

# Geography 5223: Design and Implementation of GIS

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## Spring 2020

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**Location:** Derby Hall 0135

**Time:** Monday and Wednesday 12:45 - 2:05 PM

Course URL: <http://carmen.osu.edu>

Instructor: Prof. Ningchuan Xiao

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Office Hours: Thursday 11 - Noon or by appointment

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Office hours: Thursday 12 - 2 PM or by appointment

This course covers 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 about programming skills, software testing, and verification. The second theme of this course is about project management for GIS software development. The course is organized around a set of coding workshops, lectures, and discussions. It is mostly a project-oriented course, where each coding workshop will end with finishing a project using the concepts covered in that workshop, and there is also a final project.

Upon completion of this course students will be able to

- understand the tasks of GIS customization,
- understand event-driven and object-oriented programming techniques,
- 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.

## Texts

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The following textbook is required for this course:

- *Agile Project Management For Dummies*, (2nd Ed.) by Mark C. Layton and Steven J. Ostermiller, John Wiley & Sons, Inc., 2017.

In addition to the textbook, we will also use online sources for tool development in QGIS and ArcGIS Pro. Detailed instructions and tutorials will be provided during the semester. There are other readings materials that will be handed out during the class.

## Prerequisites

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Geography 5222 or consent of instructor.

## Credit Hours

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This class is for 3 credits.

## Schedule

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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:

Weeks 1: Introduction

Weeks 3-5: Python scripting for ArcGIS Pro

Weeks 6-8: Agile project management

Week 9: GIS ethics

Week 10: [spring break](#)

Weeks 11-15: QGIS plug-ins development

Week 16: Presentations

Week 17: Final exam

## Evaluation and Activities

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### Peer review

The following is a breakdown of the components that will be used to evaluate student performance in this class.

- **Coding exercises.** Each coding workshop consists of 5 or 6 sessions and at the end of each sessions there will be some reflection exercises that require the completion of the coding tasks introduced in that day. These are relatively quick turnarounds with about 1 day to finish and submit.

- **Workshop projects.** At the end of each workshop, there is also a project. All the workshops will be working toward a same project idea, which is based on the market share of public libraries in Franklin County. Manual calculation of the market share will be introduced at the beginning of the semester.
- **Final project.** Students will be divided into several teams, each working on a GIS development project. The size of a team typically will not be more than 4 students. Each project should be concluded by (a) delivering the final product including a full set of documents and software, and (b) making professional presentations about the project to the class. There will be multiple releases of the product during the semester and it is important for each team to deliver their product by the time specified in the course schedule. Each release will also be reviewed by peer students. Teams that do not deliver the complete package on time will not receive any credit for the project.
- **Quizzes.** There will be a number of in class exercises or quizzes.
- **Examination.** A comprehensive examination will be given in the finals week.

Each final project will receive a whole letter grade. Other evaluation categories will be graded based on the percent of the total points received using the following scheme:

Category grade	Percent (%)
A	90 or higher
B	80 to 90
C	70 to 80
D	60 to 70
E	Lower than 60

A **definitional grading system** as listed below will be used to determine the course grade of each student. The number of letters in the “Best grades” column is the minimum number of grades that the student meets or exceeds among all categories. The course grade is the highest level the student can reach for ALL the three columns in the table. For example, assuming the first letter grade is for the project, ABBCB will be a B+, ABBBC will be a B, AABCB will be an A-, AAABC will be a B, AAACB will be an A, and AABBA (or AAABB) will be an A.

Course grade	Best grades	Project	Lowest grade
A	AAA	B	C
A-	AA	B	C

Course grade	Best grades	Project	Lowest grade
B+	A	B	C
B	BBB	C	C
B-	BB	C	D
C+	B	C	D
C	CCC	C	D
C-	CC	C	E
D+	C	D	E
D		D	E
E			E

## Important Class Policies

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- **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 name.# 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.
- **Late submissions.** I will not give makeup quizzes or accept late submissions unless a good and acceptable reason is presented **prior to the due date** (in the case of a quiz, it will be before the quiz starts). Submissions after due date will no longer be accepted, unless otherwise permitted.
- **Deliverables.** All deliverables must be submitted as specified in the homework/project instructions. There will be **absolutely no email submissions**. Email submissions of work for this class will not be acknowledged and will not be accepted.
- **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 accounts 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](#).