GEOL 444/544: Arc-GIS for Geology
Brandon Lutz; blutz@nmsu.edu

Introduction/Contact

Course name: Arc-GIS for Geology
Times: M, W 1:30-2.45 pm
Instructor: Brandon Lutz, blutz@nmsu.edu; zoom meetings by appointment

Course Description

This course will teach you the most important Arc-GIS tools for geoscience.

Student outcomes:

1. Understand basic GIS data management (file types, folder structure, datum, projection)
2. Know where/how to find GIS data
3. Make professional-looking maps from start to finish
4. Edit and Analyze GIS data

Grading

Tutorial Quizzes	(10 total; 10 pts each, 100 pts)	10%	
Exercises	(9 total; ~60 pts each, 600 pts)*****	60%	* one exercise is 120 pts
Final Project	(01 total; 300 pts)	30%	

Total = 1000 pts.

Course Structure

Tutorials: very short videos that describe how to do a specific thing in Arc-GIS
- Uploaded Wed/Thu usually and as needed
- Quizzed over and discussed on Mon

Exercises: short projects that have a final product and utilize many Arc-GIS skills

Final Project: an Arc-GIS project that keys in on your interests
- Undergrads/grads: Present the final project to everyone
- Grads: presentation and paper on final project

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Mondays before 12:30 pm:
- watch and complete the tutorial on GIS skills

Mondays 1:30-2:45 pm:
- Discussion of tutorial on GIS skills
- Some lecture and in-class discussion
- Quiz over GIS tutorial and/or lecture
- Questions and troubleshoot previous week exercise

Wednesdays by 12:30 pm:
- Usually exercises from previous week turned in
- Watch video that describes next exercise

Wednesdays 1:30-2:45 pm:
- Begin new exercise together and troubleshoot problems

Exercises

Due Wednesdays @ 12:30 pm (see schedule).
- Watch the video explaining the exercise (if applicable). Work on it. Ask question ahead of time.
- Submitted following Wednesdays @ 12:30 pm **(you have 1 week to complete most)**
- Submissions will vary (most just a map PDF and .mpk)
- Submit online via Canvas.

Final Project

April 1st: Project idea and Procedure due
May 3rd: Final project due
May 3rd-14th: Presentations of final projects

Grads: Must complete a paper too (about project); length will vary. Project must be fully explained

- o **Format for paper (USE GSA Manuscript Style Template)**
  - Introduction
    - summarize the whole project succinctly
    - provide any important background information; why does your project matter?
    - 1 page maximum
  - Method
    - What did you do?
    - How?
    - A few paragraphs maximum
    - Include figures and captions
  - Results
    - What did you find?
    - Could be presented in tables and figures
  - Discussion and Conclusions
    - What does it all mean?
    - Why is it important?
    - Give a 1-2 sentence summary at the end
    - Length will vary; include figs and captions

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Late Policy

Late exercises and project will be accepted at 50%, even if they are 5 minutes late. Get your work done on time. Exercises will be compounding and cumulative. Please get in touch ahead of time if you have special circumstances.

Weekly Plan (last updated Jan 25th)

Week of	Tutorials	Monday	Wednesday
1/25/21 1/27/21	None….	• Syllabus/Intro • Organization • Remote Access	• Remote Access PC • Student Arc-GIS licenses • Arc-Map vs catalog • Lecture
2/1/21 2/3/21	• Datums & Projections • File Types (vector/raster) • Folder structure • Labels and Symbols • Data vs. Layout View • Data Frames • Export Map	• Quiz on tutorials • Intro: Ex 1	**Ex 1:** Map of NM *(Due 2/10/21)*
2/8/21 2/10/21	• Downloading Data • DEMs • Attributes • Definition Query • Labels	• Quiz on tutorials • Issues: Ex 1 • Intro: Ex 2	**Ex 1 due @ 12:30 pm** **Ex 2:** Map of Las Cruces *(Due 2/17/21)*
2/15/21 2/17/21	• Surface analyses (slope, contour, aspect, hillshade, curvature, relief)	• Quiz on tutorials • Issues: Ex 2 • Intro: Ex 3	**Ex 2 due @ 12:30 p** **Ex 3:** Slope map of Organ Mtns & "M" Mountain **(Due 2/25/21)**
2/22/21 2/24/21	• Georeferencing • Project Raster	• Quiz on tutorials • Issues: Ex 3 • Intro: Ex 4	**Ex 3 due @ 12:30 p** **Ex 4:** Georeferencing **(Due 3/3/21)**
3/1/21 3/3/21	• Point data • Add XY-data • lines • polygons	• Quiz on tutorials • Issues: Ex 4 • Intro: Ex 5	**Ex 4 due @ 12:30 p** **Ex 5:** TBD **(Due 3/3/21)**

Date	Topics		
3/8/21 3/10/21	• Editing polygons • Create features template • Create S/D symbols	• Quiz on tutorials • Issues: Ex 5 • Intro: Ex 6	**Ex 5 due @ 12:30 p** **Ex 6:** Digitizing Geologic maps **(Due 3/24/21) (worth 100 pts)**
3/15/21 3/17/21	• Topology Tools • Create Polygons from Points	Working on Ex 6	Working on Ex 6
3/22/21 3/24/21	Spring Break	SB 2021	SB 2021 **Ex 6 due @ 12:30 p**
3/29/21 3/31/21	• Reclassifying data • TBD • TBD	• Quiz on tutorials • Intro: Ex 7	**Ex 7:** Reclassifying the NM State Geologic map **(Due 4/7/21)**
4/5/21 4/7/21	• GIS profiles • Interpolation methods • Projecting data to cross-sections • Data transferability **Final project topics due**	• Quiz on tutorials • Issues: Ex 7 • Intro: Ex 8	**Ex 7 due @ 12:30 p** **Ex 8:** Profiles across major faults in the ECSZ **(Due 4/14/21)**
4/12/21 4/14/21	• Raster calculator	• Quiz on tutorials • Issues: Ex 8 • Intro: Ex 9	**Ex 8 due @ 12:30 p** **Ex 9:** Raster Calculations **(Due 4/21/21)**
4/19/21 4/21/21	• Export to Adobe Illustrator • Map Finishing • Multiply • Adobe tricks	• Quiz on tutorials • Issues: Ex 9	**Ex 9 due @ 12:30 p**
4/26/21 4/28/21	Open	Help with final projects	open
5/3/21 5/7/21	None..	Student presentations	Student presentations
5/10/21	**Final projects due**	EXAM week	EXAM week