GEOL 4812 - GIS Applications to Geology

Fall 2026 Syllabus, Section 01, CRN 43545,

Credit hours: 3

Instructor

Thomas Jordan, PhD, PG

Public Instructor Information

Instructor Title: Researcher & Part-Time Faculty
Instructor Professional Qualifications:

Ph.D., Geophysics, University at Buffalo, Buffalo, New York, 2003.

M.S., Geology, State University of New York at Fredonia, Fredonia, New York, 1986.

B.A., Geology, Alfred University, Alfred, New York, 1984.

Licensed Professional Geologist in 10 States

40 years of Industry Experience

Instructor Office Location: Moser 1050
Instructor Office Phone:330.941.3616

Course Description

4812. GIS Applications to Geology. This course covers a variety of geologic applications of GIS software; topics covered include: flood mapping, landslide hazard mapping, modeling soil erosion, watershed delineation, etc. Although you will be exposed to the basic functions of ArcGIS, the course is designed primarily to provide experience in obtaining, managing, interpreting, displaying, and presenting geo-spatial data in a meaningful context. Prereq.: GEOL 3701, GEOG 2611. 3 s.h.

Course Readings

Group	Title	Author	ISBN
Required	No Readings		

The course readings are subject to change in the event of extenuating circumstances, research developments, current events, and/or to ensure better learning.

Schedule of Topics and Assignments

Day	Date	Proposed Topic	Due/To Prepare for Class
Thu	8/27	Introduction, Data Sources, & Working with ArcPro, YSU Campus Map Project	
Thu	9/3	Introduction to Project #1: Property Development - Pennsylvania USGS Earth Explorer Resource and Georeferencing Historical Aerials & Maps Project Setup, Goal, and Deliverable Discussion	
Thu	9/10	Project 1 Continued: Building the Geodatabase and Discussion on Data Needs	
Thu	9/17	Intellectual Diversion: Image Processing and Machine Learning Methods - Missoula, MT Site	

Thu	9/24	Applying Machine Learning Lessons to Project 1	
Thu	10/1	The Geologic Base Map – Living off the Grid! (Examining Common Gridding Algorithms & Outcomes for Geological Applications) Kickoff Project #2: Structure Contour Map of the Faulted Pocono Formation, Lock Haven Quadrangle. Project Setup, Goal, and Deliverable Discussion	Draft Project 1 Report Due
Thu	10/8	Project #2 Continued: Examination of Gridding Outcomes and Fault Boundaries, Discussion of Local / Regional Geology	Final Project 1 Report Due
Thu	10/15	Project #3: DEMs and the Carolina Bays – What the heck are these things? Project Setup, Goal, Background Information, and Deliverable Discussion, Additional Sources of Data	Draft Project #2 Due
Thu	10/22	Using AI to Create Python Scripts for Processing Project #3 Data Testing & Debugging Custom Python Scripts	Final Project #2 Due
Thu	10/29	Compilation of Carolina Bays Results, Interpretation, & Discussion	>>> Proposal for Final GIS Project Due <<<
Thu	11/5	Introduction to Fracture Trace Analysis Methods for Abandoned Mines, Dams, and Other Sites of Interest Continue Work on Project #3	
Thu	11/12	Intellectural Diversion: Let there be LiDAR! Surface Features from a Former Electronics Facility, New Jersey	Draft Project #3 Due
Thu	11/19	Intellectual Diversion: DEMs and the Hydrology Tool Sets – Crab Creek Example Using Model Builder to Automate Workflows	Final Project #3 Due
Thu	11/26	Thanksgiving Holiday!!	
Thu	12/3	Intellectual Diversion: Working with Landsat, NAIP Color IR & NDVI Remote Sensing Data - In-Class Exercise Mineral Deposits at Laramie Mountains, WY, Avella, PA Landslide Evaluation	
Thu	12/10	Final GIS Project Presentations	

The course schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement, and/or to ensure better learning.