Spring GEOG 492/592: GIS 2 Syllabus

It is very true that being proficient in a word processor makes me a better writer.
- Don J. Clincher, The Arts of Phenomenal Writing

Page URL: https://sites.google.com/a/pdx.edu/gis-2-applications/

Basic Information

Spring 2017 Course Information
Credits: 4
Lecture: Tuesday 16:00 - 17:50 in Cramer Hall 413
Weekly Online Learning: See D2L (https://d2l.pdx.edu/)
TA Office Hours: Thursday 18:00-19:50 at CH469
TA Online Labs Hours: Friday 1200-13:50; see TA lab syllabus on D2L
Use this PSU page to find the CRN, course room, and schedule information.

Instructor & TA

Geoffrey Duh (jduh@pdx.edu)
Office: 424H Cramer Hall
Instructor's Office Hours: Tuesday and Thursday noon - 1:30 pm, or by appointment
Teaching Assistant : Tim Hitchins (hitchins@pdx.edu)

Course Objectives

Students will learn how to solve spatial decision problems with GIS and understand the limitations and pitfalls of using GIS. The major learning objectives of the course are that students will 1) develop problem-solving skills and 2) interpret quantitative (statistics) results of GIS analysis correctly. The course includes the theory and methods involved in multicriteria spatial analysis, network analysis, GIS modeling, spatial interpolation, and geostatistical analysis. The practical component includes the use of ESRI's ArcGIS extensions, including Spatial Analyst, Network Analyst, and Geostatistical Analyst. Both the theoretical and practical components of the course are important. Students will work in groups on a final project in which they investigate a GIS application in depth based on the concepts and techniques learned in class.

How to succeed in an online course?

More and more people in the workforce—and mostly knowledge workers—will have to manage themselves.
—Peter F. Drucker, Management Challenges for the 21st Century (read more here)

Learning self-management is also one of the goals of this hybrid GIS course. Given the open-ended nature of data science inquiries, GIS professionals must be good at self-management to be productive. Among other benefits, taking an online course is a good opportunity to learn and practice self-management. You must develop new skills (finding meanings in the tasks you are undertaking, time management, and others) to succeed in an online/hybrid course. Here is one useful tip:

"Students really, really need to be organized from the beginning to be successful in an online course, all assignment due dates should be in their calendar, online or paper folders should be created for each week, [and] the work area should be not only quiet but clean—keeping all coursework materials together." - Karen Stevens, chief undergraduate adviser of the University of Massachusetts—Amherst's University Without Walls program. Read the complete article here.

About 50% of the "lectures" of this course are online. The online components (readings, discussions, and quizzes) are administered automatically on D2L based on a strict weekly schedule (midnight Sunday to 11:59 pm the following Sunday). The weekly online materials become available at the beginning of the week (Sunday). All online activities for that week must be completed by the end of the week (11:59 pm on the Sunday of the weekend). Students will not be able to take an online quiz if the deadline has passed. See the class schedule table below for the beginning and ending dates of the weeks. **Make sure that you start working on D2L weekly module(s) at the beginning of the week.**

Textbooks

There is no required textbook for this class. Instead, students will read articles from peer-reviewed journals. These articles will be available on D2L. There are several ArcGIS books (in pdf or other online format) that will be used for both the theoretical and practical components of the course. See the Readings section for a complete reading list.

Lab Exercises

Lab attendance is not mandatory. It is highly recommended for students that need help with their assignments. This class has two lab sessions (one in classroom and one online) during which TA is available for answering questions. Students can attend either one or both. These practical exercises provide a way to acquire skills using ArcGIS and to apply the course concepts to real data. All exercises require a significant amount of time to finish, so make sure you pace your lab exercises appropriately so that you keep up with their schedule. The lab instructions are available on D2L. You can do the labs on your own computer or using CH 475 or Ch469. Please refer to the Lab syllabus for lab submission, due dates, and late policies.

D2L Lab Discussions

Students should post lab questions on D2L Lab Discussions. Students are encouraged to answer questions posted by their peers. Those who are interested in posting a (video) answer please see D2L course instructions for posting a video (screencast) response.

Exams

There are six weekly quizzes throughout the term (one of which is a bonus quiz in week 8) and one major/comprehensive quiz in week 8 (see the schedule table for the exact quiz schedule). There is no final exam.

Students have one week to submit the quizzes, from Monday morning to Sunday midnight. All quizzes, except for Week 8's comprehensive quiz, do not have a time limit to complete them, as long as they are submitted by Sunday midnight. Students will have 90 minutes to complete Week 8's comprehensive quiz. The comprehensive quiz is available from Monday morning to Sunday 11 pm in week 8.

Class Participation

The in-classroom lecture component of this course includes discussion of the readings in class. That means students are expected to read the weekly readings before class and be active participants in class discussion.

The online modules in weeks 3, 4, 9, and 10 also have their own D2L online discussion questions. Students must participate in at least 2 of the 4 D2L online discussions this term by posting responses to all the posted questions **by noon on the Friday** of the weeks they choose. Students' initial posts will be held for approval and approved in Friday afternoon. Any follow-up discussions on D2L are encouraged and welcome. The instructor will monitor the discussion activities on D2L and use the information for grading class participation component of the final grade.

Journal Article Summary and Discussion (graduate students only)

Journal Article Summary (graduate students only)

Graduate students will be divided into groups by the instructor based on students' research interests. Each group is required to select one article to read, review, and facilitate online class discussion held on D2L Journal Discussion. The selected article should be related to the topics covered in this course or a topic approved by the instructor. A group must give the title and an electronic copy of the selected article to the instructor by the due date (see the Schedule Table). A group should submit more than one article if they are unsure of the relevance/suitability of the article chosen.

Within each group, **each individual** graduate student needs to prepare an article summary. The summary should take the form of a written critique of the article (2 page max.) and include **3** discussion questions and answers. The summary must be submitted electronically to D2L Dropbox before noon the previous Friday the article is scheduled (see the schedule table).

Online Journal Discussion (graduate students only)

Graduate students assigned to the week will post their discussion questions **as a group** on D2L Journal Discussion on the previous Friday before midnight. Each group will prepare 3 discussion questions and post them on the D2L discussions. Graduate students are required to read the articles before the Discussion started on Monday and participate in the online discussion (by posting responses to the 3 questions). The online discussion of journal articles will start in the 6th week. Your participation in the online discussion will count towards your class participation grade.

Project

A GIS project is required for all students. Students will work in project groups of 2 to 3 students. The project should investigate a particular research problem using the GIS software packages that we use in class. You will acquire spatial data and, if necessary, digitize the data yourselves. The project must involve some types of spatial analysis with a quantitative component. The deliverable is a poster that you will present to the class during the final exam period. For examples of GIS student projects, please visit the instructor's student project page.

There are two major milestones of the project:

Project proposal: (see Schedule Table for the due date): Submit a one page project proposal in Google

Doc format. See D2L for proposal preparation instructions. If you have any questions, please meet with the instructor before the due date to discuss your proposal.
Project presentation: You will create an ArcGIS Online Story Map for your final project. Students will perform a peer-review on the story maps during the final exam period. See D2L for AGOL Story Map instructions.

Grading

The final grades will be assigned based on separate curves for graduate and undergrad students. The components of the grade are:

	Undergraduates	Graduate Students
Lab assignments	30%	25%
Class quizzes	25%	25%
Article review	N/A	10%
Class Participation	15%	15%
Project	30%	25%

Schedule Table

Week	***Topic - In-classroom***	***Topic - Online***	***Lab***
1	Course Overview & Basic GIS Concepts Review 04/04	Basics of Raster Data (D2L Quiz - 10 points) 04/02 - 04/09	Lab 1: Raster Analysis Tools in ArcGIS Due on 04/14 (midnight)
2	Raster Data Analysis 04/11	Raster Data Analysis Using Raster Data for Site Selection (D2L Quiz - 10 points) 04/09 - 04/16	Lab 1 continued
3	Environmental Justice Analysis 04/18	Volunteered Geographic Information (D2L Online Discussion) 04/16 - 04/23	Lab 2: ArcGIS ModelBuilder Due on 04/21 (midnight)
4	Multi-Criteria Decision Making **Journal Article Selection due before class** 04/25	Dasymetric Mapping (D2L Online Discussion) 04/23 - 04/30	Lab 3: Dasymetric Mapping Due on 04/28 (midnight)
5	No lecture, project groups meeting during class hours. Complete ESRI E-Learning Stroy Map module. **Project Proposal due by 11 pm** 05/02	Network Analysis (D2L Quiz - 10 points) 04/30 - 05/07	Lab 4: Network Analyst Due on 05/05 (midnight)

6	Spatial Pattern Analysis 05/09	Exploring Spatial Patterns in Your Data Using ArcGIS (D2L Quiz - 10 points) **Grad Journal Article Discussion** 05/07 - 05/14	Lab 5: Spatial Pattern Analysis Due on 05/12 (midnight)
7	Statistical GIS Modeling 05/16	Performing Spatial Interpolation Using ArcGIS (D2L Quiz - 10 points) **Grad Journal Article Discussion** 05/14 - 05/21	Lab 6: Interpolation and Geostatistical Modeling in ArcGIS Due on 05/19 (midnight)
8	Exploratory Spatial Data Analysis 05/23	Regression Analysis Using ArcGIS (Bonus Quiz - 5 points) Comprehensive D2L Quiz - 30 points - 90 minutes time limit 05/21 - 05/28	Work on projects
9	Term project discussion 05/30	Critical GIS (D2L Online Discussion) **Grad Journal Article Discussion** 05/28 - 06/04	Work on projects
10	GIS&T Body of Knowledge and USDL Competency Model 06/06	GIS Ethics (D2L Online Discussion) 06/04 - 06/11	Work on projects
Final	**Project Story Map Peer-Review Session (CH469)** 06/13 15:30 - 17:50		

Readings

The pdf files of the class readings are also available at I:\Students\Instructors\Geoffrey_Duh\GEOG4592GIS2\Class_Readings

Week 2: Raster Data Analysis

- Pages 73-106. Section 2 (Chapters 4 and 5) in Using ArcGIS Spatial Analyst (Using_Spatial_Analyst.pdf).

Week 3:

Environmental Justice Analysis

- Chakraborty, J. and Armstrong, M.P. (2001). Assessing the impact of airborne toxic release on populations withspecial needs. Professional Geographer, 53(1):119-131. (ChakrabortyArmstrong_2001.pdf)

Volunteered Geographic Information

- Elwood, S., et al. 2012. Researching Volunteered Geographic Information: Spatial Data, Geographic Research, and New Social Practice. Annals of the Association of American Geographers, 102(3): 571–590. (Elwood_2012.pdf)

Week 4:

Dasymetric Mapping

- Eicher, Cory and Brewer, Cynthia 2001. Dasymetric mapping and areal interpolation:

Implemetation and evaluation. Cartography in Geographic Information Science, Vol. 28, No. 2 pp. 125-138. (EicherBrewer_2001.pdf)

Multi-Criteria Decision Making

- Fuller, D.O., Williamson. R., Jeffe, M., and James, D. 2003. Multi-criteria evaluation of safety and risks along transportation corridors on the Hopi Reservation. Applied Geography, 23 (2-3): 177-188. (Fuller_etal_2003.pdf)

Week 5: Network Analysis

- Lloyd, Christopher 2010. Network Analysis. In Spatial Data Analysis. Oxford Press. (Lloyd_2010.pdf)

Week 6:

Spatial Pattern Analysis

- Zhang, C. et al. 2008. Use of local Moran's I and GIS to identify pollution hotspots of Pb in urban soils of Galway, Ireland. Science of the Total Environment, 398, pP. 212-221. (Zhang_etal_2008.pdf)

Exploring Spatial Patterns in Your Data Using ArcGIS

- Read ArcGIS Desktop Online Help for all tools in the Spatial Statistics Toolbox.

Grad students discussion journal article

- TBD

Week 7:

Statistical GIS Modeling

- Lee, S. and Pradhan, P. 2007. Landslide hazard mapping at Selangor, Malaysia using frequency ratio and logistic regression models. Landslides, 4: 33-41. (LeePradhan_2007.pdf)

Performing Spatial Interpolation Using ArcGIS

- Pages 49-79. Using ArcGIS Geostatisical Analyst (Using_Geostatistical_Analyst.pdf)

Grad students discussion journal article

- TBD

Week 8: Exploratory Spatial Data Analysis

- Pages 81-112. Using ArcGIS Geostatisical Analyst (Using_Geostatistical_Analyst.pdf)

Week 9:

Critial GIS

- Schuurman, Nadine (2006). Formalization matters: Critical GIS and Ontology research Annals of the Association of American Geographers, 96(4), 2006, pp. 726-739. (Schuurman_2006.pdf)

Grad students discussion journal article

- TBD

Week 10:

GIS Ethics

- GIS Certification Institute - Code of Ethics (web link)
- GIS Certification Institute - Rules of Conduct (web link)

GIS&T Body of Knowledge & GIS Competency Model (**Optional Readings**)

- DiBiase D. et al. (Eds) 2006. Geographic Information Sciences & Technology: Body of Knowledge (1st edition). UCGIS and AAG. URL: http://www.ucgis.org/priorities/education/modelcurriculaproject.asp (AAGKnowledge_Flyer.pdf) Chapter 2: (BOKch 2.pdf)
- US Department of Labor Geospatial Technology Competency Model (Geospatial-Industry.pdf)

Title IX & Academic Guidelines

Title IX Reporting Obligations

As an instructor, one of my responsibilities is to help create a safe learning environment for my students and for the campus as a whole. As a member of the university community, I have the responsibility to report any instances of sexual harassment, sexual violence and/or other forms of prohibited discrimination. If you would rather share information about sexual harassment, sexual violence or discrimination to a confidential employee who does not have this reporting responsibility, you can find a list of those individuals. For more information about Title IX please complete the required student module Creating a Safe Campus in your D2L.

Requests for Academic Accommodation

Students who have a learning disability that may affect their performance should contact the Disability Resource Center, Suite 116 Smith Memorial Student Union (phone: 503-725-4150, email: drc@pdx.edu, TTY or relay: 503-725-6504). If you have a documented disability and are registered with the Disability Resource Center meet with the instructor as soon as possible so that accommodations can be made.

For more information see http://www.pdx.edu/drc/.

Policy on Academic Honesty

Any type of academically and ethically dishonest work (plagiarism, copying someone else's work, etc.) may result in an automatic "F" for the assignment and, when appropriate, a report filed with the Office of Student Affairs. The PSU Bulletin includes the following statement on Academic Honesty: "The Student Conduct Code, which applies to all students, prohibits all forms of academic cheating, fraud, and dishonesty. These acts include, but are not limited to, plagiarism, buying and selling of course assignments and research papers, performing academic assignments including tests and examinations for other persons, unauthorized disclosure and receipt academic information, and other practices commonly understood to be academically dishonest."

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