Geography 5223: Design and Implementation of GIS

Spring 2022

Location: 0135 Derby Hall
Date and time: Monday and Wednesday, 12:45 to 2:05 PM
Course URL: http://carmen.osu.edu

Instructors
Prof. Ningchuan Xiao | xiao.37@osu.edu
Ms. Polina Berezina | berezina.2@buckeyemail.osu.edu

Office hours

Day	Room	Time and link	Instructor
Thursday	1083 Derby Hall	10-12	Ms. Berezina
Friday	1132 Derby Hall	10:30-12	Dr. Xiao

This course covers a wide range of topics in developing GIS software tools. There are two main themes of this course. First, we introduce techniques that will help students build custom tools to automate spatial data handling processes, including topics of programming skills, software testing, and verification. The second theme of this course is about project management for GIS software development. More specifically, we discuss how agile methods can be applied for software development projects. The course is organized around a set of coding tutorials, lectures, and discussions. It is mostly a project-oriented course, where each major coding topic will end with finishing a project using the concepts covered, and there is also a final project. Upon completion of this course students will be able to

- understand the tasks of GIS customization,
- write code to implement GIS tools in open-source and commercial GIS,
- understand the fundamentals of agile project management
- put together and manage a project to automate GIS tasks, and
- identify and act upon ethic issues in GIS software design and applications.

How this course works

This course is divided into weekly modules and each module is released at the beginning of the week. A module is organized around a specific topic and may consist of coding tutorials, readings, and other activities. The final project is a long-term process that starts in week 3 and continues through a set of major steps during the semester.

Texts

The following textbook is required for this course:

- *Agile Project Management For Dummies*, (3rd Ed.) by Mark C. Layton and Steven J. Ostermiller, John Wiley & Sons, Inc., 2020.

The following two textbooks are optional:

- *Python Scripting for ArcGIS Pro*, by Paul A. Zandbergen, ESRI Press, 2020.
- *Advanced Python Scripting for ArcGIS Pro*, by Paul A. Zandbergen, ESRI Press, 2020

In addition to the textbooks, we will provide tutorials to cover topics of tool development in QGIS and ArcGIS Pro.

Prerequisites

Geography 5222 or consent of instructor.

Credit Hours

This class is for 3 credits.

Schedule

The detailed course schedule is presented on the front page of the Carmen site. In general, the course is roughly divided into the following topics:

Week 1: Introduction
Weeks 3-6: Python scripting for ArcGIS Pro
Weeks 7-9: Agile project management
Weeks 11-14: QGIS tool development
Week 15: Final projects

Grading

Assignment category	Weights
Module exercises	20
Module completion	5
Class projects	20
Final projects	25
Quizzes	20
Participation	10
Total	100

It is important to note that the final grade will be calculated using the above weights. The grade automatically calculated on Carmen may not be correct. When there is a difference, please calculate your final grade using the weights listed here.

Course organization and assignment information

- **Module exercises.** Each module includes some questions that reflect what is covered in that module. These exercises are typically due in a week.
- **Module completion.** Each module also includes a check-your-knowledge/skills quiz. These quizzes can be taken multiple times and will be graded automatically.
- **Class projects.** At the end of the topics of ArcGIS Pro and QGIS, there is also a project that will be assigned to every student in this class. All the tutorials will be working toward the same project idea, which is based on computing the market share of public libraries in Franklin County. Manual calculation of the market share will introduced at the beginning of the semester.
- **Final projects.** Students will be divided into several teams, each working on a GIS development project. A typical team has no more than 4 students. Conducting the final project is a semester long process, where formal deliverables such as a video presentation and/or document are required at each of the steps. Some of these videos and documents will also be peer reviewed. At the end of the semester each project should be concluded by (a) delivering the final product including a full set of documents, software, and necessary data, and (b) making professional

presentations about the project to the class. Teams that do not deliver the complete package on time will not receive any credit for the project.

- **Participation.** Each student will peer review different presentation videos and other final project through the semester. Participation in these peer reviews are counted toward the participation. There may also be a number unannounced pop quizzes that will be counted as participation. There may be opportunities for students to earn up to 5 extra participation points.
- **Quizzes.** There will be two quizzes for this semester, focusing on Python for ArcGIS Pro and QGIS, respectively.

Important Class Policies

- **Lab computers**. The computers in the classroom will have all the software installed for this class. Every student should be able to log in any computer with their OSU credentials. Please note that WE ARE NOT RESPONSIBLE FOR FILES LEFT ON LAB MACHINES. Files on the computer hard drive may be deleted at any time if needed. Students should use USB devices or Cloud storage to save their work. It is important to LOG OUT when you are done with their work.
- **Submissions**. All submissions must be done on Carmen (unless otherwise specified). There will be **absolutely no email submissions**. Email submissions of work for this class will not be acknowledged and will not be accepted.
- **Late submissions**. Late submissions may be accepted up to a week past the due date. One day late will incur a 10% penalty. Two days late will incur 20% penalty. Three days will incur a 30% penalty. Four days late will incur a 40% penalty. Five to seven days late will only receive 50% credit of the grade you would have received if it was submitted on time. If you contact me **prior to the due date** for deadline adjustments you will not incur any penalty. Please note this may not apply to every assignment. The final project, for example, has a firm deadline that cannot be changed.
- **Do your own work**. Collaboration is healthy and often necessary, but each student should definitely finish the work individually. Please see below for more information about academic misconduct.
- **Communication**. The only official way to communicate with me and the TA is through our OSU email address as listed on the top of the syllabus. We cannot guarantee that we will reply messages through any other methods. We normally will reply emails in a day (except weekends or holidays).

Students with Disabilities. I would like to hear from anyone who has a disability that may require some modification of seating, testing, or other class requirements so that appropriate arrangements may be made. Please talk with me after class or during my office hours. If you need more information about disabilities and accommodations, contact the Office of Disability Services.

Policy on Plagiarism and Academic Misconduct. If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. In the Code of Student Conduct, academic misconduct is defined as "any activity that tends to compromise the academic integrity of the university, or subvert the educational process"; plagiarism is defined as "the representation of another's work or ideas as one's own; it includes the unacknowledged word-for-word use and/or paraphrasing of another person's work, and/or the inappropriate unacknowledged use of another person's ideas."

Plagiarism is wrong and should be prohibited. The University has a policy on academic misconduct and plagiarism, as provided in the Code of Student Conduct. To further understand this, it is worthwhile to read and understand the Eight Cardinal Rules of Academic Integrity at here and guidelines to avoid plagiarism at here.