Department of GIS
College of Arts and Sciences
UNIVERSITY OF Redlands

GIS 667 Online – Programming for GIS
Spring 2025

Instructor: Rob Burke, Masters of Applied Geography, Esri 1991, UofR2000
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Class Meetings: 6:00pm – 8:00pm (Pacific Time), Thursday's starting Jan 9
Online at Zoom: (I will share a URL used to connect to Zoom to your email address)
Office Hours: Tuesdays and Wednesdays – 7:00pm to 8:00pm or by appointment.

Course Description
This course introduces the fundamental concepts and skills of programming necessary for GIS. Students will learn core programming concepts including data structures, conditionals, loops, variables, and functions. It covers how to write statements in scripts, organize code, handle user interaction, and incorporate decision-making logic in programming. It provides hands-on coding exercises of using common data structures, writing custom functions, and working files. It also introduces the Esri ArcPy Python site package to work with GIS data using Esri's Spatial Analysis tools.

Course Objectives
The goal of this course is to prepare students with skills to develop and customize GIS operations. At the end of the course, the students are expected to:

1. Understand the concept of GIS programming.
2. Design, code, and debug Python programs.
3. Implement fundamental GIS algorithms using Python programs.
4. Understand the structure of the ArcPy package and use it to customize GIS operations.

Textbooks
• Downey, Allen. ***Think Python***, *How to Think Like a Computer Scientist* (3rd edition), O'Reilly, Free: https://allendowney.github.io/ThinkPython/index.html

• Zandbergen, Paul A. ***Python Scripting for ArcGIS Pro*** (3rd edition), Esri Press
https://www.esri.com/en-us/esri-press/browse/python-scripting-for-arcgis-pro

Prerequisites
This course assumes that the student has a basic level of competency in mathematics.

Statement about Intellectual Property, Video or Audio Recording, or Screenshots

It is possible that we have to move to an online teaching environment due to unforeseeable circumstances. The content of the course is the intellectual property of the faculty member and should not be disseminated or reproduced without explicit consent. To protect the privacy of all class members, no video or audio recordings of any part of video- or audio-conferences should be made without the explicit prior consent of all students and the instructor. To protect the privacy of all class members, no screenshots or still images of videoconferences should be taken without the explicit prior consent of all students.

Assignments

Each student will complete a series of assignments that complement the lecture presentations. The focus of the assignments will be to reinforce the theoretical concepts introduced through lectures and discussions.

Point deduction will be assessed on late assignments at the rate of 10% of the maximum points of the assignment per day. Due date extension is possible if there is an unforeseeable condition keeping you from finishing the assignment on time. However, extension can only be made to the immediate upcoming assignment due. Extension will not be granted to past assignments.

Assessment

Students will be evaluated based on homework assignments, in-class discussion participation, mid-term exam, and the final project. The exam will be closed book and subjects covered in both lectures and labs will be tested on.

Grade = Homework (60%) + Mid-term Exam (10%) + Final Project (20%) + Participation (10%)

Missed class policy

There is a proportional deduction from the participation score per missed class. To avoid the deduction let the instructor know that you are going to miss a class and submit a plan to complete a makeup assignment and the work to be done in that class meeting.

Academic Honesty

The University policy on academic honesty (University of Redlands Catalog) will be strictly enforced. You should read this. If you have any questions about what constitutes academic dishonesty on a particular assignment, ask the professor.

Grading scale

0-60	60-63	63-67	67-70	70-73	73-77	77-80	80-83	83-87	87-90	90-95	95-100
F	D-	D	D+	C-	C	C+	B-	B	B+	A-	A
0	0.7	1.0	1.3	1.7	2.0	2.3	2.7	3.0	3.3	3.7	4.0

Tentative Class Schedule (Spring 2025)

Week	Subject	Reading	Homework Assignment
Jan. 9	Class overview and Python programming, objects	Downey 1, 2	HW #1
Jan. 16	Python Syntax, Data Types, Variables, Expressions, Iterations, and Conditionals	Downey 5, 7, 9 Zandbergen 1	HW #2
Jan. 23	Working with Strings and Other Sequences with Indexing	Downey 8, 10, 11, 12	HW #3
Jan. 30	Functions and Modules	Downey 3, 6	HW #4
Feb. 6	Working with Files and Web REST Services	Downey 12	HW #5
Feb. 13	Classes and Objects: Definition and Implementation Mutable Objects	Downey 14, 15	HW #6
Feb. 20	Classes and Objects: Inheritance and composition, exam terms and study guide	Downey 16, 17 Handouts	Study for exam
Feb. 27	**Mid-term Exam**		
Mar. 3-8	Spring Break		
Mar. 13	ArcGIS Geo-processing Framework	Zandbergen 2, 5, 6, 7	HW #7
Mar. 20	ArcGIS Geometry and Attribute API for Advanced Analysis	Zandbergen 8, 9	HW #8 Share ideas for final project
Mar. 27	Working with Image Data	Zandbergen Handouts	HW #9 Firm up final project
Apr. 3	Other Useful Modules || Final Project Proposal Due	Downey 19 Handouts	HW #10
Apr. 10	Working on final Project: Creating a script tool		
Apr. 17	**Final Project Due**		

Statements

Accommodations

If you are a student with a disability requesting reasonable academic accommodation in this course, please contact Academic Support and Accessibility (ASA). ASA is in the Student Success Center on the ground floor of the Armacost Library. You can reach the office at 909-748-8069 or asa@redlands.edu. All requests for reasonable accommodation require registration with ASA in advance of need. Faculty, students, and ASA will work together regarding classroom accommodations. You are encouraged to discuss approved accommodations with your faculty. More information is available on the ASA webpage.

Office of Equity and Title IX

In order to provide a safe and equitable learning environment for all students, faculty, and staff, discrimination, harassment, retaliation, sexual misconduct, and sexual harassment (including sexual assault, dating or domestic violence, and stalking) are not tolerated at the University of Redlands. The University prohibits unlawful discrimination or harassment (as defined in the Policy Prohibiting Discrimination, Harassment, Sexual Misconduct, and Retaliation) on the basis of age, color, race, ethnicity, national origin, ancestry, sex, marital status, pregnancy, status as a complaining party of domestic violence, sexual orientation, gender, gender identity or expression, physical or mental disability, genetic information, religion/creed, citizenship status (except to comply with legal requirements for employment), military/veteran status, or any other characteristic protected by law. If you or someone you know has experienced or experiences any of these behaviors, know that you are not alone. You can contact the Office of Equity and Title IX for reporting options, supportive measures, and resources to support you.

Many faculty and staff at the University of Redlands are considered "Responsible Employees," which means that if you tell me about a situation involving any of the above, I must report the matter to the Office of Equity and Title IX. Although I make that report, you are in control of how you would like to proceed, including whether or not you wish to pursue a formal complaint. Our goal is to make sure you are aware of the range of reporting options available to you and have access to the support and resources you need.

To report an incident directly, you can:
• Contact the Interim Director of Equity & Title IX, Christopher Jones, at 909-748-8289 or titleix@redlands.edu
• Report online at: www.redlands.edu/titleixandequity

You can also report to local law enforcement at 909-798-7681, ext. 1. If you are ever in immediate danger, please call 911 or email/text 911@redlandspolice.org if you cannot call. To reach Public Safety on campus, call 909-748-8888 or use the Rave Guardian app. If you wish to speak to someone confidentially (meaning not connecting with the Office of Equity and Title IX Office), you can contact the following resources:

Campus: Counseling Center: 909-748-8108 or 24-Hour Crisis Line: 909-748-8960
               TimelyCare, 24/7 emotional support; 12 free telehealth counseling sessions
Community: Partners Against Violence, 24-hour sexual assault crisis line: 909-885-8884
               Option House, 24-hour dating/domestic violence crisis line: 909-381-3471
Online: https://www.rainn.org/ (sexual assault); https://www.loveisrespect.org/

For more information, visit www.redlands.edu/titleixandequity

Counseling Center

The Counseling Center provides free and confidential mental health services, including short-term individual therapy, group therapy, single-session therapy, consultations, and urgent appointments to all students with in-person or virtual options. Our Counseling Center is committed to inclusivity and to providing a supportive space for everyone. Please call 909-748-8108 to schedule an appointment or email counseling_center@redlands.edu. If a student is in crisis, please call 909-748-8960 for the 24/7 mental health crisis line. For more information on our resources, go here. Another option for individual therapy for all students is TimelyCare, which provides virtual therapy immediately (Talk Now) or up to 12 scheduled virtual therapy sessions per year. Students can choose their therapist from a list of providers for the scheduled therapy option.

CARE Team

The University CARE Team exists to help provide support and resources to students that are overwhelmed, experiencing significant distress, or possibly present some risk to themselves or others. As a faculty member, I may reach out to students about whom I am concerned to talk individually, and/or refer them to the CARE Team. If you have concerns about a fellow student, consider sharing your concern with the CARE Team via their online form. This is part of who we are as a caring, proactive community where we all look out for one another. Additionally, if you feel that you or someone else needs immediate mental health support, the University has a 24/7 mental health crisis line at 909-748-8960, and the Timely Care app, which offers on-demand emotional care. Both services connect to a live, licensed counselor.

Emergency Student Loans:

Student Financial Services (SFS) administers a short-term, no-interest loan fund to assist students experiencing an emergency or cash-flow problem. Except in unusual circumstances, these loans do not exceed $200 and are billed to the student's account. Evidence of repayment ability is a prerequisite for all short-term loans made to students. Students are eligible for one emergency student loan per term.
Contact: SFS@redlands.edu or x8047