

Geography 388 - Introduction to GIS

Instructor: Jinwen Xu

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Office hours: Tuesday 1-3pm, or by appointment

Course website:

<http://laulima.hawaii.edu> (for readings and assignments)

Class time: Monday, Wednesday & Friday 09:00AM to 11:45AM

Classroom: Physical Sciences Building 310

Overview

This course is an introduction to geographical information systems, focusing on spatial data processing and analysis in the science and management of environmental and human resources. Topics covered include GIS data structures, data sources, data collection, data quality, geodesy and map projections, spatial and tabular data analyses, digital elevation data and terrain analyses, cartographic modeling, and cartographic layout. Laboratory exercises provide practical experiences that complement the theory covered in lectures. The goal of the course is to help students to gain a comprehensive understanding of GIS concepts and get started with using GIS in practice.

The specific learning outcomes are:

- Understanding basic spatial data structures and being able to edit the data using GIS.
- Being able to use publicly available GIS data for practical analytic work.
- Being familiar with the common tools of spatial analysis GIS.
- Being able to use GIS as analytic platform to support decision-making.

Readings and Materials

Suggested textbook (not required):

GIS Fundamentals: A First Textbook on Geographic Information Systems, Fifth edition, Bolstad, Paul V., 2016.

GIS Tutorial 1: Basic Workbook, 10.3.x edition, Wilpen L. Gorr, Kristen S. Kurland, 2016

Supplementary readings will be recommended weekly

Course Structure:

• 30 lectures & labs, including 11 labs. • 10 regular labs, 1 optional final lab. • 2 exams (1 mid-term, 1 final exam) • Participation, including popup quizzes and signing in sheet

Grading:

Grading: Grading will be based on my best professional judgment of our performance on a set of weighted components. The components and weights are:

- 50% - Weekly labs
- 15% - mid-term exam (short answer)
- 25% - Final exam (short answer)
- 10% - Participation and popup quizzes
- Extra points are given (up to 5) to final lab

Grade scale

A+ 97.5-100	B+ 87.5-89.99	C+ 77.5-79.99	D+ 60.0-64.49
A 92.5-97.49	B 82.5-87.49	C 70-77.49	D 50.0-59.99
A- 90-92.49	B- 80-82.49	C- 65-69.99	F <50

Course lab work

Labs will be introduced in class and explanation will be given to accomplish the tasks. Time will be allotted in class to work on the labs. If more time is needed, they can be finished after class. Finished labs should be submitted through Laulima unless instructed otherwise **Labs submitted up to 1 week late are penalized 20%. Labs more than 1 week late are penalized 100%.**

Throughout the labs sessions you will need to save/backup your work. To do this you will need to purchase a portable USB Flash Drive to use in the lab. As GIS files can be quite large, you should get a 1GB or larger Flash Drive. Also try to find a USB 3.0 Flash Drive, it will be faster.

Please note you may work together on labs, but you each must do every part of each lab and **turn in entirely your own work.** That means each of you should perform every step indicated in the lab manual. **Your grade is for individual effort; copied files/maps from other students will be construed as cheating, at a minimum you'll get zero for the lab, and you may automatically fail the course.**

All labs will be done in computer. We will set up an account for every student in the computer lab. The software to be used is ArcGIS 10, its extensions (such as spatial analyst and 3D analyst) and web mapping tools (e.g. Google Maps/Earth).

Finished lab assignments should be submitted in **Microsoft Word** or **PDF** format through **Laulima**. Lab instructions will contain numbered questions to be answered and very specific deliverables such as maps, tables and graphs.

The final lab is different from previous labs in that you will have an opportunity to use what you have learned to solve a practical problem independently. You identify the problem by yourself, e.g., the identification of areas suitable for a park development. You will need to put together the spatial and tabular data required to solve the problem.

Class Schedule

Class	Topic
Class 1 (Mon May 20)	1st half: Course Intro 2nd half: Intro to ArcGIS Post Lab 1: Intro to ArcGIS on Laulima (Due on 28th) Post Lab 2: Creating/editing vector data in ArcGIS on Laulima (Due on 28th)
Class 2 (Wed May 22)	1st half: Vector data model 2nd half: Lab work
Class 3 (Fri May 24)	1st half: Watch video 'Geospatial Revolution' 2nd half: Lab work
Class 4 (Mon May 27)	No class: Memorial Day Post Lab 3: Manipulating Vector Data: spatial topology (Due on 4th) Post Lab 4: Manipulating Vector Data: query, join, spatial query (Due on 4th)
Class 5 (Wed May 29)	1st half: Spatial topology and relations 2nd half: Review of Lab1 & Lab2; Lab work
Class 6 (Fri May 31)	1st half: GIS databases, table manipulation 2nd half: Lab work
Class 7 (Mon Jun 3)	1st half: Coordinate systems and map projections 2nd half: Lab work Post Lab5: Transformations of projections, datum and coordinate systems in GIS (Due on 9th) Post Lab 6: Spatial analysis of vector data (Due on 9th)
Class 8 (Wed Jun 5)	1st half: Spatial analysis of vector data I 2nd half: Review of lab3 & lab4; Lab work
Class 9 (Fri Jun 7)	1st half: Spatial analysis of vector data II 2nd half: Lab work
Class 10 (Mon Jun 10)	Mid-term review Review of Lab5 & 6; Prep for mid-term exam

Class	Topic
Class 11 (Wed Jun 12)	Mid-term Exam Post Lab 7: Getting to know raster data on Laulima (Due on 20th) Post Lab 8: Spatial Analyses on Raster Data on Laulima (Due on 20th)
Class 12 (Fri Jun 14)	1st half: Raster data model 2nd half: Review of lab5 & lab6; Mid-term Exam Q&A; Lab work
Class 13 (Mon Jun 17)	1st half: Spatial analysis of raster data I 2nd half: Lab work
Class 14 (Wed Jun 19)	1st half: Spatial analysis of raster data II 2nd half: Lab work Post Lab 9: Terrain analysis on Laulima (Due on 25th) Post Lab 10: Cost Surface Analysis on Laulima (Due on 25th) Post Final Lab (optional) on Laulima (Due on June 30)
Class 15 (Fri Jun 21)	1st half: Terrain analysis 2nd half: Review Lab 7&8; Lab work
Class 16 (Mon Jun 24)	1st half: Cartographic Modeling 2nd half: Lab work
Class 17 (Wed Jun 26)	1st half: Final review 2nd half: Review lab 9&10; Prep for final exam
Class 18 (Fri Jun 28)	Final exam

Important Note: This syllabus is tentative and subject to change. This is updated on May 19th, 2019.