cost path to the missing mushroom hunters destination

Lecture: MW, 9-9:50 in 221 McKenzie
Labs: M, 10-11:50 or 12-1:40 or T, 1-2:50 or 3-4:50 in SSIL

Course Website: canvas.uoregon.edu

Instructor: Dr. Nick Kohler
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Office Hours: Thursday, 9-10am

GE: Paige Portwood - **Office Hours:** TBA in Reed Room (Knight Library 235)
GE: Jill Stone - **Office Hours:** TBA in Reed Room (Knight Library 235)

Textbook: ***Geographic Information Science and Systems***, Fourth Edition (2015) by Longley, Goodchild, Maguire and Rhind.
Additional required and supplemental readings will be made available online

Overview:

An introduction to mapping, geospatial data, cartography and spatial analysis, this class addresses questions in three major areas:

1. How can people sense and represent the 'real' world?
2. How can we record, recall, and analyse this information?
3. How can we communicate and discuss this information with other folks?

The class explores these questions through the applied use of software designed to facilitate the recording, symbolization, analysis, and communication of data about the world - that is turn data about the real world into information useful for acting in the real world. This is often done with maps, and much of the work will involve the use of "Geographic Information Systems (GIS)" or other mapping software.

The cover the basic theory and practices of geospatial data management and analysis, and the techniques of modern digital cartography using Geographic Information Systems.

Class discussions and other activities explore Geographic Information Science - how the development of modern geospatial data collection and analysis capabilities are changing the way science and society operates.

By the end of the class, students should have a sound understanding of how spatial data is represented, how the data is stored and analysed, how the results of this are communicated, and why and when these techniques are appropriate. Applied skills learned include the ability to follow instructions, to find help when the instructions fail, and to create maps and conduct basic spatial analysis using GIS software.

Learning Outcomes

After completing the course students

- Understand the mathematical fundamentals underlying geographic coordinate systems and other geographic reference systems
- Are able to critically evaluate maps and GI systems output in a scientific way
- Can analyze and visualize geographic data sets using GI systems tools
- Understand the role and function of the technical components of current GI systems, as well as their historical roots

Estimated Workload

The course contains lectures, reading assignments, and in-class activities/quizzes, as well as lab assignments, including a final project. Students spend two hours in lectures and two hours in labs. Each lecture consists of 30 mins of presentation by the instructor and 20 mins of in-class activities. Presentations are interleaved with in-class activities, in order to allow students to actively engage with concepts and to make theoretical material tangible with hands-on experience. In-class activities include short quizzes, discussion group exercises, and mapping exercises. Assignments deepen the practical part of the learning experience enabling students to apply the presented concepts so as to reach learning objectives. Assignments practice the main steps for deriving a geospatial analysis and visualization using GIS tools. Students are expected to spend about eight hours per week on assignments: two hours in labs and on average six hours outside of classroom. Another two hours outside of classroom are required for course readings.

Course Schedule, Spring 2018 *(Draft April 1)*

Week / Day	Reading and online materials	Lab
Week 1- **Conceptual Foundations:** **M (4/2):** Geographic Information Sciences and Geographic Data; Types of Maps; Map Properties; Scale	Chapter 1 and 2 (pp. 1-54) ***Online:*** GIS Foundations[Mapping and visualization in ArcGIS for Desktop ; What is ArcMap? ; A Quick Tour of ArcMap ; Working with Map Scales]	**Lab 1** - Introduction to SSIL - raster and vector data: **40 points**
W (4/4): History of GIScience and Cartography, Map Properties; Data Models and Objects	***Representing Geography***, Chapter 3 (pp.55-76)	
Week 2- **Geospatial Data: Coordinate Systems and Map Projections** **M (4/9):** Earth Geometry and Spherical Coordinate Systems; Map Projections;	***Georeferencing*** PLACE NAMES & REFERENCE SYSTEMS, Chapter 4.1-4.7 (pp.77-86) PROJECTIONS, Chapter 4.7-4.8 (pp.88-91) ***Online:*** What are map projections	**Lab 2** - Map Projections, **40 points**
W (4/11): Cartesian Coordinate Systems, Map Display and Spatial Analysis.	COORDINATE SYSTEMS, Chapter 4.8.1-4.9 (pp.91-95) GPS and Geotagging Chapter 4.10-4.13 (pp.95-98)	
Week 3 **M (4/16): Map Design Introduction**	***Cartography and Map Production*** MAPS AND CARTOGRAPHY, Chapter 11.1-11.2.1 (pp. 237-246) MAP DESIGN, Chapter 11.3-11.6 (pp. 246-265)	**Lab 3** - Map Design Introduction, Spatial data types and querying values - Global Population **40 points**
W (4/18): ***Quiz 1 - Coordinate Systems, Map Projections, Spatial Data Types, Map Display***		
Week 4 **W (4/23):** - Data models and SQL	***Geographic Data Modeling*** Chapter 7(pp. 152-172)	**Lab 4** -Washington Rainfall / Selection and Filters; interaction and tools, **40 points**
W (4/25): Geospatial Data Analysis - attribute tables	***Creating and Maintaining Geographic Databases*** Chapter 9 (pp. 194-216)	
Week 5 **M (4/30): Distance, Selections, and Overlay Analysis**	Introduction, Attribute Tables, Spatial Joins Chapter 13.1-13.2.2(pp.290-300)	**Lab 5** - Presenting GIS Data - Tsunami Planning in Florence, Oregon, **40 points**

	Overlay Chapter 13.2.3-13.2.4 (pp.300-303) Analysis based on Distance Chapter 13.3.1-13.3.3 (pp.304-309)	
W (5/2): Density analysis and surface interpolation	More Analysis Chapter 13.3.4-13.4 (pp.310-318)	
Week 6 **M (5/7): Basic surface display and analysis**	***Spatial Analysis and Inference*** Analysis of Surfaces Chapter 14.3.1-14.3.4 (pp.319-328)	**Lab 5 due the end of lab**
W (5/9): Routing and other distance analysis	More Analysis Chapter 14.4-14.6 (pp.329-338)	
Week 7 - Geovisualization **M (5/14):**	***Geovisualization*** Chapter 12 (pp.266-289)	**Lab 6** Oregon Vegetation / Overlay, **100 points**
W (5/16): ***Quiz 2 - Spatial Analysis and Geovisualization***		
Week 8 **M (5/21):** Geographic Data Collections and Data Sources	***Data Collection*** Chapter 8 (pp. 173-193)	
W (5/23):	The Geoweb Chapter 10 (pp. 217-236)	
Week 9 **M (5/28):**	**Memorial Day** - *No Classes*	**Lab 7** - Surface Analysis, **60 points**
W (5/30): Geographic Information Sciences Overview - Grad Presentations	***Uncertainty*** Chapter 5 (pp. 99-127),	
Week 10 - **Last Week of Classes** **M (6/4):**		**Lab 7 due by Friday June 3 at 5pm**
W (6/6): Quiz 3 - GIS Data Collection and Management, Geovisualization		
Week 11 - **Finals Week** **W (6/13)**	**Final Lab Project due by Noon Wednesday, June 13**	

Course Grading:

Geog 481:

50% - Quizzes and Group Exercises: 3 scheduled longer quizzes and additional take-home or in-class quizzes and exercises.
50% - Lab exercises and Final Project: This usually have a component due by the end of lab session and a component due one or two weeks following the lab. These generally require extra work outside of class time to complete!

Geog 581:

Graduate students have additional requirements of an independent final lab with writeup and references, and presentation of their final project work

* ***late work will get reduced credit of 10% per day late. During and after Week 10 the reduction is 30% per day late.***

GRADING RUBRIC

Grading criteria follow http://gradeculture.uoregon.edu:

- **A+** Only used when a student's performance significantly exceeds all requirements and expectations for the class. Typically very few to no students receive this grade.
- **A** Excellent grasp of material and strong performance across the board, or exceptional performance in one aspect of the course offsetting somewhat less strong performance in another. Typically no more than a quarter of the students in a class receive this grade, fewer in lower-division classes.
- **B** Good grasp of material and good performance on most components of the course. Typically this is the most common grade.
- **C** Satisfactory grasp of material and/or performance on significant aspects of the class.
- **D** Subpar grasp of material and/or performance on significant aspects of the class.
- **F** Unacceptable grasp of material and/or performance on significant aspects of the class.

Grading in basic activities, such as examinations and lab assignments, evaluates in how far an answer reflects that the question with its background was understood and solved following the methods to be applied in the specific answer. Grading of advanced activities with higher degrees of freedom, such as advanced labs, the final project, or literature reviews, additionally evaluates the suitability of the choices made, e.g. the project plan, the method chosen for analysis, the choice of articles selected for review. Students should make sure that they seek guidance early for these tasks so as to actively discuss alternatives and should justify their choices in write-ups.

Statement about Graduate Students GE

Work of graduate students in the class will not be evaluated by the GEs