



Environmental Data Science

EVS4932 Class# 22753

T Periods 5-6 (11:45 PM - 1:40 PM)/R Period 6 (12:50 PM – 1:40 PM), Architecture Building room 120
3 credit hours
Spring Semester 2024

Instructor: Dr. Ryan Good (he/him)

Email: ryangood@ufl.edu

Office Location: McCarty D, Room 2049

Office Hours: Tuesdays & Thursdays 9-10:15am (in-person and Zoom), or by appointment

We are here for you! Please don't hesitate to ask for assistance!

Course Overview and Purpose

The class will provide an overview of data science's role in environmental science, including basics of data literacy, as well as introductions to common environmental data science methodologies including GIS and spatial data analysis, R and statistical analysis, programming including Python, and AI developments and applications. Case studies will be drawn from common environmental problems.

This is a new course in development, planned to become a new requirement for Environmental Science majors at the next curriculum revision. Because it is not an established course, you will have both advantages and disadvantages. We will shape the course to enrolled students' interests, and you will have a chance to shape the form of the course for future semesters. However, the lectures, activities, and assignment instructions are not polished and will not be available as early as they would in more established course. Additionally, it's likely that we will face some changes to our plans and schedule as we move through the semester.

Prerequisites

None

Required Textbook

Gutman & Goldmeier (2021). *Becoming a Data Head: How to Think, Speak, and Understand Data Science, Statistics, and Machine Learning*. Wiley.

This text is available through the UF All Access program.

All additional readings and course materials will be posted on Canvas and free to access. A copy of the textbook has been requested for purchase as the UF libraries, and will be available on reserve at Marston Science Library if they elect to buy a copy.

Required Technology and Minimum Technical Skills

You need to have access to a personal computer or laptop with a working webcam and microphone in order to access all features of the course Canvas site and to participate in online office hours. To complete your tasks in this course, you will need access to software provided on computers in our classroom.

Student Learning Outcomes

At the end of this course, you will be able to:

1. Discuss concepts, practices, opportunities, and challenges of big data
2. Build data literacy by drawing links between data acquisition, data processing, and data analysis
3. Apply data science tools in service of environmental challenges
4. Propose data-based solutions for environmental questions

Course Structure

This is an in-person course split into multiple parts. We will begin the course by exploring what big data is, where it comes from, and how environmental scientists use it. We will then explore several brief case study methodologies used by environmental scientists to analyze data. The course will end with an individual project where you will conduct your own data analyses.

Grading Policies

For information on how UF assigns grade points, visit: <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

A	93 to 100%		C	73 to < 77%
A-	90 to < 93%		C-	70 to < 73%
B+	87 to < 89%		D+	67 to < 70%
B	83 to < 87%		D	63 to < 67%
B-	80 to < 83%		D-	60 to < 63%
C+	77 to < 79%		E	<60%

The final grade for this course is based on a 1000-point scale and will be weighted as follows:

Grade Component	Points	Percentage
Reading Assignments	150	15.0%
Homework/Lab Activities	300	30.0%
Mid-term exam	100	10.0%
Final Project	300	30.0%
Final Presentation	100	10.0%
Class Participation	50	5.0%
Total	1000	100%

Reading Assignments: Assigned readings will be posted on Canvas roughly 10 days before they should be completed. Paired with our assigned readings, you will prepare a short write-up summarizing and critiquing the reading. These assignments will be due on Wednesdays in weeks they are assigned. Your lowest scoring reading assignment will be dropped; you can choose to skip one, or complete all and your lowest earned score will be dropped.

Homework/Lab Activities: We will complete several small lab exercises orienting and practicing basic processes with the various analytical tools we will cover. Class time will be given to work on these, but they

will likely need to be completed as homework if not finished in class. These assignments will be due on Mondays in the weeks they are assigned.

Mid-term Exam: You will take an exam following our first unit of class, testing your knowledge of data literacy. Questions will be some combination of multiple choice, matching, and short answer.

Final Project: The course will conclude with an extended final project. In this project you will identify a research question of interest and a data set or sets that can be used to help answer the question; you will propose an analytical plan-of-action and execute your analysis. We will discuss the appropriate breadth and depth of research questions before beginning the project.

Final Presentation: At the semester's end, you will present your project to the class, including your topic, data, analysis, and findings. These will be roughly 10-15 minute presentations.

Class Participation: Learning is an active process facilitated by reflecting on, critically thinking about, and applying readings, lecture material, and out-of-class experiences. Your engagement grade is based on the quantity and quality of your contributions to formal and informal in-class discussions and activities. You are strongly encouraged to participate during each class meeting by asking relevant questions, engaging in discussion, or sharing personal experiences on the topic. The precise number of engagement opportunities will vary depending on the needs and interests of this semester's cohort of students.

Specific grading criteria for each assignment will be provided on Canvas. You are responsible for maintaining duplicate copies of all work submitted in this course until the end of the semester. In case of a grading dispute, you must notify your instructor via email within one week of the date the grade is posted. It is your responsibility to verify that all assignments are successfully uploaded to Canvas. Missing, corrupt, or incompatible files may result in grade penalties up to a score of zero for the assignment.

Course Policies

Diversity and Inclusiveness Statement

Diversity is one of our biggest assets in the classroom and in environmental science. Different perspectives enrich our understanding of the variety of human-nature interactions and are imperative to developing just solutions to complex environmental problems. This classroom is a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities & races, genders, gender identities, gender expressions, national origins, religions (if any), sexual orientations, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming, and inclusive environment for every other member of the class. This does not mean that you are not allowed to disagree with others, but that such differences should be explored without ad hominem judgment.

It is my goal to present diverse societal perspectives on environmental issues. For pedagogical reasons, this may include strategies such as “playing devil’s advocate” or “putting yourself in the shoes of others” from time to time. At no point should students misconstrue such pedagogical strategies as an endorsement of any position in conflict with CS/HB 7 as adopted by the 2022 Florida legislature.

Should I inadvertently make a statement offensive to you, please let me know so that I may learn and grow from the incident.

Attendance Policy

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. [Click here to read the university attendance policies](#). Missing in-class work, including exams, will incur a score of zero unless you can provide evidence that the assessment was missed due to an excusable reason.

Excusable reasons:

- In case of illness, upon receipt of a doctor's note or equivalent, or by following the procedure outlined here: <https://care.dso.ufl.edu/instructor-notifications>.
- In case of religious holidays, by informing your instructor via email at least one week ahead of time.
- In case of military duty, jury duty, participation in academic conferences, or participation in official university or UAA events, by providing appropriate evidence at least one week ahead of time.
- In case of family emergencies or other extenuating circumstances, by following the procedure outlined here: <https://care.dso.ufl.edu/instructor-notifications>.
- In all other cases, or if you are unsure, please email your instructor as soon as feasible. Absences are generally not excused for non-emergency travel and vehicle problems.

You are still responsible for turning assignments in on time unless an extension has been requested via email and approved by your instructor prior to the deadline. In case of true documented emergencies, the instructor may waive this requirement.

Make-up Policy

To maintain fairness, only work missed due to excused absences can be made up. For absences excused ahead of time, I will develop a make-up plan and schedule. In case of documented illnesses or emergencies, arrangements for completing make-up exams or assignments should be made upon your return to class. If experiencing truly extenuating circumstances resulting in longer absences, you should notify me as soon as possible to develop a plan to make up missed work. Missed extra credit opportunities cannot be made up. If you miss an exam for a non-excusable reason, a score of zero will be entered.

Late Work

You are responsible for turning assignments in on time unless an extension has been requested via email prior to the deadline. In case of true documented emergencies, we may waive this requirement. Technical difficulties are not an excuse for missing an assessment or assignment; you should have contingency plans in case any such issues arise. We recommend storing your documents on a cloud service that can be accessed from any device ([Dropbox](#) and [OneDrive](#) are free to UF students), and having a plan for internet outages (such as identifying a source for public WiFi near you or tethering through your cell phone). Try not to wait until the last minute to submit assignments!

Assignments submitted between one and four days late will incur a penalty of 10% of the possible points per day. Work submitted more than four days late will be assigned a score of zero. Because your timely participation in discussion assignments directly impacts your classmates' abilities to complete their own work, discussion-based assignments are not accepted late.

I highly recommend starting work on assignments early to preclude unexpected emergencies or late-semester stress from compromising your grade. Deadline extensions may be available on certain assignments if requested ahead of time via email, but must be justified. If extended deadlines are not met, late penalties will be assessed based on the original, not the revised due date!

Artificial Intelligence (AI) Statement

AI applications including natural language chatbots like ChatGPT are an amazing new technology that is revolutionizing the way we access information, just like computers, the internet, and mobile phones did in prior decades. AI can be a useful tool for tasks such as editing, spellchecking, organizing, and brainstorming. Other uses, including copying & pasting ChatGPT output and representing as your own work, are not appropriate in college courses; doing so constitutes academic dishonesty.

Office Hours

Please take advantage of office hours to discuss any questions or concerns. Contact your teaching assistant for basic questions, help with assignments, and clarifications regarding grades and feedback. Contact your instructor regarding absences, grading disputes, concerns about other students, and any other issues. If you cannot be present for the regularly scheduled office hours, we will attempt to accommodate you at an alternate time.

Course Communications

The preferred way to get in touch with your instructor outside of office hours is via Canvas message or direct email from your official UF email account. Emails from outside providers, like Gmail, are not considered secure and will be ignored to protect student privacy. University policy dictates that grades cannot be discussed via email, so if you have a grade-specific question, you should ask it during office hours. You can expect a response within 24 hours on weekdays. All students are expected to check the course web site on Canvas (<http://elearning.ufl.edu>) each weekday. In addition, we may send specific communications directly to your UF email, which you should check daily as well. You should enable Canvas notifications for this class, so that you are notified immediately about grading, assignment feedback, due date changes, announcements, etc.

External Communication

You may use GroupMe or similar tools to communicate with other students about the class and environmental science-related topics. **You may not, however, discuss quiz and exam questions/answers with others, including quizzes and exams from the current or prior semesters, or collaborate on any assignments intended to be worked on individually.** Doing so constitutes academic dishonesty.

Canvas Display Name Change

Canvas uses the "Display Name" as set in myUFL. The Display Name is what you want people to see in the UF Directory, such as "Ally" instead of "Allison." To update your display name, go to one.ufl.edu, click on the dropdown at the top right, and select "Directory Profile." Click "Edit" on the right of the name panel, uncheck "Use my legal name" under "Display Name," update how you wish your name to be displayed, and click "Submit" at the bottom. This change may take up to 24 hours to appear in Canvas. This does not change your legal name for official UF records.

Technical Difficulties

For help with technical issues or difficulties with Canvas, please contact the UF Computing Help Desk at <http://helpdesk.ufl.edu> .
352-392-HELP (4357)
Walk-in: HUB 132

While technical difficulties are not generally an acceptable excuse, any requests for make-ups (assignments, exams, etc.) due to technical issues should be accompanied by the ticket number received from the UF Computing Help Desk when the problem was reported to them. The ticket number will document the time and date of the problem. You should email your instructor within 24 hours of the technical difficulty if you wish to request a make-up.

CALS and University of Florida Policies

Academic Honesty and Plagiarism

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: *"We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."* You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment."* It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>.

PLAGIARISM, WHETHER INTENTIONAL OR UNINTENTIONAL, IS A SERIOUS AND POTENTIALLY CAREER-ENDING FORM OF ACADEMIC MISCONDUCT. Copying and pasting is never okay in academia.

Direct quotes are not commonly used in science writing; paraphrases accompanied by a proper citation should be used instead. Use of direct quotes of outside sources in this class will result in a loss of credit. Use of photographs or images without proper citation, both in-text and in a references list, is also considered plagiarism.

Grades and Grade Points

For information on current UF policies for assigning grade points, see <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

Course Evaluation Process

Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at: <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at: <https://gatorevals.aa.ufl.edu/public-results/>.

Software Use

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Services for Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation.

You must submit this documentation prior to submitting assignments or taking quizzes or exams. Accommodations are not retroactive; therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations. The DRC may be contacted by visiting 001 Reid Hall, calling 352-392-8565, or visiting their web site at www.dso.ufl.edu/drc/.

Student Complaints

Residential Course: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>

Online Course: <http://www.distance.ufl.edu/student-complaint-process>

Campus Helping Resources

Your wellbeing is important to your instructor and the University of Florida community. Students experiencing crises or personal problems that interfere with their general wellbeing are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *U Matter We Care*, 352-292-2273. UF's umbrella program for UF's caring culture. Provides students in distress with support and coordination of the wide variety of appropriate resources. <https://umatter.ufl.edu/>
- *University Counseling & Wellness Center*, 3190 Radio Road, 352-392-1575. Counseling Services, Groups and Workshops, Outreach and Consultation, Self-Help Library & Wellness Coaching. <https://www.counseling.ufl.edu/>
- *Gatorwell Health Promotion Services*, multiple locations on campus, 352-273-4450. GatorWell uses health promotion strategies to educate UF students about health and wellness topics relevant to the college experience. <https://gatorwell.ufsa.ufl.edu/>
- *Career Connections Center*, First floor Reitz Union, 352-392-1601, <https://career.ufl.edu/>
- Student Success Initiative, <https://studentsuccess.ufl.edu/>

- *Dean of Students Office*, 202 Peabody Hall, 392-1261. Among other services, the DSO assists students who are experiencing situations that compromises their ability to attend classes. This includes family emergencies and medical issues (including mental health crises). <https://care.dso.ufl.edu/>
- *CLAS Academic Resources*, Turlington Hall, 352-392-2010 or 352-392-6420. General study skills, tutoring, and supplemental instruction for select classes. <https://academicresources.clas.ufl.edu/>
- *Writing Studio*, 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers. <https://writing.ufl.edu/writing-studio/>
- *Field and Fork Pantry*. Food and toiletries for students experiencing food insecurity. <https://pantry.fieldandfork.ufl.edu/>
- *UF Help Desk*. 352-392-4357. Technical support for computer issues and UF web services. <https://helpdesk.ufl.edu/>
- *University Police Department*, 352-392-1111 (or 9-1-1 for emergencies). <https://www.police.ufl.edu/>
- *Library Support*. Various ways to receive assistance with using the libraries or finding resources. <https://uflib.ufl.edu/find/ask/>

Student Complaints

Residential Course: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>

Online Course: <https://pfs.tnt.aa.ufl.edu/state-authorization-status/#student-complaint>

Course Outline (subject to change – please check the Canvas calendar for the latest information)

Topic Schedule

We do not have a finalized schedule during the pilot semester, as things will likely change on a regular basis as we focus on your interests and determine how much time needs to be devoted to any given topic. The most up-to-date schedule will always be provided on Canvas.

Approximate Date and Topic	
Week 1	Class orientation
Weeks 2-3	Thinking about data
Weeks 4-6	Basic data science analysis
February 15	Mid-term Exam
Week 7	Methodologies: Statistical Analyses
Weeks 8-9	Methodologies: GIS & Spatial Data
Week 10	Spring Break
Week 11	Methodologies: Programming
Week 12	Methodologies: AI
Weeks 13-15	Final Project
April 23	Final Presentations and Class Wrap-Up

Course Alterations

Due to unforeseen circumstances or to enhance class learning opportunities, it may be necessary to alter the information given in this syllabus during the semester. Such changes are not unusual and should be expected. All changes to the syllabus will be posted to Canvas. It is your responsibility to keep up with any syllabus changes.