[Course information is subject to change]

GEOG 488/588: Introduction to Geographic Information Systems

Contact Information: David Banis (dbanis@pdx.edu)
4 credits with lectures and lab components

Course Objectives

The course includes an overview of the theory and general principles of GIS and practical experience in its use. The practical component involves the use of the desktop GIS software package ArcGIS. Both the theoretical and practical components of the course are important. Without a theoretical understanding of GIS methods, you will make poor geographic modeling decisions and when necessary you will not be able to migrate to a new or different GIS software package. Without a practical understanding of GIS software, your theoretical knowledge cannot be put to use. All students must complete a final project in which they investigate a GIS application in depth.

Text and Readings

The text for this course is "*GIS Fundamentals 6th Edition*," written by Paul Bolstad, 2019.

Exams

There will be two midterms consisting of a mix of objective questions and short essay questions. There will be no final exam.

Computer Lab Exercises

Each student must sign up for a weekly lab section; there will be 8 lab assignments that use ArcGIS Pro software. These exercises provide a way to acquire skills using ArcGIS and allow you to apply the course concepts to real data. The lab exercises will take longer to complete than a 2-hour lab session, typically 4-6 hrs. Consult with your lab teaching assistant about due dates and requirements.

You have access to the computer lab in Cramer Hall 469 which you can use any time (except when other classes are being held). You can also download and install a trial version of ArcGIS Pro, which allows you to do some of the lab assignments on your own computer (Windows only). ArcGIS Pro software is also available in open computer labs on campus, as well as the PSU Virtual Computer Lab: vlab.pdx.edu.

Project

All students must complete a final project in which they investigate a GIS application in depth. The project is intended to provide a deeper understanding of GIS through an investigation of a particular research problem.

Graduate students will work on self-defined projects. You will need to acquire the spatial data, and the project should involve some type of spatial analysis using the GIS software package you have been using in class. That means you must do more than just make maps. It is suggested that you use secondary GIS data sources available online to do your project. While you are welcome to digitize data to create your own spatial dataset, doing so is very time-consuming and is not the purpose of this project; performing a spatial analysis is the purpose of this project. The grade for your project is based on the cohesiveness and logic of your research question, and the appropriateness of the methods and techniques. The complexity and comprehensiveness of your project will not be criteria for judging the quality of your project.

There are three stages to the project:

1. Submit a one or two page project proposal by the beginning of week 6. It should include a research question, a detailed description of the spatial and attribute databases you will use, and a conceptual description of the methods you will use. Each student should discuss the proposal with the instructor before turning it in.

2. Schedule your presentation for the final day of class or finals week.

3. Oral presentations. Every presentation must include the following sections: an Introduction, Datasets Used, Analysis Methods, Results, and Conclusions. Turn in a Powerpoint presentation.

Undergraduate students will be given several pre-defined projects to choose from - the project will be somewhat like a lab exercise, but with very few instructions. A project report must be submitted by the time of the final exam period. As an alternative, undergraduate students are welcome to work on a project of their own choosing, either on their own or in a group. If this option is chosen, then the student or group must submit a project proposal as described above.

Grading

488:	**588/591:**
Lab Assignments 50%	Lab Assignments 45%
Exams 30%	Exams 30%
Project 20%	Project 25%

Course Schedule

Date	Topic	Topic	Lab
Week 1	Course Overview Intro to GIS	Applications Cartography	Lab 1: Introduction to ArcGIS
Week 2	Cartography (continued Data classification	Data Models	Lab 2: Map Symbology and Classification
Week 3	Data Models (continued) Georeferencing Systems	Georeferencing Systems (continued) Data Sources	Lab 3: Projections and Public GIS Data
Week 4	Geographic Databases and Queries	Queries, Joins, and Relates	Lab 4: Queries and Joins
Week 5	MIDTERM 1	Nature of Geographic Data	Lab 5: Building Geodatabases Creating and Editing Features
Week 6	Geocoding Data Collection and Creation Project proposal due	Uncertainty Vector Analysis	Lab 6: Geocoding Addresses and Mapping XY Data
Week 7	Vector Analysis (continued)	Raster Analysis	Lab 7: Vector Spatial Analysis
Week 8	Raster Analysis (continued)	Spatial Modeling	Lab 8: Raster Spatial Analysis
Week 9	Advanced Spatial Analysis	MIDTERM 2	Work on Project
Week 10	GIS Software	Grad Student Presentations	Work on Project
	Remaining Grad Student Presentations	Final Exam Due	