



Geographic Information Science and Systems

Course Number: GGIS 403

Credit Hours: 4

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Course Meetings/Location: Online Course

Course Website Learning Management System: [CANVAS](#)

Office Location and Office Hours: [Microsoft 365 Booking](#) (Wed. 10am-12pm, 4pm - 6pm)

Course Description

Introduces the conceptual and technical fundamentals of geographic information science as a gateway to advanced study in geographic information science and cover geographic information science as an interdisciplinary scientific field and geographic information systems as a tool in many application domains. We will progress through the geospatial data science pipeline.

This course is intended for those students interested in spatial analysis in Python. It does not include instruction in GIS software.

Course Objectives

In this course you will:

- Learn how to gather and process data for use in geospatial analyses
- Learn the basic principles of GIS, including data types and processing methods.
- Learn how to present project results in written, oral, and graphic forms
- Develop technical programming skills for carrying out basic geospatial data science workflows

Required Textbook

There are no required textbooks for this course. We will use the UCGIS GIS&T Book of Knowledge. This resource can be found [here](#).

Technology

To succeed in this course, you should have the following technological competencies

- Be sure you know how to use the course management system as you will need to utilize this course management system weekly.
- Understand basic computer tools such as unzipping files, accessing websites, and file repository structure.
- Be able to access materials located on the [UIUC Library Catalog](#). This includes logging into the site and finding materials using search functions.

Course Topics

- Week 1: Introduction to Geospatial Data Science
- Week 2: Data
- Week 3: Exploratory Data Science
- Week 4: Pre-Processing
- Week 5: Analysis
- Week 6: Model Validation
- Week 7: Communication
- Week 8: Final Project

Assessment

The following assessments are used in this course to assess your learning progress.

Weekly Overview

Each week will begin with a weekly overview, explaining what the module is about, what learning goals you are expected to achieve, and what activities you will participate in. Each week is designed with the same structure and activities unless otherwise specified. Weekly instructional activities are explained in greater detail below.

Readings and Lessons

You will be expected to read 3-4 articles per week. These readings may include technical documentation, peer reviewed journal articles, or encyclopedic types of entries from UC BoK. You may need to log into the UIUC Library in order to access readings.

Technical Labs

Technical labs will use Python programming language on the [CyberGISx platform](#). Instructions are available on the platform. You should do this as soon as possible as your first lab will begin in Week 2.

If you are competent in Python, you may feel free to use another IDE, such as Visual Studio Code, Kaggle, etc. However, your instructor will not be able to provide technical help with these other platforms.

Quizzes

A review quiz is provided each week. You will be assessed on your understanding of conceptual information from the readings and lectures for the week. Quizzes do not cover Python concepts.

Final Project

This course concludes with a final project. Your final project will require you to use Python to solve a problem that is pre-defined and data provided. Your ability to recall prior skills taught in technical labs will be assessed.

Grading

Assignments and Points Possible

Assignment	Points Possible
Weekly Quiz (6 quizzes @ 5 pts each)	30
Labs (5 labs @ 6 pts each)	30
Final Project (2 tasks @ 20 pts each)	40
Total Points Possible (<i>total points may change at the discretion of the instructor—students would be informed of any changes with plenty of advanced notice</i>)	100

Grading Scale

- A >= 95%
- A- 90% - 94.99%
- B+ 85% - 89.99%

- B 80-84.99%
- B- 75-79.99%
- C+ 70-74.99%
- C 65-69.99%
- C- 60-64.99%
- D+ 56-59.99%
- D 52-55.99%
- D- 50-51.99%
- F <50%

University Disclaimers

Disabilities Accommodations

To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible as DRES provides students with academic accommodations, access, and support services. To contact DRES you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TDD), or e-mail a message to disability@uiuc.edu. <http://www.disability.illinois.edu/>.

University of Illinois Academic Integrity

The University of Illinois at Urbana-Champaign Student Code should also be considered as a part of this syllabus. Students should pay particular attention to Article 1, Part 4: Academic Integrity. Read the Code at the following URL: <http://studentcode.illinois.edu/>.

Academic dishonesty may result in a failing grade. Every student is expected to review and abide by the Academic Integrity Policy: <http://studentcode.illinois.edu/>. Ignorance is not an excuse for any academic dishonesty. It is your responsibility to read this policy to avoid any misunderstanding. Do not hesitate to ask the instructor(s) if you are ever in doubt about what constitutes plagiarism, cheating, or any other breach of academic integrity.

How can students prevent dishonesty in their writing? Follow these simple recommendations:

1. Start assignments early. Yeah, I know that's hard for many students. Believe it or not, teachers procrastinate too sometimes. In most cases I encounter, the reason is often that the student started the assignment late and felt pressure simply to take their chances and complete the assignment.
2. Get help early. If you're not confident in your ability to put together an assignment, schedule an appointment with me to talk through your ideas and the process. Also, make an appointment with the Center for Writing Studies: <http://www.cws.illinois.edu/workshop>. They

offer one-on-one tutoring for the writing process, and every student I've sent there has not only loved it, but also greatly improved their writing assignments and grades.

3. Cite all of your sources: As you research and read your sources, cite them. I would rather you over-cite than risk under-citing. If you read something and then paraphrase or summarize from what you read, you must cite that source in the text and in a reference list at the end.
4. What about photos, graphics, or templates from the Web? You may use any photos and graphics that are royalty-free, meaning they are free for anyone to use or after you purchase them. Downloading images from any website will generally be a copyright violation. In short, Google Images and other websites are NOT the place to get images! You may use basic, barebones templates without graphical/image elements.

Emergency Response Recommendations

Emergency response recommendations can be found at the following website: <http://police.illinois.edu/emergency-preparedness>. I encourage you to review this website and the campus building floor plans website within the first 10 days of the class available at <http://police.illinois.edu/emergency-preparedness/building-emergency-action-plans/>.

Family Educational Rights and Privacy Act (FERPA)

Any student who has suppressed their directory information pursuant to *Family Educational Rights and Privacy Act* (FERPA) should self-identify to the instructor to ensure the protection of the privacy of their attendance in this course. See <http://registrar.illinois.edu/ferpa> for more information on FERPA.

Sexual Misconduct Policy and Reporting

The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the University's Title IX and Disability Office. In turn, an individual with the Title IX and Disability Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options.

A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here: wecare.illinois.edu/resources/students/#confidential.

Other information about resources and reporting is available here: wecare.illinois.edu.

Attendance and Tardiness

Coming to class is like going to a job. As your supervisor (instructor), you are expected to be on time and present (physically and mentally). I understand that students get sick, have family or personal issues, and have professional opportunities that may prevent them from attending class. It happens to professors, too! Communicate with me and let me know what is going on if you are having issues getting to class on time (such as distance from your previous class) or missed sessions.

Late Assignments Policy

All assignments will have a due date and time given on the course website. Please be sure you are aware of every due date by checking in on the course site frequently.

- Assignments may be turned in late up to one week with a 10% penalty. No assignment submissions will be accepted after that 1-week buffer.
- All assignments must be turned in no later than the final day of course. You can find this date in the Date Range on the [Course Explorer](#).
- Excused absences (see below for definition) may only be requested prior to the deadline.
- DRES accommodations will be provided; however, all students must turn in their assignments by the last date of this course in the Date Range on [Course Explorer](#).

Excused Absences and Assignment Deadline Extensions

If you miss a due date for an assignment or miss out on in-class points, the following requirements must be met in order to not receive a deduction for lateness or to make up points given in class. Assignments will be due on a date set by the instructor for any of the cases below, as long as the excuse is approved. However, you may be required to turn in an assignment early at the sole discretion of the instructor.

The University of Illinois excused absences: See [university policy](#) for a complete list of University excused absences.

University of Illinois-approved activities or professional development: This is what the “free” professional development days can be used for. Student rallies, protests, strikes, “Unofficial,” etc. are not acceptable excuses. Attending sporting events is also not an acceptable excuse. Instructors are under no obligation to excuse students from class or offer assignment deadline extensions for these types of activities, even if you have a letter. Each situation will be evaluated on a case-by-case basis.

Religious Observances: Illinois law requires the University to reasonably accommodate its students' religious beliefs, observances, and practices in regard to admissions, class attendance, and the scheduling of examinations and work requirements. Students should complete the Request for Accommodation for Religious Observances form should any instructors require an absence letter in order to manage the absence. In order to best facilitate planning and communication between students and faculty, students should make requests for absence letters as early as possible in the semester in which the request applies.

Illness or other medical emergency: You will need to provide a written medical doctor's (M.D.) note with dates excused within 1 week of due date or class missed. The Emergency Dean can be contacted: <http://www.odos.uiuc.edu/emergency/>. If your illness is going to affect you long-term or repeatedly, you should contact Disabilities Resources & Educational Services (<http://www.disability.uiuc.edu>) to get a Request for Accommodations.

Funeral or family-member illness: The incident must be filed with the University Emergency Dean: <http://www.odos.uiuc.edu/emergency> to obtain an Absence Letter. This must be provided to the instructor within one week of missing class or missing an assignment deadline.

Technology-related excuses: You are responsible for ensuring that your computer is in working order. In the event something does happen, please call or email your instructor immediately. Again, starting early on an assignment will usually help you avoid these types of issues.

Any other extenuating circumstances: There are countless other reasons that may cause you to miss class and in the majority of cases you will know in advance of an assignment due date or exam. As soon as you know, it is your responsibility to inform me. In these cases, you might have to turn in the assignment early, but other grade penalties for absences will still apply. In the other minority of cases, the excuse may or may not be accepted as determined by the instructor.

Zoom Recordings and Copyright Policies

Zoom sessions for this course may be recorded by designated instructors only. Zoom recordings are compliant with federal FERPA regulations. Any Zoom recordings of class sessions will be added to a secure site (Moodle, Canvas or other campus learning management system) or approved campus video platform (Illinois Media Space) and can only be accessed by persons enrolled in this course who have a University of Illinois netID and password. Please review the university FERPA compliance and Zoom and FERPA compliance information for additional details. If you have specific concerns about Zoom recordings for this class and your privacy rights as a student, contact the course instructor.

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permission from the copyright holder. Students are not allowed to upload, post or transmit materials used in this course to course-sharing or other websites.

Mental Health

Significant stress, mood changes, excessive worry, substance/alcohol misuse or interferences in eating or sleep can have an impact on academic performance, social development, and emotional well-being. The University of Illinois offers various confidential services including individual and group counseling, crisis intervention, psychiatric services, and specialized screenings covered through the Student Health Fee. If you or someone you know experiences any of the above mental health concerns, it is strongly encouraged to contact or visit any of the University's resources provided below. Getting help is a smart and courageous thing to do for yourself and for those who care about you.

Counseling Center (217) 333-3704

McKinley Health Center (217) 333-2700

National Suicide Prevention Lifeline (800) 273-8255

Rosecrance Crisis Line (217) 359-4141 (available 24/7, 365 days a year)

If you are in immediate danger, call 911.

*This statement is approved by the University of Illinois Counseling Center

Community of Care

As members of the Illinois community, we each have a responsibility to express care and concern for one another. If you come across a classmate whose behavior concerns you, whether, in regard to their well-being or yours, we encourage you to refer this behavior to the Student Assistance Center (217-333-0050 or <http://odos.illinois.edu/community-of-care/referral/>). Based on your report, the staff in the Student Assistance Center reaches out to students to ensure they have the support they need to be healthy and safe.

Further, as a Community of Care, we want to support your overall wellness. We know that students sometimes face challenges that can impact academic performance (examples include mental health concerns, food insecurity, homelessness, & personal emergencies). Should you find that you are managing such a challenge and that it is interfering with your coursework, you are encouraged to contact the Student Assistance Center (SAC) in the Office of the Dean of Students for support and referrals to campus and/or community resources.