NR 322 - Introduction to Geographic Information Systems

SYLLABUS - FALL 2020 Covid Edition

Department of Ecosystem Science and Sustainability | Warner College of Natural Resources

GENERAL INFORMATION

Instructor: **Elizabeth Tulanowski** Email: *E.Tulanowski@colostate.edu*
Online Office hours: Tuesdays, 7-8pm Wednesdays, 1-2pm

Teaching Assistants: **Lauren Abram** Email: *lauren.abram@colostate.edu*
Online lab hours: Wednesdays 4-5pm
Josh Reyling Email: *joshua.reyling@colostate.edu*
Online lab hours: Fridays 1-2pm

Scheduled Class Meeting times:

Lecture	M / W 9:00am – 9:50am	BSB A101 *(Can now only hold 45 students)* Thursday lab students attend Monday lectures Wed / Fri lab students attend Wednesday lectures
Lab Section 1	W 10:00am – 12:50pm	Natural Resources 243
Lab Section 2	Th 8:00am – 10:50am	Natural Resources 232
Lab Section 3	Th 1:00pm – 3:50pm	Natural Resources 232
Lab Section 4	F 9:00am –11:50m	Natural Resources 232

Course Description (official)

Fundamental concepts of spatial data handling and computer-assisted map analysis.

Course Objectives

This course is designed to introduce students to **geographic information systems** (GIS), a complex system of software, hardware, and data that allows for the creation, storage, analysis, and display of spatial (geographic) data. The purpose of the course is threefold, to:

1) Examine the broad context in which GIS is used;
2) Understand core concepts of GIS and spatial data such as data models, coordinate systems, digital cartography, and spatial analysis techniques;
3) Gain hands-on experience using GIS software and methods to manipulate spatial data and solve spatial problems

COURSE MATERIALS

Required Text: Paul Bolstad, GIS Fundamentals, 6th Edition.
This software-agnostic text provides a good overview and necessary detail of the concepts we will be covering in this course. Available digitally or in print from the campus bookstore, Xanedu or Amazon.

Software: This course will use **ArcGIS Pro v. 2.6** for nearly all the lab exercises.

Your options for accessing the software we need:

- Natural Resources building – computer labs in Room 232 and Room 107 (only until Nov. 20)
- Borrow a WCNR laptop. They have ArcGIS Pro installed, but need a VPN connection for licensing.
- Use Remote Desktop to log on to a WCNR machine
    - Follow these steps from WCNR Help page and this how-to video
- Install ArcGIS Pro locally on your own ***Windows*** computer (Not a Mac. It doesn't work on Macs)
    - Download the installation instructions can be found on Canvas > Course Documents
    - Licensing is through an ArcGIS Online account that each student will receive.

Esri ArcGIS Online Accounts: Every student will receive an Esri account, via email, for accessing online resources through arcgis.com, training.esri.com, and licensing ArcGIS Pro on your own machine.

COURSE COMPONENTS

Lectures

- 50-minute in-person lectures on Monday and Wednesday will focus on concepts, difficult topics, the uses of GIS, software demos, and interactive learning activities.
- Lecture slides with links to videos and supplemental resources, as well as video recordings of the lectures, will be posted to Canvas.
- Attendance is not mandatory. If it is safe for you to attend, and you learn better in person, with structured live classes, please attend.

Exercises

- Three-hour lab sessions each week to give you hands-on experience with the software, applying the concepts presented in lecture to solve spatial problems. Lab exercises will be a combination of **step-by-step activities and self-directed activities**. As the semester goes on, you will be expected to do more on your own with less "hand-holding."
- Late lab assignments are subject to a 5 point penalty up to 7 days, and will not be accepted after that without a valid excuse approved by the instructor. Check Canvas assignment for due dates.
- You may need to complete lab exercises on your own. You are expected to have or gain access to a computer with the necessary software. Refer to the "Software" section above, or see the instructor if you need help with this.
- Lab exercises will be **submitted to Canvas, typically as a PDF map or as a Word document**.

Exams

- The lecture component of the course will have a **midterm** and **final exam**.
- The lab component of the course will have **2 lab projects**. The projects will have you work through some spatial tasks with little to no instruction to assess your practical GIS skills and will be done both in and out of your scheduled lab time.

Quizzes

- There will be 12 weekly, open book, **online quizzes** will be given on Canvas, as indicated in the schedule. They **are due by 9am every Monday**, and will cover the previous week's material.
- **Late quizzes are not accepted** without prior approval.

"Extra-curriculars"

Education is more than just what you learn in the classroom. Throughout the semester you will be required to complete or attend (virtually) 2 activities outside of the classroom.

- These activities will include things like:
    - Read an article and write up a summary
    - Complete an online GIS lesson from training.esri.com
    - Attend a GIS event: Mapathon, Seminar, workshop, webinar, Meetup, conference
- You may do a third for extra credit.

A detailed handout on this is available on Canvas > Course Documents.

IMPORTANT DATES

Classes begin	Monday, Aug. 24
Labor Day, no classes	Monday, Sept. 7
Last day to drop without record entry	Wednesday, Sept. 9
NR 322 Midterm	Wednesday, Oct. 7
Lab Project #1	In lab Oct. 12, 13, 14
Lab Project #2	In lab Weeks 13, 15, 16
Last day of in-person instruction	Friday, Nov. 20
Fall Break, Thanksgiving week, no classes	Nov. 23 - 27
Remote instruction	Nov. 30 – Dec. 11
Last day of classes	Friday, Dec. 11
NR 322 Final Exam	Scheduled for Monday, Dec. 14 7:30 – 9:30**am** *(Online Exam*)
All make-up assignments due	Tuesday, Dec. 15, 12 noon.

Refer to the semester schedule on the last two pages for all reading, assignment, and quiz dates.

Important COVID information for Students:

All students should fill out a student-specific symptom checker each day before coming to class

https://covidrecovery.colostate.edu/daily-symptom-checker/

In addition, please utilize the symptom checker to report symptoms, if you have a positive test, or exposed to a known COVID contact. If you know or believe you have been exposed or are symptomatic, it is important for the health of yourself and others that you report it through this checker. You will not be in trouble or penalized in any way for reporting. If you report symptoms or a positive test, you will receive immediate instructions on what to do and CSU's Public Health Office will be notified. Once notified, that office will contact you and most likely conduct contact tracing, initiate any necessary public health requirements and/or recommendations and notify you if you need to take any steps.

For the latest information about the University's response, please visit the CSU COVID-19 site (https://covidrecovery.colostate.edu/).

COURSE MODIFICATIONS due to Covid-19:

1. **Lecture** hall can fit 45 of our ~90 students. We will offer in-person lectures, rotating which students attend each time. Lectures will be recorded and posted to Canvas.
2. **Labs** will have ~23 students in a space that can fit 49. Students will spread out.
3. Cleaning protocols: Students will **wipe down their desks/workstations** before and after sitting there.
4. Instructor/TA will provide in-person assistance from **6 feet away**, screen-sharing with Microsoft Teams will be used so students' screens can be shown on the projector and the instructor can point to things from up front.
5. Instructors and students will **wear a mask at all times** to limit spread of germs.
6. Do not come to class is you have symptoms or may have been exposed to Covid-19. Follow the CSU health guidelines.
7. Office hours may be held outside during good weather and online using **Microsoft Teams**. Students can share their screen to get help troubleshooting.

EXPECTATIONS

Expectations of Me:

My goal is to teach you the fundamentals of GIS and provide ample opportunity to become proficient with GIS software and solving simple spatial problems.

- I will teach using up to date materials and offer relevant examples from the geospatial industry.
- I will strive to help you understand the concepts and am happy to provide extra help when necessary, but sometimes the best learning is done through some struggle – so you'll have to "figure it out" sometimes too!
- Exams and assignments will be graded within a week or two of the due date. I will typically respond to emails by the next day.
- I will follow public health guidelines and enforce them for all students.

Expectations from You:

- **Put in the effort and be engaged.** Active learning can be hard work! When attending lecture or watching the recordings, pay attention, take notes! Start each week having read the assigned text, ready to discuss the content, or ask questions to facilitate better understanding.
- **Complete assignments**, and on time.
- Adhere to the **academic code of conduct.**
- **Communicate**. Contact the instructor or TA if you are having trouble.
- Be **respectful** of others. We can all learn from one another's stories, backgrounds, and ideas.
- **Help each other** when appropriate, within the limits of the code of conduct.

GRADING

Category	Description
Laboratory exercises 32% / 320 points	11 lab exercises (Labs 0 -10 ; worth 20- 30 points each) using GIS software to reinforce concepts and gain practical experience.
Quizzes 15% / 150 points	12 online, open-book, weekly quizzes (worth 10-15 points each) through Canvas to test your understanding of the readings and lectures. Refer to the Schedule for dates. Quizzes are due Mondays at 9am, before the first lecture of the week.
Lab projects 24% / 240 points	Self-directed, hands-on lab projects to assess students' understanding of techniques covered in exercises. Lab Project #1: 10%, Week 8 ; Lab Project #2: 14%, Weeks 13-16.
Mid-term exam 10% / 100 points	A mid-term exam will assess your understanding of core concepts. Administered online this semester, during Week 7.
Final exam 10% / 100 points	A final exam will assess your understanding of core concepts. Scheduled for Monday, Dec. 14th, 7:30am – 9:30am, administered online through Canvas.
Class participation 5% / 50 points	Students are expected to participate lecture and lab. Even though attendance is not mandatory, you must still engage in class and demonstrate effort. Examples include: ask questions, complete lecture exercises, participate in discussions (live or online), attend online office hours, good communication with instructor.
Extra-curriculars 4% / 40 points	GIS related activities to complete or attend outside of regular class time. You must do 2 activities, 20 points each. Document posted to Canvas with options.
Total of 1000 points	

Final grades will be assigned using the following CSU grading scheme:
*I will only round up if you are within .5 of the next whole letter grade.

Grade	Score	Grade	Score
A+	99 - 100	B-	80-83
A	93.3 - 99	C+	77-80
A-	90-93.3	C	70-77
B+	87-90	D	60-70
B	83-87	F	0-60

POLICIES

Attendance Policy and Participation: Attendance is not required this semester, due to concerns related to COVID-19. I still recommend attending lecture, lab, or office hours if you are able to safely to do so. All lectures and demos will be recorded and posted to Canvas. Make your own decisions about what you need to best learn the material. Regardless of attendance, all students need to participate and engage in class - attend or watch the lectures each week and promptly complete the quiz.

Late assignments / Make-up work:

- Late lab assignments are subject to a 5 point deduction, up to 7 days after the due date and will not be accepted after that*.
- Quizzes, Extra-curriculars, and lab projects will not be accepted late*.
- Please arrange any extended absences or makeup exams with the instructor ahead of time.

*Except with prior written permission from instructor/TAs. Please talk to us if you are struggling with the material, software or with personal/mental health issues.

SDC Accommodations: Any student who needs special accommodations or has special needs is encouraged to speak with me about those needs within the first two weeks of the semester. Extensions for assignments can be entered into Canvas for individual students entitled to them. Extended due dates should be worked out AHEAD OF TIME, not after the fact.

Professionalism: Per university policy and classroom etiquette; cell phones and devices must be silenced during all classroom and lab lectures or you may be asked to leave. Please arrive on time for class. Students habitually disturbing class by talking/ arriving late etc., will be warned, and may suffer a grade reduction.

When emailing the instructor or TA, please include your full name, CSU ID, and the course number in your email.

Academic Responsibility: All work in this course must be completed in accordance with the CSU academic honesty policy (http://catalog.colostate.edu/front/policies.aspx). Plagiarism or failing to meet the academic honesty policy in other ways will result in dismissal from class and will be reported. All work is to be done independently. Open book exams and quizzes allow use of notes, class materials, and the internet, but you must still work alone. **By participating in this course, you agree to abide by the following honor pledge, "I will not give, receive, or use any unauthorized assistance in this course."**

Need Other Help?
CSU is a community that cares for you. Counseling Services has trained professionals who can help. Contact 970-491-6053 or go to http://health.colostate.edu. "Tell Someone" by calling 970-491-1350 to discreetly discuss your concerns (http://safety.colostate.edu/tell-someone.aspx).

Week	Dates	Lesson #	In-person Lecture Topic & Quiz Info	Videos to watch	Lab Exercise	Assigned Reading
1	Aug. 24		Course Overview and What is GIS?	**All**: Watch Lesson 1 video- Importance of Place	Lab 0: Computer skills & Geospatial Appetizers	Ch. 1
	Aug. 26		Course Overview and What is GIS? (Encore presentation) **QUIZ 1**	Watch the lecture recording if you don't attend		Ch. 1
2	Aug. 31	Lesson 2a	Spatial Data: **Vector**	Watch the video for the Lesson 2 lecture(s) you don't attend	Lab 1: Meet ArcGIS Pro	Ch. 2 (p.40-52)
	Sept. 2	Lesson 2b	Spatial Data: **Raster** **QUIZ 2**			Ch. 2 (p.40-50)
3	Sept. 7		**Labor Day, no lecture**		Lab 2: Exploring Spatial Data	
	Sept. 9	Lesson 2c	Understanding spatial data **QUIZ 3**	Watch Lesson 2C video if you don't attend		Ch. 2
4	Sept. 14	Lesson 3a	Spatial database design activity & Projections and Coordinate systems Q&A	(1) **All**: Watch the Lesson 3 videos before class (2) Watch activity video if you don't attend	Lab 3: Understanding projections and coordinate systems	Ch. 4 (p.147-155) + Ch. 3 (p. 87-107 & 116-132)
	Sept. 16	Lesson 3b	Spatial Database design activity & Projections and Coordinate systems Q&A **QUIZ 4**			Ch. 3 (p.87-107 & 116-132)
5	Sept. 21	Lesson 4a	Map critiques and Making great maps demo	(1) **All**: Watch Lesson 4 videos before class (2) Watch lecture recording if you don't attend	Lab 4: Making a map	Ch. 4 (p. 181-191)
	Sept. 23	Lesson 4b	Map critiques and Making great maps demo **QUIZ 5**			Ch. 4 (p. 181-191) +388-392
6	Sept. 28	Lesson 5a	Spatial data sources	Watch the Lesson 5 videos for the lecture(s) you don't attend	Lab 5: Spatial data creation and acquisition	Ch. 4 (p.156-167) + Ch. 7
	Sept. 30	Lesson 5b	Creating and editing data **QUIZ 6**			Ch. 4 (p.156-167) + Ch. 7
7	Oct. 5		Review		Lab 6: Working with tabular data	Ch. 4 (p.156-168) + Ch. 7
	Oct. 7		**Midterm Exam (on Canvas)** **No quiz**			STUDY!

Week	Dates	Lesson #	In-person Lecture Topic & Quiz Info	Videos to watch	Lab Exercise	Assigned Reading
8	Oct. 12	Lesson 6	Visualizing tabular data	Watch the Lesson videos for the lecture(s) you don't attend	**Lab Project #1**	Refer to Ch. 8
8	Oct. 14	Lesson 5c	Finding GIS data on the internet + Go over Midterm **QUIZ 7**		**Lab Project #1**	Ch. 7
9	Oct. 19	Lesson 7a	Spatial analysis: Vector	Watch the Lesson videos for the lecture(s) you don't attend	Lab 7: Getting ready for analysis	Ch. 9 (p.373-420)
	Oct. 21	Lesson 7b	Spatial analysis: Vector **QUIZ 8**			Ch. 9 (p. 398-403)
10	Oct. 26	Lesson 7c	Spatial analysis: Vector	(1) Watch the Lesson 7c videos if you don't attend (2) **ALL:** Watch the Lesson 8 video	Lab 8: Vector analysis	Ch. 9 (p. 404-419)
	Oct. 28	Lesson 9a	Spatial analysis: Raster **QUIZ 9**			Ch. 14
11	Nov. 2	Lesson 9b	Spatial analysis: Raster	Watch the Lesson videos for the lecture(s) you don't attend	Lab 9: Working with Rasters	Ch. 10 + p. 54-60
	Nov. 4	Lesson 9c	Spatial analysis: Raster **QUIZ 10**			Ch. 10 / 11
12	Nov. 9		Spatial thinking activity and Review	**ALL**: Watch the lecture activity video	Lab 10: Raster analysis	Ch. 10
	Nov. 11		Spatial thinking activity and Review			
13	Nov. 16	Lesson 10	Spatial Modeling and Workflows **QUIZ 11**	Watch the Lesson videos for the lecture(s) you don't attend	**Lab Project #2 (Part 1)**	Ch. 13
	Nov. 18	Lesson 11	GIS Software/Technology Options			Ch. 1
14	Nov. 23 - 27		Thanksgiving Week, No classes | End of in-person instruction			
15 (online)	Nov. 30		Review (+ Case Study or Guest speaker)	**Live lectures on Zoom –** attend live or watch recording	**Lab Project #2 (Part 2)** (continue working remotely)	
	Dec. 2	Lesson 12	Field data collection techniques **QUIZ 12**			Ch. 5
16 (online)	Dec. 7	Lesson 13a	Geospatial: What's Next. Web Mapping	**Live lectures on Zoom –** attend live or watch recording	**Lab Project #2 (Part 3)** (continue working remotely)	Ch. 15
	Dec. 9	Lesson 13b	Geospatial: What's Next + Final review			

Quizzes are due by 9am on Mondays after the material is covered. Refer to Canvas for the exact lab due dates/times.