

# Geography 5223: Design and Implementation of GIS

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## Spring 2018

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**Location: Derby Hall 0135**

**Time: Monday and Wednesday 2:20 - 3:40 PM**

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

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This course covers fundamental design and implementation issues related to GIS development. Upon completion of this course students will be able to

- understand the tasks of GIS customization,
- understand object-oriented, event-driven programming techniques,
- write code to implement GIS tools,
- put together a project to make GIS tasks more efficient and effective, and
- be familiar with basic software development processes.

## Texts

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The following textbooks are required for this course:

- *Software Engineering*, (10th Ed.) by I. Sommerville, Addison Wesley Publishers, 2016. (Required. Rent from Amazon, or from the publisher at [here](#))
- *Python Scripting for ArcGIS*, by P. Zandbergen, ESRI Press, 2015. (Required)
- *Beginning ArcGIS for Desktop Development using .NET*, by Pouria Amirian, Wrox, 2013. (Recommended)
- *QGIS Python Programming Cookbook, Second Edition*, by Joel Lawhead. Packt Publishing, 2017 (Recommended, ebook at [here](#))

In addition to these books, we will also use online sources, especially for open-source GIS development using QGIS. There are other readings materials that will be handed out during the class.

## Prerequisites

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Geography 5210 or 5220 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 divided into the following modules:

- Weeks 1-2: Introducing software engineering
- Weeks 3-5: Python scripting for ArcGIS
- Weeks 5-7: Software design and UML
- Weeks 7-9: Python for QGIS plug-ins
- Week 10: spring break
- Weeks 11-13: C# and .Net
- Weeks 13-15: Software testing and other issues
- Week 16: Presentations
- Week 17: Final exam

# Evaluation and Activities

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The following is a breakdown of the components that will be used to evaluate student performance in this class. At the end of the semester, the percentage of each component will be used to convert to a total of up to 100 points. Standard OSU grading scheme will then be used to determine the final letter grade.

- **Coding workshop participation (15%).** Each coding workshop consists of 5 sessions and at the end of each sessions there will be some reflection questions that require the completion of the coding exercises introduced in that day. These are quick turnarounds with about 1 day to finish and submit.
- **Coding workshop projects (35%).** 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 and is introduced in the second week. Unless otherwise announced, all workshop projects are due in a week. Each project is worth 10% of the total, and the introduction to the project is worth 5%.
- **Final project (30%).** Students will be divided into several groups, each working on a GIS development project. The size of a group typically will not be more than 4 people. Members of each group will determine necessary working teams to fulfill different design and implementation goals of the project. Each project should be concluded by (a) delivering the final products including a full set of documents and software, and (b) professionally presenting the project to the class. During the semester, a number of formal presentations will be given by each group to the class to report the progress, and these presentations are mandatory. The performance of each group and hence its members may be reviewed by peers (groups and individuals). Detailed review instruction and forms will be handed out. It is important for each group to deliver their product by the time specified in the course schedule. Groups that do not deliver the complete package on time will not receive any credit for the project.
- **Examination (15%).** A comprehensive examination will be given in the finals week.
- **Participation (5%).** There will be a number of in class exercises or quizzes.

## Important Class Policies

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- **Individual 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.
- **Deliverables.** All deliverables must be submitted as specified in instructions. Please note that **email submissions will not be accepted and will not be acknowledged.**
- **Late submission.** I will not give makeup quizzes or accept late submissions unless a good reason is presented **prior to** the due date. The deadline for the final project is firm.

**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 the Eight Cardinal Rules of Academic Integrity at <http://www.northwestern.edu/uacc/8cards.html> and guidelines to avoid plagiarism at <http://www.northwestern.edu/uacc/plagiar.html>.