

Course Syllabus
PCB 4462/5469
GIS for Biologists and Ecologists

INSTRUCTOR INFORMATION

Instructor: **Dr. Kristy A. Lewis (she/her)**

Office Location: BIO305 (This is the same classroom where the class is taking place)

Office Hours:

- **Monday, 3:30PM - 4:30PM (Aug. 29 - Nov. 28)**
- **Wednesday, 3:30PM - 4:30PM (Aug. 31 - Nov. 30)**

Both days you will find Dr. Lewis in BIO305. Please note I am holding office hours in BIO305 to give you more time to work on tutorials and practice exercises while I am in the room.

**Dr. Lewis is can also arrange ad hoc zoom appointments if students need 1:1 time to discuss course related topics. Please speak to Dr. Lewis during class to plan this type of meeting or send a message in Webcourses to Dr. Lewis.*

COURSE INFORMATION

Term: Fall 2022

Credit Hours: 3

Class Meeting Day/Time: MW 4:30PM - 5:45PM

Class Location: BIO305

Course Modality: P-Face to Face

COURSE COMMUNICATION

All course communication will be carried out in class, in announcements on Webcourses, and through the Communications Inbox in Webcourses. If you need to speak with me or set up a zoom 1:1 office hour meeting, please send a message through Webcourses. I ask that you refrain from sending emails to my [.ucf.edu](mailto:ucf.edu) account, as it is likely that those emails will be lost in the mix. Thank you for understanding!

COURSE DESCRIPTION

Geographic Information Science (GIS) has emerged as a powerful data visualization and analysis discipline. This course investigates how GIS is currently being used to better understand and address environmental problems and to help manage and conserve natural resources. We will discuss the basic and current applications of GIS in an environmental, biological and ecological context. We will use real biological and ecological GIS data sets to learn the basic, intermediate and some advanced applications of GIS. Specific topics include but are not limited to: climate change, biodiversity, habitat management, and water resource use. Through this course, students will also strengthen their ecology “tool box:” collaboration,

teamwork, presentation skills, discussion skills, and their ability to interpret scientific literature and think critically.

COURSE MATERIALS AND RESOURCES

Students are required to **purchase or rent** the book below for the duration of the course. I understand this is an expense and can be burdensome, so if you lack the resources to purchase the textbook, please send me a message directly so that we can work on a solution together.

TEXTBOOK: Price, M.H. Mastering ArcGIS Pro, Second Edition. 2023. ISBN: 978-1-264-09120-1

[Find it at the UCF Bookstore.](#)

ArcGIS Pro: Version 2.8.1 software (evaluation copy from ESRI) will be provided at the class. You will be able to install this software on your computer or access ArcGIS through UCF Apps via the Azure cloud computing platform.

STUDENT LEARNING OUTCOMES

1. Describe uses of GIS in ecology and biology
2. Identify GIS concepts and how these are used to gather, manage, quality check, process, analyze, model, and interpret environmental spatial data
3. Identify environmental spatial data needed for particular tasks used in their careers
4. Develop, analyze, and produce products that examine a real-world environmental issue of interest for a final project (Grad students only)
5. Demonstrate an understanding of Geographic Information Systems.
6. Demonstrate ability to 'think spatially'.
7. Demonstrate a solid understanding of the technical, scientific, and organizational aspects of a GIS project management.
8. Identify the major components of ArcGIS Pro and what they are used for.
9. Demonstrate an understanding of standard spatial data formats used in GIS.
10. Demonstrate an understanding of common GIS data structures such as vector and raster.
11. Understand the importance of coordinate systems in GIS.
12. Demonstrate an ability to work with tables within a GIS.
13. Perform attribute and spatial queries.
14. Demonstrate an understanding of how spatial data sets can be combined and compared to help solve, visualize and analyze biological and ecological data.
15. Demonstrate an understanding of common data entry methods like geocoding, digitizing and editing data.
16. Learn how to use social media as a professional resource.
17. Learn how to effectively work in teams to reach a common goal.

TIPS FOR SUCCESS

The following tips will help us all be successful in this course. Please carefully review carefully!

1. **Leverage the Power of Together!** There will be a lot of class time and office hour time to work on your assignments. I encourage you to take advantage of the privilege we have to meet in person. Working together in class gives you the opportunity to ask your classmates and me for help and I highly encourage you to use class time to interact and learn together.
2. **Calendar Block to Keep Current!** Each week, you will have readings, videos, and assignments to consume before you come to class. That is, this course uses a student-centered approach where the "normal lecture material" will be **consumed by the student outside of class.** Educational scholarship and research show that learning works best when you practice new skills before, during, and after class. Therefore, to support this effort, I encourage you to use an approach called "**Calendar Blocking.**" This task is a simple planning tool, where each week, you block a certain period of time, (~1-2 hour blocks) to work on particular assignments and exercises. For instance, if you calendar block for this class every Sunday, Tuesday and Thursday from 11AM - 1PM, those will be your pre-determined times to work on this material. This approach helps get you into a routine and you are less likely to get behind on the material. Use your calendar to your advantage.
3. **Feedback Statement.** I welcome your feedback so that I can make this experience better for you and all students. This [LINK](#) will take you to an anonymous survey, available all semester, that will allow you to give me feedback at any point this semester. I also welcome positive feedback if you feel something is working well in the class and you want to let me know!
4. **Keep a GIS Journal!** I highly encourage you to buy a bound notebook, similar to a journal, solely for use in this class. I will often have you reflect on questions, and ask you to jot them down in your GIS journal for later discussion. In addition, using a journal is a great way to record your own personal tips and reminders for how to navigate the software. You will always have this resource if you intend to use GIS in the future! Check out [AMAZON](#) for affordable options!

MISSING ASSIGNMENTS AND LATE WORK POLICY (Late Work Make Up Day)

If you miss a deadline or due date for an assignment, tutorial or exercise, you will have the opportunity to complete that assignment and turn it in over a **24 hour period on November 21, 2022**. In other words, you can turn in that assignment any time on Nov. 21. There will be no penalty or points deducted for those assignments. This policy can only be used for **ONE assignment** per student. **Therefore, I will not be accepting late assignments.** Team Based Learning rules regarding absences will be addressed in the Team Based Learning materials provided to you separately.

If you represent the university in an authorized event or activity (for example, **student-athletes**) and are unable to meet a course deadline due to a conflict with that event, please provide the instructor with documentation **in advance** to arrange a make-up. No penalty will be applied. For more information, see the UCF policy at <https://policies.ucf.edu/documents/4-401.pdf>. If this participation conflicts with your course assignments, I will offer a reasonable opportunity for you to complete missed assignments and/or exams. **Otherwise, the make-up policy will revert to the Late Work Make Up Day on Nov. 21.**

Students must notify their instructor **in advance** if they intend to miss class for a **religious observance**. For more information, see the UCF policy at <http://regulations.ucf.edu/chapter5/documents/5.020ReligiousObservancesFINALJan19.pdf>

DISCUSSION AND PARTICIPATION

Students are expected to be active participants in the learning process. Each student is expected to read the assigned text and other assigned materials and be prepared for Team Based Learning activities during class meetings. Class exercises assigned need to be accomplished and turned in on time.

The software employed for the course exercises will be ESRI® **ArcGIS Pro: Version 2.8.1** software. The Desktop software can also be accessed via apps.ucf.edu and will also be available for installation on your laptop or home computer should that be desired. You should plan on spending a substantial amount of time each week (~4-6 hours) working on the Teaching Tutorials and Practice Exercises and completing your before class readings and videos. ***The only real way to learn GIS is by practicing, making mistakes, and learning how to work through challenges. This class is a safe space to make mistakes in the process of learning.***

Teamwork Makes the Dream Work. Have you ever heard the saying, "It takes a village"? This saying holds true when attempting to not only learn the new software associated with GIS but also in becoming a geospatial thinker. This course will require you to work together to solve problems and to complete the Team Based Learning aspects of the course.

REDUNDANCY (Backing up your data)

Back up your files using [One Drive](#) in Office365, Google Drive or Dropbox. If you have a thumbdrive, please bring it to class and use it as another form of back-up to your exercises and assignments. Technical issues can and will happen. **If you store all your documents on a cloud-based server, you will always have your documents and they will always be backed up and safe.** (I suggest backing up your data to both your thumbdrive and the cloud before leaving class each day.)

A CULTURE OF MUTUAL RESPECT AND INCLUSION

It is my intent that students from **all diverse backgrounds** and **perspectives** be well-served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength, and benefit. It is my intent to present materials and activities that are respectful of diversity: gender, sexual orientation, disability, age, socioeconomic status, ethnicity, race culture, perspective, and other background characteristics. Your suggestions about how to improve the value of diversity in this course are encouraged and appreciated (Use this [LINK](#)). Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. In addition, in scheduling major assignments, I have attempted to avoid conflicts with major religious holidays. If, however, I have inadvertently schedule a major deadline that creates a conflict with your religious observances, please let me know as soon as possible so that we can make other arrangements.

With your help, I aim to create a safe classroom space for all who inhabit it, where we are free to make mistakes in the pursuit of knowledge, and where we can trust each other to be a part of a supportive community. Please do your part!

The University of Central Florida considers the diversity of its students, faculty, and staff to be a strength and critical to its educational mission. ***No lesson in this course is intended to espouse, promote, advance, inoculate, or compel a particular feeling, perception, viewpoint, or belief.***

Title IX prohibits sex discrimination, including sexual misconduct, sexual violence, sexual harassment, and retaliation. If you or someone you know has been harassed or assaulted, you can find resources available to support the victim, including confidential resources and information concerning reporting options at www.shield.ucf.edu and <http://cares.sdes.ucf.edu/>. If you read this far down in the syllabus, email Dr. Lewis at the appropriate email address provided above to receive 5 bonus points on your first assignment.

For more information on diversity and inclusion, Title IX, accessibility, or UCF's complaint processes contact:

- Title IX – OIE – <http://oie.ucf.edu/> & askanadvocate@ucf.edu
- Disability Accommodation – Student Accessibility Services – <http://sas.sdes.ucf.edu/> & sas@ucf.edu
- Diversity and Inclusion Training and Events – www.diversity.ucf.edu
- Student Bias Grievances – Just Knights response team – <http://jkrt.sdes.ucf.edu/>
- UCF Compliance and Ethics Office – <http://compliance.ucf.edu/> & complianceandethics@ucf.edu
- Ombuds Office – <http://www.ombuds.ucf.edu>

COURSE ACTIVITIES

GIS Tweets

As a class, we will collectively host an @UCFBioGIS Twitter account. This account will facilitate discussions about how GIS is used in Biology and Ecology at the beginning of some class periods. **Graduate students (only)** will be required to Tweet two times throughout the semester and present their Tweet in a **5-min lightning presentation**. Details will be provided separately. Undergraduate students are encouraged to follow along on our class Twitter, re-tweet and learn collectively with the graduate students how to use a professional facing Twitter account.

Modules, Teaching Tutorials, Practice Exercises

During this semester we will have various modules, teaching tutorials, practice exercises and TBL quizzes. These tasks are designed to understand the capabilities and techniques used in biological and ecological applications of GIS.

Team Based Learning

Team Based Learning (TBL) is an evidence-based instructional strategy that is based on procedures for developing high performance learning teams that has been shown to dramatically enhance the quality of student learning.

Four principles underlying Team-Based Learning

Team-Based Learning implementation is based on four underlying principles (Michaelson & Richards 2005):

1. Groups should be properly formed (e.g. Intellectual talent should be equally distributed among the groups). These teams are fixed for the whole course.
2. Students are accountable for their pre-learning and for working in teams.
3. Team assignments must promote both learning and team development.
4. Students must receive frequent and immediate feedback.

We will only be implementing part of the TBL experience, which includes team formation and working in teams, consuming course materials prior to class, taking both the individual and team Readiness Assurance Tests, appeals process and instructor feedback.

Preparation before class and In-class Readiness Assurance Testing

Students must complete preparatory materials before a class. Materials may be reading, video, or other text. **There will be an individual quiz (iRAT) almost every Monday**, followed by taking the same quiz collectively as a team (tRAT).

Readiness Assurance Test (RAT): Students complete an individual readiness assurance test (IRAT), consisting of 10 multiple choice questions. After submitting their individual answers, and they take the same test, the team RAT (TRAT), with their team. As a team they use scratch cards (**IF-AT cards**), hoping to find a star that indicates a correct answer. All members of each team share the same TRAT score, and both IRAT and TRAT scores count toward the students' grades.

Appeals: Teams have the opportunity to do a written appeal of a IRAT/TRAT question they felt was poorly written, the answer was mistakenly coded, or their answer choice is better.

Instructor Feedback: The instructor will review the responses from the RATs to identify topics that are shown to be problematic, confusing, or need further explanation. Then, we will discuss these topics as a class to ensure everyone has a solid grasp on the topics.

Final GIS Project

Written Final Project DUE: December 9, 2022 11:59PM

You will develop a novel biological or ecological research question that will be answered, at least in part, but using a GIS.

Components of the Final Project.

(G = task is for Grad Students Only)

1. A project abstract . (We will discuss in class what constitutes a great abstract) **(G)**
2. A question, hypothesis, objective or problem statement
3. A description of data used, including the source of data, provided in paragraph or bulleted form
4. A step-by-step description of the methodology employed and list number and type of GIS tools you used

(Undergrads must use a minimum of 5 tools or functions and grad students must use a minimum of 8 tools or functions)

5. The results in a graphic/map and/or table form. Each figure and table must have a proper figure or table caption.

(We will discuss in class how to properly caption figures and tables)

6. Your evaluation of the analysis, including how it could be improved (For instance, what problems did you encounter during your analysis, what other new tools did you use that were not explicitly covered in the course, do you think your approach to the analysis was the best way to answer your research question, do the results make sense given your knowledge of the ecosystem, organism, or overall ecology of the system?
7. A final oral presentation to the class **(G)**
8. References

Assignment Submissions

For each module, tutorial, or practice exercise, I will provide specific details in the assignment itself on how to submit it for grading.

Attendance/Participation

In this course, you will mostly consume the lecture-type content outside of class. During actual class times, we will learn by doing and by participating in Team Based Learning activities and quizzes. Your attendance to in person class is required. If you plan to miss class, please provide Dr. Lewis with at least a week notice to ensure the student remains up to date on course activities. See the above section on make-up work for a full understanding how missing class will impact your success in this course.

ASSESSMENT AND GRADING PROCEDURES

*NOTE-This course is split level-which means that both upper level undergraduates and graduate students take this course at the same time. Therefore, I distinguish between the levels by requiring expanded activities and exercises for the graduate students. Below you will find the list of assignments required for both academic levels.

**The class will vote on the weight given to the iRAT and the tRAT and the grading table will be updated at that time. The current percentages are only estimates at this point.*

Assignments	Points
Tweets (grad only)	6%
iRAT	7.8%
tRAT	18.2%
MIDTERM	5%
LinkedIn Learning Intro Assignment, Teaching Tutorials, Practice Exercises	37%
Final Project	13%
Final Exam	13%
TOTAL PERCENT	100%

ZOOM

There may be times during the semester where remote instruction will be needed due to the COVID-19 pandemic or instructor travel. In that case, this course will use Zoom for some synchronous (“real time”) or asynchronous (recorded) class meetings. Students will be notified if zoom will be used for instruction.

Please take the time to familiarize yourself with Zoom by visiting the [UCF Zoom Guides](#). Zoom also works on your mobile device (phone or tablet) as well as your PC or Mac.

Things to Know About Zoom:

- You must sign in to my Zoom session using your **UCF NID and password.**
- The Zoom sessions are recorded.
- Improper classroom behavior is not tolerated within Zoom sessions and may result in a referral to the Office of Student Conduct.

- You can contact [Webcourses@UCF Support](mailto:Webcourses@UCF.Support) if you have any technical issues accessing Zoom.

TECHNICAL RESOURCES

- [Webcourses@UCF Support](mailto:Webcourses@UCF.Support) provides technical support for students taking courses at UCF.
- [Knights Online](#): Resources specific for online activity including Webcourses@UCF tutorials.

COVID-19

I recognize and understand the difficult times we are STILL in. The COVID-19 pandemic impacts us all in many ways, including physically, mentally, emotionally, financially, academically, and professionally. I will work with you on challenges you may be encountering and to provide support to help you succeed. However, please keep in mind that I will hold you accountable, especially in terms of class attendance, participation, and contributions.

COVID-19: Statement Regarding Masking Guidelines in the Classroom

For masking guidelines in the classroom, I will be following CDC recommendations found [HERE](#). Each week I will be checking the website and providing my masking expectations via Announcements in Webcourses. I ask each of you to take our public health considerations seriously, especially since we will be in a small classroom.

COVID-19: If you test positive.

Students should not come to campus if they are ill, are experiencing any symptoms of COVID-19 or have tested positive for COVID-19.

Students should contact their instructor(s) **as soon as possible** if they miss class for any illness to discuss reasonable adjustments that might need to be made. When possible, students should contact their instructor(s) **before missing class**.

Please review this website for more details: <https://www.ucf.edu/coronavirus/>

Academic Integrity

Students should familiarize themselves with UCF's Rules of Conduct at <https://scai.sdes.ucf.edu/student-rules-of-conduct/>. According to Section 1, "Academic Misconduct," students are prohibited from engaging in:

1. Unauthorized assistance: Using or attempting to use unauthorized materials, information or study aids in any academic exercise unless specifically authorized by the instructor of record. The unauthorized possession of examination or course-related material also constitutes cheating.
2. Communication to another through written, visual, electronic, or oral means: The presentation of material which has not been studied or learned, but rather was obtained through someone else's efforts and used as part of an examination, course assignment, or project.

3. Commercial Use of Academic Material: Selling of course material to another person, student, and/or uploading course material to a third-party vendor without authorization or without the express written permission of the university and the instructor. Course materials include but are not limited to class notes, Instructor's PowerPoints, course syllabi, tests, quizzes, labs, instruction sheets, homework, study guides, handouts, etc.
4. Falsifying or misrepresenting the student's own academic work.
5. Plagiarism: Using or appropriating another's work without any indication of the source, thereby attempting to convey the impression that such work is the student's own.
6. Multiple Submissions: Submitting the same academic work for credit more than once without the express written permission of the instructor.
7. Helping another violate academic behavior standards.
8. Soliciting assistance with academic coursework and/or degree requirements.

Responses to Academic Dishonesty, Plagiarism, or Cheating

Students should also familiarize themselves with the procedures for academic misconduct in UCF's student handbook, *The Golden Rule* <<https://goldenrule.sdes.ucf.edu/>>. UCF faculty members have a responsibility for students' education and the value of a UCF degree, and so seek to prevent unethical behavior and respond to academic misconduct when necessary. Penalties for violating rules, policies, and instructions within this course can range from a zero on the exercise to an "F" letter grade in the course. In addition, an Academic Misconduct report could be filed with the Office of Student Conduct, which could lead to disciplinary warning, disciplinary probation, or deferred suspension or separation from the University through suspension, dismissal, or expulsion with the addition of a "Z" designation on one's transcript.

Being found in violation of academic conduct standards could result in a student having to disclose such behavior on a graduate school application, being removed from a leadership position within a student organization, the recipient of scholarships, participation in University activities such as study abroad, internships, etc.

Let's avoid all of this by demonstrating values of honesty, trust, and integrity. No grade is worth compromising your integrity and moving your moral compass. Stay true to doing the right thing: take the zero, not a shortcut.

Course Accessibility Statement

The University of Central Florida is committed to providing access and inclusion for all persons with disabilities. Students with disabilities who need access to course content due to course design limitations should contact the professor as soon as possible. Students should also connect with Student Accessibility Services (SAS) <<http://sas.sdes.ucf.edu/>> (Ferrell Commons 185, sas@ucf.edu, phone 407-823-2371). For students connected with SAS, a Course Accessibility Letter may be created and sent to professors, which informs faculty of potential course access and accommodations that might be necessary and reasonable. Determining reasonable access and accommodations requires consideration of the course design, course learning objectives and the individual academic and course barriers experienced by the student. Further conversation with SAS, faculty and the student may be warranted to ensure an accessible course experience.

Campus Safety Statement

Emergencies on campus are rare, but if one should arise during class, everyone needs to work together. Students should be aware of their surroundings and familiar with some basic safety and security concepts.

- In case of an emergency, dial 911 for assistance.
- Every UCF classroom contains an emergency procedure guide posted on a wall near the door. Students should make a note of the guide's physical location and review the online version at <http://emergency.ucf.edu/emergency_guide.html>.
- Students should know the evacuation routes from each of their classrooms and have a plan for finding safety in case of an emergency.
- If there is a medical emergency during class, students may need to access a first-aid kit or AED (Automated External Defibrillator). To learn where those are located, see <<https://ehs.ucf.edu/automated-external-defibrillator-aed-locations>>.
- To stay informed about emergency situations, students can sign up to receive UCF text alerts by going to <<https://my.ucf.edu>> and logging in. Click on "Student Self Service" located on the left side of the screen in the toolbar, scroll down to the blue "Personal Information" heading on the Student Center screen, click on "UCF Alert", fill out the information, including e-mail address, cell phone number, and cell phone provider, click "Apply" to save the changes, and then click "OK."
- Students with special needs related to emergency situations should speak with their instructors outside of class.
- To learn about how to manage an active-shooter situation on campus or elsewhere, consider viewing this video (<<https://youtu.be/NIKYajEx4pk>>).

Deployed Active-Duty Military Students

Students who are deployed active duty military and/or National Guard personnel and require accommodation should contact their instructors as soon as possible after the semester begins and/or after they receive notification of deployment to make related arrangements.

Copyright

This course may contain copyright protected materials such as audio or video clips, images, text materials, etc. These items are being used with regard to the Fair Use doctrine in order to enhance the learning environment. Please do not copy, duplicate, download or distribute these items. The use of these materials is strictly reserved for this online classroom environment and your use only. All copyright materials are credited to the copyright holder.

Third-Party Software and FERPA

During this course you might have the opportunity to use public online services and/or software applications sometimes called third-party software such as a blog or wiki. While some of these could be required assignments, you need not make any personally identifying information on a public site. Do not post or provide any private information about yourself or your classmates. Where appropriate you may use a pseudonym or nickname. Some written assignments posted publicly may require personal reflection/comments, but the assignments will not require you to disclose any personally identity-sensitive information. If you have any concerns about this, please contact your instructor.