

GEOG 104
Geographic Information Science and Spatial Reasoning
Fall 2017

Tues & Thurs | 9:30AM – 10:45AM | GMCS-309

Instructor: Dara Seidl

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Office: SH-307A

Office Hours: Tues & Wed 11:00AM – 12:00PM, or by appointment

Blackboard URL: <https://blackboard.sdsu.edu>

Overview

This course introduces fundamental concepts in geographic information science (GIScience), including geographic information systems (GIS), global positioning systems (GPS), cartography, remote sensing, and spatial statistics. Class activities are designed to demonstrate the use of critical technologies in addressing human and environmental problems. Students will interact with GIS platforms and learn how to solve spatial problem types from multiple disciplines, including health, biology, economics, social policy, history, urban planning, and natural hazards research. Practical exercises will give students hands-on experience with the collection, organization, visualization, analysis, and editing of spatial data.

This is a General Education (GE) course in the category of Foundations: Mathematics and Quantitative Reasoning.

Prerequisite

Satisfaction of the Entry-Level Mathematics requirement (ELM).

Expected Student Learning Outcomes

1. Students will become familiar with the foundations of geographic information science and applications of geospatial technology.
2. Students will learn how to quantify and develop numerical solutions for spatial problems from across disciplines.
3. Students will operate internet-based geographic tools to visualize and analyze GIS datasets.

Required Textbook

An Introduction to Geographic Information Systems, 4th Edition (2011). Ian Heywood, Sarah Cornelius, and Steve Carver, Eds. Pearson. ISBN-13: 9780273722595.

Practical Exercises

In addition to weekly readings from the textbook and supplementary material on Blackboard, there will be a total of 5 graded take-home practical exercises. These exercises will be introduced in class during Thursday sessions and are typically due on Blackboard by 9:00AM the following Thursday (see class schedule). Exercises will supplement the lectures with hands-on activity crucial for learning GIS. Some assignments will require high-speed Internet access. If a student does not have computer Internet access at home, computers in Love Library or the SAL Lab (SH-324) may be used. Please check in with me if you will need an account for the SAL Lab.

Exams

There will be 1 midterm (**Thursday 10/12**) and 1 final exam (**Thursday 12/14**). Each exam will contain 20 multiple choice questions, 5 short-answer computational questions, and 1 extended response question.

Focus Group Presentation

Towards the end of the semester, students will form groups of 4 and will be assigned a focus group topic relating to a real-world GIS problem. Each group will represent a key stakeholder in the GIS scenario and will develop a plan of action to address the problem. Students will give a 5-minute presentation (with 1 minute Q&A) on their solution with all group members presenting. Presentations will take place on **Thursday 11/30**. Groups may use online mapping tools and/or PowerPoint during the group presentation.

Lectures

Lecture slides will be posted on Blackboard. Throughout the semester, there will also be unannounced group discussion sessions during class. Students will form groups of 4-5 and be given a discussion prompt based on the course topic for that week. At the end of class, groups will turn in a summary of their discussion and question responses. Discussions provide an opportunity for students to analyze the class material and earn participation credit.

Participation

Participation will be graded according to class attendance, lecture question and answers, and in-class discussion group work. Attendance is expected at all lectures. If you are unable to attend a class, please email me ahead of time.

Grading

Practical Exercises:	40%	Focus Group Presentation:	10%
Midterm Exam:	20%	Participation:	10%
Final Exam:	20%		

The following scale will be used to assign letter grades:

A	93.4 – 100 %	C	73.4 – 76.6 %
A-	90 – 93.3 %	C-	70 – 73.3%
B+	86.7 – 89.9 %	D+	66.7– 69.9 %
B	83.4 – 86.6 %	D	63.4 – 66.6 %
B-	80 – 83.3 %	D-	60 – 63.3 %
C+	76.7 –79.9 %	F	< 60%

Class Schedule

	Dates	Topic	Readings	Exercises/Notes
Week 1	Tues 8/29 Thurs 8/31	Overview of GIScience	Heywood Ch. 1	
Week 2	Tues 9/5 Thurs 9/7	Spatial Data Sources	Heywood pp. 32-43 Underwood (2013)	Exercise 1. Google Earth (Due: Thurs 9/14)

Week 3	Tues 9/12 Thurs 9/14	Projecting the Earth	Heywood pp. 44-51 Giaino (2017)	Exercise 2. Map Projections (Due: Thurs 9/21)
Week 4	Tues 9/19 Thurs 9/21	Spatial Data Models	Heywood Ch. 3	
Week 5	Tues 9/26 Thurs 9/28	Attributes & Databases	Heywood Ch. 4	
Week 6	Tues 10/3 Thurs 10/5	Database Operations & Editing Data	Heywood Ch. 5	
Week 7	Tues 10/10 Thurs 10/12	Editing & Problem Set Review MIDTERM EXAM	---	Exercise 3. Missing Maps (Due: Tues 10/24)
Week 8	Tues 10/17 Thurs 10/19	GPS Activity and Exam Review		
Week 9	Tues 10/24 Thurs 10/26	GPS Remote Sensing	Eastman (2001)	Review: Heywood pp. 57-62 Heywood pp. 150-152
Week 10	Tues 10/31 Thurs 11/2	Spatial Analysis	Heywood pp. 175-197 Heywood pp. 198-223	Exercise 4. ArcGIS Online (Due Tues 11/7)
Week 11	Tues 11/7 Thurs 11/9	Analytical Modelling & Spatial Statistics	Heywood Ch. 7	Exercise 5. CARTO (Due Tues 11/14) <i>Focus Group Assignment Introduced</i>
Week 12	Tues 11/14 Thurs 11/16	GIS Project Design Work on Presentations	Heywood Ch. 12	
Week 13	Tues 11/21 Thurs 11/23	NO CLASS THIS WEEK		Happy Thanksgiving!
Week 14	Tues 11/28 Thurs 11/30	Sources of Error PRESENTATIONS	Heywood pp. 310-329	
Week 15	Tues 12/5 Thurs 12/7	GIS & Society	Dobson and Fisher (2007)	

Week 16	Tues 12/12 Thurs 12/14	Exam Review FINAL EXAM	---	
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Additional Readings

These additional texts supplement the textbook material and provide more in-depth reading on selected topics in GIScience. These readings will be posted on **Blackboard** in the *Course Documents* folder.

Dobson, J.E. and Fisher, P.F. 2007. The panopticon's changing geography. *Geographical Review*. 97(3): 307-323.

Eastman, J.R. 2001. Introduction to remote sensing and image processing. In *IDRISI Guide to GIS and Image Processing*, Ed. J.R. Eastman. Worcester, MA: Clark Labs.

Gaiimo, C. 2017. Why map historians are annoyed with Boston Public Schools. *Atlas Obscura*. <http://www.atlasobscura.com/articles/mercator-peters-boston-map>

Underwood, E. 2013. The new cartographers. *Science*. doi:10.1126/science.caredit.a1300045

Academic Honesty

Cheating on exams and any form of plagiarism are unacceptable and a violation of San Diego State University's Standards for Student Conduct. Cheating or plagiarism will result in a score of zero on the exam or assignment, and any incidents will be reported to the Center for Student Rights and Responsibilities.

Use of Electronic Devices

Laptop computers may be used for note-taking, but all other devices must be muted and stored during class.

Students with Disabilities

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services at (619) 594-6473. To avoid any delay in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that I cannot provide accommodations based upon disability until I have received an accommodation letter from Student Disability Services. Your cooperation is appreciated.