

GEOGRAPHY 4/590: Geospatial Data Science Applications

Winter 2022

SYLLABUS

Instructors:

Professor: Johnny Ryan (jryan4@uoregon.edu)

Office: See Canvas

Office hours: See Canvas

GE: Insang Song (isong@uoregon.edu)

Office: See Canvas

Office hours: See Canvas

Course objectives:

- Improve Python skills
- Learn how think computationally and statistically
- Solve real-world problems using spatial analysis
- Understand basic machine learning concepts for data science
- Manage individual and group software development using version control
- Collaborate on a group project
- Communicate results of data science project orally and as short write-up

Weekly schedule:

Lecture: Monday at 14:00-14:50 in 106 CON

Lab: Wednesday at 14:00-15:50 or Friday at 10:00-11:50 in 442 MCK

Grading:

- **Lab assignments (45%):** Turn in assignments on Canvas and GitHub (see instructions in Lab #1). Lab assignments are due the day before the start of the next lab (i.e. **Tuesday 11:59 pm**). Late assignments will be penalized 10% per day late. Assignments will not be accepted after 7 days past the submission deadline.
- **Final project (45%):** An essential component of this course is the final project which provides an opportunity to explore a particular topic of interest using some of the skills developed in this course. Students will present project during the week starting **March 7** and submit a write up by **March 11 11:59 pm**.
- **Participation (10%):** Half graded by GE and half by the Professor. Credit can be earned through attendance, participation in class discussion, visiting Professor and GE during office hours, and helping other students in labs.

Class website:

- **GitHub:** all lecture slides, assignments, data, and guides will be available on GitHub at <https://github.com/JohnnyRyan1/geospatial-data-science>.
- **Canvas:** the lecture slides and assignments will also be available on Canvas class site
- **R:Drive:** the lab data will also be hosted on the R:\GEOG490_590_8\Class_Data\.

Slack:

We will use Slack for most communication and discussion. Please join the course workspace with your UO email address. See Canvas announcement for invitation link. It is recommend that you use the standalone desktop app rather than the web interface.

Overview:

This course introduces students to emerging geospatial data science methods for addressing important environmental challenges in the western USA. The course will be taught as a series of short lectures and longer computer labs in which students will learn how to use Python to process (e.g. resampling, manipulating, interpolating), analyze (e.g. machine learning), and visualize (e.g. plotting, mapping) geospatial data. Students will apply these newly developed skills to real world applications (e.g. water management, renewable energy, agriculture, hazards, and climate change). In doing so, students will become familiar with a variety of data sources including those derived from satellite remote sensing, climate models, weather stations, census bureau, crowdsourced maps, and GPS. The skills developed during this course will be directly applicable to a career in (geospatial) data science.

Absences:

We will conduct activities in class which will factor into your *Participation* grade. These activities may include quizzes, group discussion, online question/answer and group activities. There is no make-up of missed class activities.

However, if you know in advance that you will miss a class, a lab, or an examination for academic reasons (i.e. for another class or program), athletic travel, the observance of a religious holy day, or other legitimate reason, you should inform the instructor as far in advance of the absence as possible. The Professor and GE will take that in account for the *Participation* grade.

Classroom behavior:

Meaningful and constructive dialogue is encouraged in this class and requires a degree of mutual respect, willingness to listen, and tolerance of opposing points of view. Respect for individual differences and alternative viewpoints will be maintained at all times in this class. One's words and use of language should be temperate and within acceptable bounds of civility and decency. Since every student is entitled to full participation in class without interruption, all students are expected to come to class prepared and on time, and remain for the full class period. All phones or other electronic devices that generate sound must be turned off or to silent mode during class. Disruptive behaviors, including excessive talking, arriving late to class, sleeping, reading newspapers, or extensive use of phones or other unauthorized electronic devices during class is not permitted.

The University Student Conduct Code (available at conduct.uoregon.edu) defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. By way of example, students should not give or receive (or attempt to give or receive) unauthorized help on assignments or examinations without express permission from the instructor. Students should properly acknowledge and document all sources of information (e.g. quotations, paraphrases, ideas) and use only the sources and resources authorized by the instructor. If there is any question about whether an act constitutes academic misconduct, it is the students' obligation to clarify the question with the instructor before committing or attempting to commit the act.

Accessible Education:

Please let me know within the first two weeks of the term if you need assistance to fully participate in the course. Participation includes access to lectures, web-based information, in-class activities, and exams. The Accessible Education Center (<http://aec.uoregon.edu/>) works with students to provide an instructor notification letter that outlines accommodations and adjustments to class design that will enable better access. Contact the Accessible Education Center for assistance with access or disability-related questions or concerns.

COVID Containment Plan for Classes:

As the University of Oregon returns to in-person instruction, the key to keeping our community healthy and safe involves **prevention**, **containment**, and **support**. Here is information critical to how the UO is responding to COVID-19.

Prevention: To prevent or reduce the spread of COVID-19 in classrooms and on campus, all students and employees:

1. Must to be comply with vaccination policy
2. Must wear face coverings in all indoor spaces on UO campus
3. Complete weekly testing if not fully vaccinated or exempted
4. Wash hands frequently and practice social distancing when possible
5. Complete daily self-checks
6. Stay home/do not come to campus if feeling symptomatic
7. Complete the UO COVID-19 case and contact reporting form if you test positive or have been in close contact with a confirmed or presumptive case.

Containment: If a student in class tests positive for COVID-19, all relevant classes will be notified via an email by the Corona Corps Care Team with instructions for students and staff based on their vaccination status. Specifically:

1. **Vaccinated and Asymptomatic students:** Quarantine not required, but daily self-monitoring before coming on campus is advised; sign up for testing through MAP 3-5 days after exposure if advised you are a contact.
2. **Unvaccinated or partially vaccinated students:** 14-day quarantine advised – do not come to class – and sign up for testing 3-5 days after notification through MAP, if asymptomatic, or through University Health Services (541-346-2770) or your primary care provider, if symptomatic.
3. **Symptomatic students:** stay home (do not come to class/campus), complete the online case and contact form, and contact University Health Services (541-346-2770) or your primary care provide to arrange for immediate COVID-19 testing.

Students identified as a **close contacts** of a positive case will be contacted by the Corona Corps Care Team (541-346-2292).

Support: The following resources are available to you as a student.

- University Health Services or call (541) 346-2770
- University Counseling Center or call (541) 346-3277 or (541) 346-3227 (after hrs.)
- MAP Covid-19 Testing
- Corona Corps or call (541) 346-2292
- Academic Advising or call (541) 346-3211
- Dean of Students or call (541)-346-3216

Good Classroom Citizenship

- Wear your mask and make sure it fits you well

- Stay home if you're sick
- Get to know your neighbors in class, and let them know if you test positive
- Get tested regularly
- Watch for signs and symptoms with the daily symptom self-check
- Wash your hands frequently or use hand sanitizer

Complete the UO COVID-19 **case and contact reporting form** if you test positive or are a close contact of someone who tests positive.

Inclement Weather:

It is generally expected that class will meet unless the University is officially closed for inclement weather. If it becomes necessary to cancel class while the University remains open, this will be announced on Canvas and by email. Updates on inclement weather and closure are also communicated in other ways described here:

<https://hr.uoregon.edu/about-hr/campus-notifications/inclement-weather/inclement-weather-immediate-updates>

Academic Disruption due to Campus Emergency:

In the event of a campus emergency that disrupts academic activities, course requirements, deadlines, and grading percentages are subject to change. Information about changes in this course will be communicated as soon as possible by email, and on Canvas. If we are not able to meet face-to-face, students should immediately log onto Canvas and read any announcements and/or access alternative assignments. Students are also expected to continue coursework as outlined in this syllabus or other instructions on Canvas. In the event that the instructor of this course has to quarantine, this course may be taught online during that time.

Reporting Obligations:

For information about my reporting obligations as an employee, please see Employee Reporting Obligations on the Office of Investigations and Civil Rights Compliance (OICRC) website. Students experiencing any form of prohibited discrimination or harassment, including sex or gender-based violence, may seek information and resources at safe.uoregon.edu, respect.uoregon.edu, or investigations.uoregon.edu or contact the non-confidential Title IX office/Office of Civil Rights Compliance (541-346-3123), or Dean of Students offices (541-346-3216), or call the 24-7 hotline 541-346-SAFE for help. I am also a mandatory reporter of child abuse. Please find more information at [Mandatory Reporting of Child Abuse and Neglect](#).

Mental Health and Wellness:

Life at college can be very complicated. Students often feel overwhelmed or stressed, experience anxiety or depression, struggle with relationships, or just need help navigating challenges in their life. If you're facing such challenges, you don't need to handle them on your own--there's help and support on campus.

As your instructor if I believe you may need additional support, I will express my concerns, the reasons for them, and refer you to resources that might be helpful. It is not my intention to know the details of what might be bothering you, but simply to let you know I care and that help is available. Getting help is a courageous thing to do—for yourself and those you care about.

University Health Services help students cope with difficult emotions and life stressors. If you need general resources on coping with stress or want to talk with another student who has been in the same place as you, visit the Duck Nest (located in the EMU on the ground floor) and get help from one of the specially trained Peer Wellness Advocates. Find out more at health.uoregon.edu/ducknest.

University Counseling Services (UCS) has a team of dedicated staff members to support you with your concerns, many of whom can provide identity-based support. All clinical services are free and confidential. Find out more at counseling.uoregon.edu or by calling 541-346-3227 (anytime UCS is closed, the After-Hours Support and Crisis Line is available by calling this same number).

Basic Needs:

Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live and believes this may affect their performance in the course is urged to contact the Dean of Students Office (346-3216, 164 Oregon Hall) for support.

This UO webpage includes resources for food, housing, healthcare, childcare, transportation, technology, finances, and legal support: <https://blogs.uoregon.edu/basicneeds/food/>

Accommodation for Religious Observances:

The university makes reasonable accommodations, upon request, for students who are unable to attend a class for religious obligations or observance reasons, in accordance with the university discrimination policy which says “Any student who, because of religious beliefs, is unable to attend classes on a particular day shall be excused from attendance requirements and from any examination or other assignment on that day. The student shall make up the examination or other assignment missed because of the absence.” To request accommodations for this course for religious observance, visit the Office of the Registrar's website (<https://registrar.uoregon.edu/calendars/religious-observances>) and complete and submit to the instructor the “Student Religious Accommodation Request” form prior to the end of the second week of the term.