Geographic Information Systems Certificate Program

Instructors

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Description

The Geographic Information Systems (GIS) Certificate Program provides students with an overview of the world of geospatial technology and how it is used to solve real world problems. The course offers understanding of the geospatial concepts and hands-on experience using the latest tools in the GIS industry, using ESRI's ArcGIS software.

Objectives

- Learn cartographic principles for map design, map reading and interpretation
- Learn concepts such as map scale, coordinate systems, and map projections
- Learn about data models and data formats
- Create and edit data; symbology
- Identify and access publicly available data sets
- Data visualization techniques and analysis tools
- Automate GIS custom workflows with Model Builder
- ArcGIS extensions such as Spatial Analyst, 3D analyst, Network Analyst
- Introduction to Python
- Introduction to Web GIS (ArcGIS Online, Story Map, Dashboard)

Source: ESRI

Class Information

Jan 28 – May 8, 2025

Tuesdays & Thursdays

6:00 pm – 8:00 pm

Online: Zoom Meeting
https://unm.zoom.us/j/93068730465

Office Hours: By appointment only

Required Materials

Getting to Know ArcGIS Pro 3.2 ISBN 9781589487772
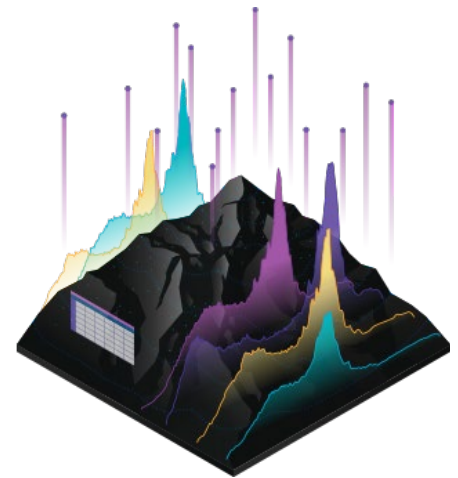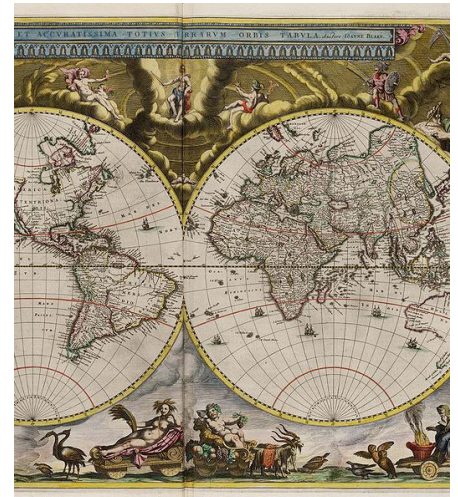
Optional Materials

How to Lie with Maps 3rd Edition, ISBN 978-0226435923

Required Software

PC or a Laptop with Windows OS is required

ArcGIS Pro (*license provided by the UNM Continuing Education*)

Course Schedule

Week 1	
Jan 28	Course Administration, Syllabus, Introductions, Software Provisioning Introduction to GIS, A Brief History
Jan 30	Data Models and Data Formats Reading – Chapter 1 & Chapter 2 Exercises: 2a, 2b (Getting to Know ArcGIS Pro)
Week 2	
Feb 4	What is Cartography? & Brief History Map Elements & Map Design Reading – Chapters 2, 10 (How to Lie with Maps) Exercise 1: Make a Map (Instructions provided in class)*
Feb 6	Coordinate Systems and Map Projections Map Scale & Generalization Reading – Chapter 3 (How to Lie with Maps) Exercise 2: Map Projections (Instructions provided in class)
Week 3	
Feb 11	Thematic Maps Readings – Chapters 6, 7 (How to Lie with Maps) Exercise 3: Thematic Maps (Instructions provided in class)*
Feb 13	Color & Typography Reading – Chapter 5 (How to Lie with Maps)
Week 4	
Feb 18	Data Classification Readings – Chapter 11 (How to Lie with Maps) Exercise 3b (Getting to know ArcGIS Pro) Exercise 4: Data Classification (Instructions provided in class)*
Feb 20	Ethics in GIS
Week 5	
Feb 25	Geodatabases Exercise 4a (Getting to know ArcGIS Pro)

Feb 27	Creating and Editing Data Exercises 4b, 4c (Getting to know ArcGIS Pro)
Week 6	
Mar 4	Querying Data Exercise 3a (Getting to know ArcGIS Pro)
Mar 6	Quiz and Review
Week 7	
Mar 11	Joins and Relates Exercise 3d (Getting to know ArcGIS Pro)
Mar 13	Geocoding Exercise 7b (Getting to know ArcGIS Pro)
Week 8	
Mar 18	Vector Analysis: Preparing data for analysis, Data Extraction Exercise 7c (Getting to know ArcGIS Pro)
Mar 20	Vector Analysis: Proximity and Overlay operations, Analyzing Spatial Patterns Exercises: 8a, 8b (Getting to Know ArcGIS)
Week 9	
Mar 25	Geodatabase Topology
Mar 27	Introduction to Model Builder Exercises 5a, 5b (Getting to know ArcGIS Pro)
Week 10	
Apr 1	Working with Rasters, Georeferencing
Apr 3	Quiz & Review
Week 11	
Apr 8	TBA
Apr 10	TBA
Week 12	
Apr 15	Raster Analysis 1 – Conditional, Density, Distance, Extraction Exercises • Part A: Introduction to the ArcGIS raster • Part B: Extract data by mask
Apr 17	Raster Analysis 2 – Map Algebra, Reclassify, Raster Overlay, Raster Statistics

Week 13	

Apr 22	Raster Analysis 3 – Interpolation, Surface, Generalization
	
	Exercises
	    • Part A: ArcGIS Geostatistical Analyst
	    • Part B: Site Selection

Apr 24	Terrain Analysis
	
	Exercises
	    • Part A: Creating a 3D Scene, creating a TIN from contours, draping features onto a TIN, and navigating Scenes
	    • Part B: 3D Analyst for landform analysis

Week 14	
Apr 29	Python Scripting Part 1 Exercises – Python Window and Scripting
May 1	Python Scripting Part 2 Exercises – Python Window and Scripting
Week 15	
May 6	Network Analysis Exercises – Network Analysis

May 8	Web GIS – Intro to ArcGIS Online
	
	Exercises
	    • Part A: Add data to ArcGIS Online and Create a Web map; customizing and stylizing data on ArcGIS Online
	    • Part B: Create a Web mapping application

Quick Reference Table of Assignments

Exercise	Due Date
Exercise 1 – Making a Map*	February 14, 2025
Exercise 3 – Thematic Maps*	February 21, 2025
Exercise 4 – Data Classification*	February 28, 2025
Exercise 5 – TBD	Tentative

* Required to turn in the assignment.

References:

Spatial Analyst: https://pro.arcgis.com/en/pro-app/latest/help/analysis/spatial-analyst/basics/what-is-the-spatial-analyst-extension.htm

3D Analyst: https://pro.arcgis.com/en/pro-app/latest/help/analysis/3d-analyst/get-started-with-3d-analyst-in-pro.htm

Network Analyst: https://pro.arcgis.com/en/pro-app/latest/help/analysis/networks/what-is-network-analyst-.htm

Additional Requirements

Students are expected to complete and turn in all assignments on time and participate in quizzes.

Attendance and active participation in all classes is expected. Please inform the instructor ahead of time if you anticipate absence from classes.

Must have a working microphone and web camera. Web cameras must be ON throughout the class. Mute microphone unless to identify yourself and/or share thoughts, to avoid distracting background noise.