

Instructor: Dr. Marcos Luna
Office: Meier Hall, Room 326F
Email: mluna@salemstate.edu
Phone: (978) 542-6487
Class Time: Mondays 6 – 9 p.m.
Class Room: Meier Hall, Room 321
Office Hours: Mon. 4 – 6pm, Tues. thru Fri. 3 – 5pm, or By Appointment
Website: Canvas (<http://www.salemstate.edu/elearning/>)

Course Description:

This course examines how GIS is used for research or analysis and provides students with an opportunity to improve GIS skills. Students review literature on major theories and methods of geographic inquiry, as well as case studies. Students develop a research question and plan, conduct GIS analysis, and communicate findings. Not open to students who have received credit for GGR 904.

Course Goals:

- Explore GIS technology in the context of critical inquiry and scientific investigation
- Understand theoretical and technical bases of systematic geographic investigation as they are applied through GIS analysis
- Critically evaluate the advantages and limitations of GIS-based analysis and communication
- Improve facility with, and understanding of, more advanced applications of GIS, including quantitative and automated analyses and modeling
- Understand how to select appropriate techniques for analyzing and representing spatial data

Learning Objectives:

- Critically evaluate peer reviewed and scholarly literature involving GIS and other geospatial technology
- Identify hypotheses or research questions, independent and dependent variables, methodology, and results
- Apply analytic methods in GIS-based spatial analyses
- Communicate GIS research and analysis using common research format standards

Required Materials:

- An active mind, a good attitude, and something to take notes with. Some readings and all supporting multimedia materials will be provided online through Canvas.
- Personal storage device (i.e. flash drive, thumb drive, USB drive)

Course Policies:

1. Students are responsible for all material found in the required readings and class lectures. Students are responsible for all work and lectures due to absences. Attendance is very important and will be recorded throughout the semester.
2. All quizzes and assignments are due before the assigned due dates. Late assignments will not be accepted unless discussed with the professor at least 48 hours BEFORE the due date OR with a documented emergency.
3. Students who have questions about readings, lectures, or assignments are strongly encouraged to bring them to the attention of the instructor in class, after class, or during office hours.
4. Salem State University is committed to providing equal access to the educational experience for all students in compliance with Section 504 of the Rehabilitation Act of 1973 and the American with Disabilities Act and to providing all academic accommodations, aids, and adjustments. Any student who has a documented disability requiring an accommodation, aid or adjustment should speak with the instructor immediately. Students who have not done so should provide documentation to and schedule an appointment with the Office for Students with Disabilities and obtain appropriate services.
5. **Cell phones and beepers** are to be turned **OFF** while in class. Students seen to be **texting, IMing, Facebooking**, or using a cell phone or any other **portable communication device** during class will lose participation credit for that day regardless of how well the student has participated in the day's class discussion.
6. **Laptops/tablets** may be used for note taking. However, if I find that your use of the device is becoming a distraction to you or those around you, I will ask you to turn it off or leave the classroom and you will lose participation points for that class. **Social media, Emailing, Instant Messaging, and Text Messaging** are all **INAPPROPRIATE** during class time.
7. **The instructor reserves the right to change the course content and syllabus at any time during the semester.**

8. Grading

Class Participation	10%
Article Summaries	20%
Assignments/Exercises	50%
Final Assignment Presentation	20%
<hr/>	
Total:	100%

Some detail about the assignments/exercises:

Please see the detailed reading and assignment schedule below for due dates. If you have questions about any assignment or your grades, please send me an email or come see me.

In-class Exercises

Throughout the semester there will be in-class exercises to practice techniques discussed in class and readings.

Article Summaries

Throughout the semester you will find scholarly or professional articles on *applications of GIS to energy research and analysis*, summarize the essential elements of your articles, and present an article summary at least once to the class.

Major Assignments**Assignment #1 – Descriptive Analysis**

Describe the spatial distribution and pattern of power generating stations in Massachusetts. Use as many spatial measures as are appropriate. Write up your analysis following a scientific paper format: Purpose, Background, Methods and Measures, Results, Discussion, Works Cited. This paper should be approximately 5 pages in length, excluding figures and references.

Extra Credit: Describe the spatial distribution and its relationship to the demographics of surrounding communities.

Assignment #2 – Predictive Analysis

Project electricity consumption by municipality to 2030 for Massachusetts and address the following questions: What communities are likely to see the greatest growth and decline? Are there regional patterns? How does this compare to the state as a whole? How will the future spatial pattern of consumption compare to that of today? Write up your analysis following a scientific paper format: Purpose, Background, Methods and Measures, Results, Discussion, Works Cited. This paper should be approximately 5 pages in length, excluding figures and references.

Assignment #3 – Prescriptive Analysis

Select a community in Massachusetts and evaluate the potential for at least two renewable energy sources (i.e. biomass, wind, or solar). Based on your analyses, provide a summary of your findings and recommendations to the community on the potential for exploiting renewable energy. What percentage of the community's current and projected future consumption could be replaced by these locally produced renewable energy sources? Write up your analysis and recommendation following a scientific paper format: Purpose, Background, Methods and Measures, Results, Discussion, Works Cited. This paper should be approximately 5 pages in length, excluding figures and references.

Extra Credit: Incorporate an analysis of GHGs that could be displaced by these sources.

Final Presentation

During the final two weeks of the semester you will make an oral presentation of your prescriptive analysis to the class. Presentations should be approximately 15 minutes in length.

Course Outline

Week	Date		Assignments Due
Introduction: What is research and analysis?			
1	1/27		
Measuring Geographic Distributions			
2	2/3		Article summary
Identifying Patterns			
3	2/10		Article summary
Identifying Clusters			
4	2/17	PRESIDENTS DAY – NO CLASS	
	2/21	Make-Up Day	Article summary
Analyzing Relationships for Explanation and Prediction			
5	2/24		
6	3/3		<i>Assignment #1 – Descriptive Analysis</i>
7	3/10	SPRING BREAK – NO CLASS	
Modeling Scenarios and Suitability			
8	3/17		Article summary
9	3/24		Article summary
10	3/31		<i>Assignment #2 – Predictive Analysis</i>
11	4/7	AAG	Article summary
12	4/14		Article summary

Week	Date		Assignments Due
13	4/21	PATRIOT'S DAY – NO CLASS	
	4/25	Make-Up Day	Article summary
Final Presentations			
14	4/28		<i>Assignment #3 – Prescriptive Analysis Presentations</i>
15	5/5	LAST DAY OF CLASS	<i>Presentations</i>

Article Review Guidelines

Goal: To summarize the essential elements of scholarly or professional articles

Purpose: Learning how to deconstruct, analyze and critique methods used in GIS research and analysis is an essential competency of graduate level GIS work. In these assignments, you will practice and demonstrate that skill using articles that you find through scholarly and professional literature databases. In addition, these articles may form the foundation of your written analyses for the major assignments.

Instructions: Find a scholarly, professional, or gray literature article on any application of GIS or geospatial technology to energy, and write a brief summary of your article. Your summary should be written in prose (not bulleted or fragmentary) and include the elements described below.

Format: 450 – 600 words

This must be written in prose (i.e. complete sentences, paragraphs)

Follow the required standard format

Only the terms in **bold** are required. Please do not use the outline format in your written submission.

Reference citation

1. You must use Chicago or AAG citation style.
 - a. Bowers, K., and S. D. Johnson. 2003. Measuring the geographical displacement and diffusion of benefit effects of crime prevention activity. *Journal of Quantitative Criminology* 19 (3): 275-301.
 - b. Goodell, J. 2010. *How to cool the planet : geoengineering and the audacious quest to fix Earth's climate*. Boston: Houghton Mifflin Harcourt.
 - c. Michaels, P. J., and R. C. Balling Jr. 2009. Foreword: a climate of extremes. In *Climate of extremes: global warming science they don't want you to know*, ed. P. J. Michaels, 1-10. Washington DC: Cato Institute.
 - d. Will, G. F. 2010. The Earth Doesn't Care. *Newsweek* 156:26-26.
 - e. Springer, D. 2007. *Integrating schools into healthy community design*. Issue Brief. Washington DC: National Governor's Association. <http://www.nga.org/Files/pdf/0705schoolshealthydesign.pdf> (last accessed 8 January 2011).

Research question or purpose

1. Description of the research problem or goal.
2. What is the author's main concern? Or, what is the problem or issue that drives this study?
3. What are the specific research questions be asked in this study, or what are the specific objectives to be accomplished or demonstrated?

Approach and data collection method (this should be the focus of the summary)

1. How did the authors acquire their data?
 - a. For example:
 - i. Government GIS database
 - ii. Geocoding
 - iii. Digitizing
 - iv. Remote sensing data
 - v. Secondary data source
 - vi. Etc.
2. What were the main measures used in this study and how were those measures defined?
3. What kinds of analysis were done?
 - a. Statistical analyses
 - b. Modeling
 - c. Visualization

Interpretation/findings

1. What did the authors find?
2. What are the main conclusions?

Critical evaluation

1. What are the strengths and weaknesses of this research design?
2. What are the strengths and weaknesses in their conclusions, given the research design?
3. Are you convinced? Why or why not?