University of Wisconsin at Madison
GIS Applications (Geography 578)
Spring Semester 2015

Instructor: Bill Gartner
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Office Hours: W 1:30-2:30, Th 2:30-3:30

Lecture Time: Tu & Th 1:00 - 2:15PM
Lecture Place: 444 Science Hall
Final Exam: Project Presentation
Class Number: 28511
TA: Yuying Chen

Lab Time: Th 6:00 – 8:00 PM

Lab Place: 380 Science Hall

Course Synopsis and Structure

This class details the geographic concepts, logical arguments, and workflows that make geographic information software a valuable tool for problem-solving. As detailed below, the class consists of lectures, laboratory exercises, and a student project that produces an original GIS data layer. The objectives of the course are: (1) to familiarize students with the process of conceptualizing and solving geographic problems using GIS and, (2) to provide students with the practical experience of managing GIS projects.

Lectures will detail the conceptualization process for addressing geographic problems within a GIS software environment. The conceptualization of a geographic problem begins with crafting a research question or problem statement, identifying its key concepts and variables, operationalizing variables and their relationships so that they can be analyzed within a GIS software package, and then constructing an appropriate GIS workflow. Only after a GIS analyst has conceptualized a geographic problem or scenario, can he or she address it with GIS software.   We will explore various GIS projects and scenarios in lecture with an emphasis on conceptualization. In lab, students will implement the solutions to the geographic problems presented during lecture.

Laboratory exercises highlight the practical uses of QGIS software to address different types of questions and problems.   QGIS is a free, cross-platform, open-source desktop geographic information system (GIS) that has advanced map layer viewing, editing, and analytical abilities. Students will work with both vector and raster datasets in lab.

Finally, and most importantly, this class provides a vehicle for students to conceptualize and implement a GIS project of their own choosing. Students will form research groups and craft a research question to be addressed within a GIS environment.   All student projects must have a minimum of two data layers, one of which must be the culmination of student data collection, data entry, and/or data layer editing. You may use any GIS software package for your project – both QGIS and ESRI ArcGIS software packages are available in the department computer labs.

Texts

There are no required text books for this course, though readings and tutorials will be posted on the course website at Learn@UW as the semester progresses.

Grading

Your final grade is calculated from the total number of points earned over the semester and your relative rank with respect to your classmates. In addition, each of you will evaluate the other members of your research group on a standardized form at the end of the semester. If necessary, your peer evaluations will be used to modify individual grades for the final project.

Your final grade will be calculated from the assignments and activities listed below. The weight of each category towards your final grade is shown below as a percentage in parentheses.

A) Student Project and Paper (50%)
- Project Research Question (Capstone Statement)   **Due Date:** 2 Feb
- Project Proposal Presentation (Defense)   **Due Date:** 23 or 25 Feb
- Project Proposal Paper   **Due Date:** 1 March
- Final Presentation   **Due Date:** 3 or 5 May
- Final Paper   **Due Date:** 5 May

B) Class Attendance, Participation, and Preparedness (5%)

C) Mid-Term Exam (15%)   **Date:** 3 March

D) Laboratory Assignments (25%)   **See Lab Syllabus**

E) Laboratory Attendance, Participation, and Preparedness (5%)

For each component listed above, your score will appear in the Learn@UW grade book as the number of points scored out of the total points possible for the exercise (eg 18/20).

Additional Notes Concerning Student Projects

Student projects are the most important component of this class. Separate handouts detail project guidelines and procedures. Do not underestimate the amount of time or effort that is necessary to complete your project. Although we devote many class and lab periods for students to work on their projects, the amount of allocated course time is not sufficient to

complete them. You are expected to meet with the other members of your group and work on your project outside of class every week throughout the semester. Time management, task allocation, and working with others are important skills for most GIS projects.

Everyone must contribute to all components of the student project, including presentations, assignments, and the final paper. In order to accommodate everyone's class and work schedules, please use Google Docs, Office 365, or some other form of "cloud computing" so that all research group members can contribute to written assignments and presentations.

Class Policies

* Readings, assignments, the class schedule, and any other component of the course may be amended by the instructor at any time.

* Chronic absenteeism may result in a lower or failing grade for the course at the discretion of the instructor.

* Late assignments will be heavily penalized, with a minimum penalty of 10% per day. We well understand the difficulties of balancing school, work, and family concerns. Please talk to us *ahead of time* if you have obligations necessitating flexibility.

* There is no extra-credit.

* Academic misconduct, such as cheating or plagiarism, may result in a lower or failing grade for the course. A failing grade will be given to any plagiarized assignment. It is your responsibility to become familiar with the rules of academic misconduct, and your rights to due process, according to UW Administrative Code 14. Both an overview of academic misconduct and detailed information concerning UW Administrative Code, Chapter 14 are available at http://www.students.wisc.edu/doso/academic-integrity/

* If you need special accommodations or have a developmental disability, please contact me by phone, email, or come to my office. The McBurney Disability Resource Center provides resources for students with disabilities. Please see http://www.mcburney.wisc.edu/ or call 263-2741.

* The University of Wisconsin-Madison and the Department of Geography are dedicated to a safe, supportive and non-discriminatory learning environment. It is the responsibility of all students to familiarize themselves with University policies concerning special accommodations, misconduct, discrimination, sexual harassment, and disruptive behavior. For details, please see Chapter 14 of the UW Administrative Code cited above and the resources posted at the Office for Equity and Diversity website at http://www.oed.wisc.edu/.

Lecture Schedule

Week	Tuesday	Thursday
Week 1 (1/19, 1/21)	Course Introduction and Class Overview	Research Questions (Capstone Statement) *Student Projects: Ideas*
Week 2 (1/26, 1/28)	The Process of Conceptualization and Implementation in GIS	Project Proposal Requirements *Student Projects: Finalize Projects & Groups*
Week 3 (2/2, 2/4)	*** Present Research Questions (Capstone) ***	Scenario 1: Park Access *Student Projects: Work on Project Proposals*
Week 4 (2/9, 2/11)	Student Project Example: Agricultural Potential as a Cultural Appraisal	Scenario 2: Flood Risk Student Projects: *Work on Project Proposals*
Week 5 (2/16, 2/18)	*Student Projects: Work on Project Proposals*	Scenario 3: Bank Branch Assessment *Student Projects: Work on Project Proposals*
Week 6 (2/23, 2/25)	*** Proposal Defense ***	*** Proposal Defense ***
Week 7 (3/1, 3/3)	Applications of the Conceptualization and Implementation Process	*** Mid-Term Exam ***
Week 8 (3/8, 3/10)	GIS Concepts and Workflows *Student Projects*	Scenario 4: Soil Erosion
Week 9 (3/15, 3/17)	GIS Concepts and Workflows *Student Projects*	GIS Concepts and Workflows *Student Projects*
Week 10 (3/21-3/25)	**Spring Recess**	
Week 11 (3/29, 3/31)	No Class: AAG Conference *Student Projects (meet in 380)*	No Class: AAG Conference *Student Projects (meet in 380)*
Week 12 (4/5, 4/7)	*Student Projects (meet in 380)*	*Student Projects (meet in 380)*
Week 13 (4/12, 4/14)	*Student Projects (meet in 380)*	*Student Projects (meet in 380)*
Week 14 (4/19, 4/21)	*Student Projects (meet in 380)*	*Student Projects (meet in 380)*
Week 15 (4/26, 4/28)	*Student Projects (meet in 380)*	*Student Projects (meet in 380)*
Week 16 (5/3, 5/5)	*** Final Project Presentation ***	*** Final Project Presentation * * Final Paper Due ***

* The course schedule may be amended at the discretion of the instructor at any time.

* The conceptual underpinnings of laboratory exercises will be presented during lecture prior to the exercises being assigned in lab.

* All students should be prepared to present, discuss, and defend components of your research project during student work periods (italicized above). You are also expected to constructively critique the projects of the others.