Geography 578: GIS Applications

University of Wisconsin-Madison

Fall, 2015

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Instructor:
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Lecture Hours and Location:
Tuesday & Thursday: 11:00 a.m. - 12:15 p.m.
350 Science Hall

Lab Hours and Location:
See Lab Syllabus

Instructor Office Hours:
Tuesdays: 2:30 p.m. - 3:30 p.m.
Thursdays: 2:30 p.m. - 3:30 p.m.

TA Office Hours:
See Lab Syllabus

Class Website:
learn@UW

1. Course Description:

This course focuses on the uses and applications of GIS techniques in solving practical geographic problems. It introduces a generic process for applying GIS techniques in geographic problem solving. The process includes conceptualization of a geographic problem and implementation for solving the problem using GIS techniques. Conceptualization focuses on transformation and decomposition of a given geographic problem into smaller but interconnected components. Implementation focuses on the development of geographic strategies and looks into specific GIS techniques for solving each of the smaller components under the geographic strategies so that the overall question can be addressed using GIS. The emphasis is not on the specifics of particular GIS techniques rather on the selection and use of various GIS techniques based on the geographic strategies and the application domain knowledge dictating the problem at hand. The process is further illustrated via the analyses of several case studies of GIS applications in geography. These case studies range from human to physical geography. The course is divided into three basic components: introduction of the generic process of GIS application, case studies illustrating this process, and student projects using this process. Students are encouraged to select the disciplinary domains for their projects.

The objectives are: 1) To provide students with a generic process of solving geographic problems using GIS and to develop student's skills in conceptualizing geographic problems and in developing GIS strategies to solve the problems. 2) To provide student the practical experience on managing GIS projects.

2. Evaluation and grading:

2.1 Components of Evaluation:

Midterm Exam		15%
Exercises (three of them)		20%
Student Project		50%
Planning documents	10%	
Presentation	20%	
Final report	20%	
Classroom Participation		15%
Attendance	5%	
Discussion	10%	

2.2 Grading policy:

Grades of exercises are based on:

1) The academic merit of your answers to the questions
2) Clarity of answers, ***NO BEATING AROUND THE BUSH***
3) Concise and logical presentation, no one wants to flip through a messy assignment report and looks for answers.

The grade for each of the exercises and examinations is reported as ***points_scored / total_points_of_exercise***. For example, an assignment has 20 points and your answer is worth 18 points then you should see 18/20 on your marked assignment.

2.3 Due date and time:

Each of the assignments will have a due day clearly written underneath the title of the assignment. The due time is 5:30 p.m. on the due day. Any assignment which is turned after the due time on the due day is considered late.

2.4 Penalty for late assignments:

The penalty of a late assignment is based on the number of days late (including weekends!). If an assignment is late less than 24 hours, it is considered 1 day late. If an assignment is late less than 48 hours but more than 24 hours, it is considered 2 days late, and so on. If you have to turn in an assignment late during the working hours and the instructor is not in his office, you can put it in the instructor's mail box. However, the assignment will be considered to be turned in when the instructor takes it out of his mailbox.

Late assignments are penalized 10% per day. Here is the formula for calculating the points of a late assignment:

Points_get = Points_scored - 0.1*num_days_late*Points_scored

The minimum value of Points_get is 0. Assignments handed in after the instructor has returned the graded assignment to class (usually a week after the due date) will receive no points.

3. Prerequisites:

Geog 377/CEE 357 or equivalent.

4. Computer Environment and Software:

Quantum GIS (QGIS) on PC platform will be used for the exercises. Students are free to choose whatever GIS packages on whatever platforms for their individual class projects.

5. Other Important Issues:

Class attendance is accounted as part of classroom participation and classroom participation includes asking questions and engaging in discussion.

There may be a time that the class is full and there are people waiting to get into the class. Those of you who are registered for this class but later decide not to take the course, please let the instructor know as soon as possible so that he can add the people on the waiting list to the class list.

Only medical reasons may be taken as excuses for turning in an assignment late or missing a class. However, you must provide a written report from a medical doctor stating your inability to attend class and/or complete an assignment.

The instructor and the TA will certainly give you ample time to complete each assignment. There is no reason for them to be informed that the computer is down or the software is not working a day before the assignment is due. They will NOT take this as an excuse for turning an assignment late!

6. Intended Topics and Tentative Schedule:

Lecture 01: (Sept. 3)

Introduction to Geog. 578
Student projects:
Project Requirements
Project ideas (students) I

Readings:

The article in the New York Times
CNN articles on targeting voters
Mapping out the US sniper's profile

Lecture 02: (Sept. 8)

An example of GIS application (neighborhood complaint)
Introduction to a systematic approach in GIS application
Conceptualization of geographic problems
Student projects:
Project ideas (students) II

Lab Session: (6-8 p.m.)
Implementation of strategies for solving geographic problems using GIS

Flooding scenarios for an insurance company (Conceptualization)
Flooding scenarios for an insurance company (Implementation)

Student projects:
Project ideas (students) III

Lecture 03: (Sept. 10)
Bank branch performance assessment (Conceptualization)
Bank branch performance assessment (Implementation)
Student projects:
Project ideas (students) IV

Lecture 04: (Sept 15)
Student projects:
Project ideas (students) V

Lecture 05: (Sept. 17)
Student Projects:
Finalizing student projects

Lecture 06: (Sept. 22)
Discussion of Project mini proposal
Student projects:
Students work in groups to develop mini proposals

Lecture 07: (Sept. 24)
Student projects:
Students work in groups to develop mini proposals

Lecture 08: (Sept. 29)
Student projects:
Presentation of Mini proposal (class presentation)

Lab session: (6-8 p.m.)
Review of Conceptualization
Student projects:
Students work in groups to develop conceptualization

Lecture 09: (Oct. 1)
Student projects:
Students work in groups to develop conceptualization

Lecture10: (Oct. 6)
Student projects:
Presentation of conceptualization (class presentation)

Lab session: (6-8 p.m.)
Review of virtual implementation
Student projects:
Students work in groups to develop virtual implementation

Lecture 11: (Oct. 8)
Student projects:
Students work in groups to develop virtual implementation

Lecture 12: (Oct. 13):
Student projects:
Presentation of virtual implementation (class presentation)

Lab session: (6-8 p.m.)
Review of pseudo coding
Student projects:
Students work in groups to develop pseudo coding

(Project mini proposal due)

Lecture 13: (Oct. 15)
Student projects:
Students work in groups to develop pseudo coding

Lecture 14: (Oct. 20)
Student projects:
Presentation of pseudo coding (class presentation)
Review for the mid-term

Lecture 15: (Oct. 22)
Student projects:
(Students work in groups on their projects)

(*Conceptualization document due*)

Lecture 16: (Oct. 27)
Midterm

Lecture 17: (Oct. 29)
Student projects:
(Students work in groups on their projects)

Lecture 18: (Nov. 3)
Student projects:
(Students work in groups on their projects)

(*Virtual implementation document due*)

Lecture 19: (Nov. 5)
Student projects:
(Students work in groups on their projects)

Lecture 20: (Nov. 10)
Student projects:
(Students work in groups on their projects)

Lecture 21: (Nov. 12)
Student projects:
(Students work in groups on their projects)

Lecture 22: (Nov. 17)
Project progress report
Student projects:
(Students work in groups on their projects)

(***Pseudo Coding Documentation Due***)

Lecture 23: (Nov. 19)
Student projects:
(Students work in groups on their projects)

Lecture 24: (Nov. 24)
Student projects:
(Students work in groups on their projects)

Thanksgiving Recess (Nov. 26 – Nov. 29)

Lecture 25: (Dec. 1)
Discussion of Guidelines for Final project presentation
Student projects:
(Students work in groups on their projects)

Lecture 26: (Dec. 3)
Student projects:
(Students work in groups on their projects)

Lecture 27: (Dec. 8)
Student projects:
(Students work in groups on their projects)

Lab session:
Discussion of final project report
Student projects:
Final Project Presentation (class presentation)

Lecture 29: (Dec. 10)

Student projects:
(Writing the final report)

Lecture 30: (Dec. 15)
(***Final report due***)

7. Course Materials:
There is no text for this course but some references are listed below

7.1 GIS Application Oriented:

Cromley, Ellen K. and Sara L. McLafferty, 2012. GIS and Public Health, The Guilford Press, New York, 503 p.

Heit, Michael, H. Dennison Parker, and Art Shortreid (eds.), 1996. GIS Applications in Natural Resources 2, GIS World, Inc., Fort Collins, Colorado, 540p.

Longley, Paul and Graham Clarke (eds.), 1995. GIS for Bussiness and Service Planning, Pearson Professional Ltd, Cambridge, England, 316p.

Martin, David, 1996. Geographic Information Systems: Socioeconomic applications, Routledge, New York, 210p.

Ripple, William J. (ed.). 1994. The GIS Applications Book: Examples in Natural Resources: A Compendium, American Society for Photogrammetry and Remote Sensing, Bethesda, Maryland.

Young, Haines, David Green, and Steven Cousins (eds.), 1994. Landscape Ecology and GIS, Taylor & Francis, Bristol, P.A., 300p.

7.2 Other GIS Texts:

Chang, K.T., 2014. Introduction to Geographic Information Systems (Seventh Edition). McGraw Hill, New York, 425 p.

Lo, C.P. and A.K.W. Yeung, 2002. Concepts and Techniques of Geographic Information Systems, Prentice Hall, Upper Saddle River, New Jersey, 492 p.

Longley P.A., M.F. Goodchild, D.J. Maguire, D.W. Rhind, 2011. Geographic Information Systems and Science. John Wiley and Sons, New Jersey, 539 p.