood Operations	Ch10: 446-447 & 460-473	Evaluating Transportation Accessibility: Vector Analysis, Part 2
Week 12 Apr 13 – Apr 17	Terrain Analysis & Cartographic Models, Part 1	Ch11	Working with Raster Data: Raster Analysis, Part 1
Week 13 Apr 20 – Apr 24	Cartographic Models, Part 2	Ch13: 571-591	Suitability Mapping: Raster Analysis, Part 2
Week 14 Apr 27 – May 1	Spatial Estimation & Spatial Data Quality	Ch12: 519-531 & Ch4: 190-192 and Ch14	**Lab Exam 2**
Final Exam Week May 4 – May 9	**Exam 2**		