BAYLOR UNIVERSITY · ENVIRONMENTAL SCIENCE

ENV 4487 — Advanced GIS Analysis

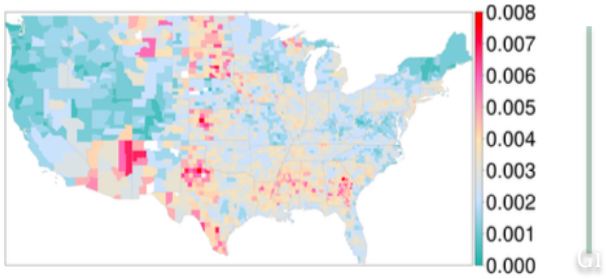
Spring 2026

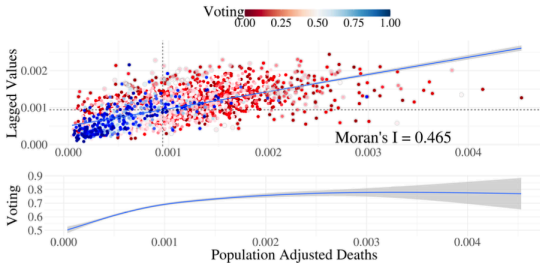
CREDITS 4

Principles and techniques for geospatial data collection, manipulation, modeling, visualization, and analysis. Emphasis on current raster modeling techniques, spatial statistical analysis, and using GIS as a predictive tool for environmental research.

CLASS DAYS	TIME	LOCATION
Mon-Wed-Fri	12:20-1:10pm (MW) 12:20-4:00pm (F)	BSB GIS Laboratory D405

ENV 4487 is a joint class between Geosciences and Environmental Science, which will explore the principles and techniques for geospatial data collection, manipulation, modeling, visualization, and analysis. Emphasis will be placed on current raster modeling techniques, spatial statistical analysis methods, and using GIS as a predictive tool for research. Students will be able to incorporate their existing research projects or other areas of interest into geospatial projects. Experience with R and ArcGIS is preferred but not required.

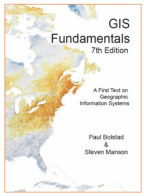




What you'll learn

- Raster modeling pipelines and map algebra
- Spatial statistics: autocorrelation, clustering, interpolation
- Predictive modeling for environmental research
- Integration of ML techniques with spatial data
- Geospatial data cleaning, joins, projections, resampling
- Cartographic design and reproducible workflows
- R integrations with modern GIS stacks
- Modeling applications in ArcGIS
- Basic use of GitHub to manage R code and data

Textbooks



GIS Fundamentals
7th edition
Paul Bolstad

Spatial Data Science with Applications in R
Edzer Pebesma, Roger Bivand
(free online)

Instructor: Dr. Erich Seamon, Environmental Science
Questions? erich_seamon@baylor.edu, or https://haclab.io/ENV4487