SUMA PS5205: GIS for Sustainability Management

Instructor Information
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Course Day & Time
Thursday 6:10-8:00pm

Note: Email is the best form of contact. Please include the course # in the subject line (SUMAPS5205: "Subject")

Course Description
Geographic Information Systems (GIS) are a system of computer software, data and analysis methods used to create, store, manage, digital information that allow us to create maps and dynamic models to analyze the physical and social processes of the world. This course is designed to provide students with a comprehensive overview of theoretical concepts underlying GIS systems and to give students a strong set of practical skills to use GIS for sustainable development research. Through a mixture of lectures, readings, focused discussions, and hands-on exercises, students will acquire an understanding of the variety and structure of spatial data and databases, gain knowledge of the principles behind raster- and vector-based spatial analysis, and learn basic cartographic principles for producing maps that effectively communicate a message. Students will also learn to use emerging Web-based mapping tools such as ArcGIS Online, Google Maps, and similar tools to develop online interactive maps and graphics. Case studies examined in class will draw examples from a wide range of GIS applications developed to assist in the design, implementation and evaluation of sustainable development projects and programs. This course satisfies the M.S. in Sustainability Management program's quantitative analysis curriculum area requirement.

Course Objectives
On completion of the course students will:

1. Use a variety of GIS software programs to create maps and reports.
2. Develop a sound knowledge of methods to search, obtain, and evaluate a wide variety of spatial data resources.
3. Develop skills needed to determine best practices for managing spatial data resources.
4. Use GIS to analyze the economic, social and environmental processes underlying the concept of building a sustainable world.
5. Gain an understanding of the limits of these technologies and make assessments of uncertainty associated with spatial data and spatial analysis models.
6. Display an ability to work collaboratively to develop strategies promoting wide ranging sustainable solutions and to effectively communicate these plans in a professional environment.

Required textbook

Mastering ArcGIS by Maribeth Price, 7th Edition, McGraw Hill ISBN# 9780078095146

Additionally, students will be assigned readings from journal articles and a variety of other sources.

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Resources and Software Packages

Students will use ArcGIS software available at all CUIT labs. Students will also be given a 1-year trial version to use on their personal computers.

Method of Evaluation

Labs and assignments = 30%
Journal Review = 10%
Quizzes and Attendance = 10%
Midterm = 25%
Final Project = 25%

- **Assignments**

Students will be assigned a series of readings that will be posted on CourseWorks. Students will also be required to complete weekly hands-on GIS exercises and submit answers to questions posed by the instructor based on the assigned readings or other topics discussed in class.

- Assignments are to be submitted via CourseWorks.

- **All** files must be named using the format **"Lastname_Firstname_Assignment"**

- Work that is submitted late will be penalized one letter grade.

- **Review of Journal Articles**

Each student will be responsible for selecting a journal article related to their area of interest in GIS applications for sustainable development and be required to present a short summary of the article to the class.

- **Midterm Exam**

The midterm will comprise 25% of your final grade. The content of the exam will require students to apply skills from the weekly lab assignments, readings, and class discussions to successfully answer a series of questions.

- **Final GIS Project**

Students will be responsible for completing and presenting a final GIS analysis project that demonstrates they have mastered the concepts and skills presented in the class. Ideally, the project will allow the students to apply the GIS and spatial analysis skills they have learned to problems discussed in their other classes or internships. The final project will comprise 25% of your final grade. The deliverables for the project include the following:

1. Draft Proposal: A structured sketch of your ideas.
2. Project Proposal: A report outlining the goals, objectives, research question, proposed research methods, GIS operations, anticipated results and any obstacles you may foresee.
3. Update: Description of the outcomes of your attempts.
4. Presentation: A 5-10 minute PowerPoint presentation that you will present to the class during the last week of class
5. Report: A 5-7 page report outlining the research question and detailing research methods, GIS operations and a summary of your research conclusions using maps and visualizations to support your findings.

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Late Assignment Policy:
Assignments are due on the dates/times identified. One letter grade will be deducted from any assignment submitted after the due date/time. Assignments not received by the time final grades must be submitted will receive zero points for the assignment.

Extra Credit Assignments:
There are no extra credit assignments.

Incompletes:
As outlined in the School's grading and academic starts policy, "A grade of 'I' (incomplete) is a temporary grade indicating failure to complete assigned work. The mark is given only upon the request of the student and at the discretion of the instructor. The student and faculty member must sign a completed 'Request for Grade of Incomplete Form' before the final class session. The 'I' must be removed within one year after the end of the semester in which the student received the grade. Students seeking an extension of this time limit must have the approval of the instruction and successfully petition of the director of their program. If no petition is made, of if the petition is unsuccessful, the grade is chanced to an N-Permanent Incomplete- which remains on the student's permanent record."

Policies

Academic Integrity

The School of Continuing Education does not tolerate cheating and/or plagiarism in any form. Those students who violate the Code of Academic and Professional Conduct will be subject to the Dean's Disciplinary Procedures. The Code of Academic and Professional Conduct can be viewed online: http://ce.columbia.edu/node/217

Please familiarize yourself with the proper methods of citation and attribution. The School provides some useful resources online; we strongly encourage you to familiarize yourself with these various styles before conducting your research: http://library.columbia.edu/help/howto/endnote.html

Violations of the Code of Academic and Professional Conduct will be reported to the Associate Dean for Student Affairs.

Accessibility Statement

Columbia is committed to providing equal access to qualified students with documented disabilities. A student's disability status and reasonable accommodations are individually determined based upon disability documentation and related information gathered through the intake process.

For more information regarding this service, please visit the University's Health Services website: http://health.columbia.edu/services/ods/support

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Course Schedule (*Subject to Change*)

Week 1 (September 6).
- Overview of Course & Objectives
- Introduction to GIS

Week 2 (September 13).
- Mapping GIS data

Week 3 (September 20).
- Presenting GIS Data

Week 4 (September 27).
- Spatial Referencing Systems

Week 5 (October 4). -
Working with Tables

Week 6 (October 11).

- ArcGIS Online

Week 7 (October 18). MIDTERM EXAM

Week 8 (October 25, and 27th or 28th).
- Geoprocessing and Modeling

- Field Trip: full day of primary data
collection at Black Rock Forest in Cornwall
NY.

Week 9 (November 1).
- Raster Based Analysis
- Open Source GIS

Week 10 (November 8).
- Density/Heat Maps

Week 11 (November 15).
- Site Suitability

Week 12 (November 22). THANKSGIVING

Week 13 (November 29).

- Final Project Workshop

Week 14 (December 6). - **LAST DAY OF CLASS**

Week 15 (December 13).

- Final Reports Due