GEOG 5222: GIS Programming and Algorithms

The Ohio State University

Autumn 2015

Time: Monday and Wednesday, 2:20 - 3:40 PM
Location: 0140 Derby Hall
Course URL: http://carmen.osu.edu

Instructor: Professor Ningchuan Xiao
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Office Hours: Tuesday 10 to 11 AM or by appointment

The goal of this course is two-fold. First, we develop fundamental programming skills for spatial data handling using Python. Second, we explore some essential algorithms used in geographic information systems for efficient data processing. We use two textbooks for this class: Sweigart's *Automate the Boring Stuff with Python* (no starch press, 2015), and Xiao's *GIS Algorithms* (Sage, 2016). The first book also has a web site at here that contains some very important things for learning Python. My own book is not yet released at this point and some materials will be provided in digital form under the assumption that they will not be circulated outside this class.

Credit Hours

This is a 3 credit hour class.

Evaluation

Student performance is assessed by five components. The following is a breakdown of those components, which will be used to convert the total to 100 points. Standard OSU grading scheme will be used to determine the final grade.

1. <u>Quizzes (30%).</u> Quizzes may take different forms and some of the questions may require students use the computer to answer.
2. <u>Exercises (35%)</u>. There are six exercises, each provided at the and of a major topic.
3. <u>Final project (15%)</u>. Each student propose a final project after we finish 2/3 of the class materials. The final project must be conducted individually.
4. <u>Review quiz (10%)</u>. On the final exam day, there will be a review quiz that covers all the topics of this course.
5. <u>Participation (10%)</u>. This includes attendance and completion of hands-on exercises after each class.

Policy

Each student must finish his or her work individually. Collaboration is healthy and often necessary, but each student should definitely finish the work individually. Please see below for more information about academic misconduct.

All deliverables must be submitted as specified in the homework/project instructions. I do not accept email submissions. I will not give makeup quizzes or accept late submissions unless a good reason is presented prior to the due date.

Schedule

The course is divided into a few major topics:

> Weeks 1-6: Python programming language
> Weeks 7-8: Geometric algorithms
> Weeks 8-9: GIS overlay
> Weeks 10-14: Indexing (k-D trees, quadtrees, R-trees)
> Weeks 15-16: Projects

The detailed schedule can be found at the **course schedule** on Carmen. Students should check this page frequently as it will be updated whenever new materials are made available.

Student 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

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's Code of Student Conduct, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's Code of Student Conduct and this syllabus may constitute "Academic Misconduct."

The Ohio State University's Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the University, or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's Code of Student Conduct is never considered an "excuse" for academic misconduct, so I recommend that you review the Code of Student Conduct and, specifically, the sections dealing with 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. If COAM determines that you have violated the University's Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this

course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- The Committee on Academic Misconduct web pages (COAM Home)
- Ten Suggestions for Preserving Academic Integrity (Ten Suggestions)
- Eight Cardinal Rules of Academic Integrity (www.northwestern.edu/uacc/8cards.html)