



Geography 805

GIS and Spatial Analysis

**Winter
2013**

	Geographic Information Science GEOG 805	Geographic Information Systems GEOG 303
Instructors:	Joe Piwowar joe.piwowar@uregina.ca 585-5273	Julia Siemer julia.siemer@uregina.ca
Office Hours: (CL 340)	I'm in my office a lot so please drop by if you have a question. I'm also happy to make an appointment for a specific time if you wish Just send me a request by email.	
Meeting Times:	11:30 – 12:20 F CL 330.2	11:30 – 12:20 MW CL 312

Introduction

Geographic Information *Science* (GI-Science) provides us with a means of understanding and dealing with some of the most pressing geographical problems of our time. GI-Science is being utilized to examine problems like tropical deforestation, the need for the ecologically sensitive development of natural resources, rapid urbanization, and the future of the global climate. GI-Science encompass many fundamental concepts about spatial analysis.

Geographical Information *Systems* (GI-Systems; GIS) are the computers and software tools used to analyze geographic data. They are distinguished from other spatial data handling activities by their emphasis on spatial analysis.

The aim of this course is to enable students to understand what a GIS is, how GIS can be used to address natural resource management and planning problems, and to give you a good grasp of GIS, both conceptually and in practice.

After successfully completing this course, you will be able to:

- understand the unique nature of geographic information
- describe various methods of abstracting geographic information from digital spatial data
- describe the common analyses applied to spatial data
- given a geographic problem, describe the spatial data and analysis steps that could be implemented in its solution

Textbook

Shellito, Bradley, 2011. *Introduction to Geospatial Technologies*. W.H.Freeman.

Coursework & Grading

You do not have to complete any of the assignments or exams from GEOG 303.

Learning ArcGIS Desktop – 10%

This course is available at <http://training.esri.com>. Finish this online course and submit the Certificate of Completion to me by email by **February 15**.

Literature Reviews – 25% (5 x 5%)

Prepare annotated reviews of 5 papers from refereed journals that describe GIS procedure(s) used in a project that interests you. Ideally, all the papers will address the topic that you will choose for your GIS project. For each paper you should include:

- A full bibliographic reference
- The objectives of the research
- A description of the data used
- A description of the analysis procedure, presented as an ordered list or a flowchart
- A summary of the results

The review of each paper should not be more than 1 or 2 pages long. Please submit your reviews to me by email by the dates listed in the Schedule.

GIS Project – 40%*

A key component of the course is for you to demonstrate your learned GIS knowledge and abilities by designing, developing, and implementing your own GIS analysis. You are to design an analysis strategy, find data to support your investigation, and implement your solution.

Research Paper – 25%

Prepare a research paper describing your project. In your paper you should:

- Introduce what you were trying to accomplish.
- Review of some previously published work on this topic.
- Describe the data and study area.
- Describe the analysis approach (include a flowchart).
- Present results of your analysis (maps, graphs, or tables where relevant).
- Interpret your results.
- Discuss the assumptions and limitations of your work.
- Present a summary and conclusions.
- Provide suggestions for future research.

A research paper that earns top marks will be one that has the potential to be submitted to a refereed journal for publication. Research papers are due **April 26**.

* This is a core course activity: your Project must receive a passing grade for you to receive a passing grade for the course.

GIS Project Implementation Process	
<ul style="list-style-type: none"> Determine the objectives of the project <ul style="list-style-type: none"> Identify the problem to solve Break down the problem into measurable criteria Determine data requirements 	<p>Prepare a <u>project proposal</u> as a 10 minute PowerPoint presentation that addresses the 3 points on the left. Presentations will be held in class on February 8. Please bring a printed copy of your PowerPoint slides to hand in to me in class on this day.</p>
<ul style="list-style-type: none"> Build the database and prepare the data for analysis <ul style="list-style-type: none"> Identify and obtain relevant data Design and implement the database Add spatial and attribute data to the database; derive new attributes, if necessary Manage and modify the data; re-project the data, if necessary 	<p>Prepare a <u>data dictionary</u> describing the data you will use in your analyses. For each data set you should include:</p> <ul style="list-style-type: none"> Source Date of collection Projection Attributes that you will use and their ranges of values. <p>The data dictionary for each data set should not be more than 1 or 2 pages long. Please submit a draft of your dictionary to me by email by March 8.</p>
<ul style="list-style-type: none"> Perform the analysis <ul style="list-style-type: none"> Determine methods and sequence of operations Process the data Evaluate and interpret the results Refine the analysis as needed to generate alternatives 	<p>Prepare a <u>flowchart</u> showing your methods and sequence of operations. Please submit a draft of your flowchart to me by email by March 8.</p>
<ul style="list-style-type: none"> Present the results <ul style="list-style-type: none"> Create final products for your intended audience Document your results Create metadata for your new data files 	<p>Prepare your <u>results</u> as a PowerPoint presentation documenting your objectives, data, analysis procedures, and results. Your presentation should not be more than about 10 slides and you need to be able to present it in 15 minutes. Presentations will be held in class on April 5.</p>

Schedule

Date		Topic	Meeting Type
January	11	Course Introduction Begin working on <i>Learning ArcGIS for Desktop</i> Begin thinking about your GIS project Start reading journals for your Literature Reviews	Class meeting
	18	Literature Review 1 due	Schedule a meeting with me to discuss your project.*
	25	Literature Review 2 due	
February	1	Literature Review 3 due	
	8	Literature Review 4 due Project proposal due Start assembling the data you will need for your project	Class meeting Project proposal presentations
	15	Literature Review 5 due <i>Learning ArcGIS for Desktop</i> Certificate of Completion due	Class meeting Schedule a meeting with me to discuss your data requirements.*
	22	<i>Reading Week</i>	
March	1	GIS analysis	
	8	Draft data dictionary due Draft GIS analysis flowchart due	Schedule a meeting with me to discuss your GIS analysis procedure.*
	15	GIS analysis	
	22	GIS analysis	
	29	GIS analysis	
April	5	Project presentation due	Class meeting Project presentations
	12		Class meeting Project presentations
	26	Research paper due	

*You must have a meeting with me during these 3 time periods to discuss the various aspects of your project. Send me an email to schedule the meeting.

NAME: _____

MARK: _____/5

LITERATURE REVIEW GRADING RUBRIC

Paper Title:

Review	(5 marks)
<ul style="list-style-type: none">• A full bibliographic reference• The objectives of the research• A description of the data used• An ordered list or flowchart that documents the analysis procedure• A summary of the results	

NAME: _____

MARK: _____/40

GIS PROJECT GRADING RUBRIC

Project Proposal (10 marks)	
<ul style="list-style-type: none"> • State the objectives of the project • Identify the problem to solve • Break down the problem into measurable criteria • Determine data requirements • Presentation clarity 	
Data Dictionaries (10 marks)	
<ul style="list-style-type: none"> • Source • Date of collection • Projection • Attributes that you will use and their ranges of values. 	
Flowchart (10 marks)	
<ul style="list-style-type: none"> • Clarity & neatness • Sufficient detail to repeat the analysis but not too complex 	
Results Presentation (10 marks)	
<ul style="list-style-type: none"> • Objectives • Data • Analysis procedures • Results 	

NAME: _____

MARK: _____/25

RESEARCH PAPER GRADING RUBRIC

Introduction and Background (3 marks)	
• Introduction to what you were trying to accomplish.	
• What has been done by others?	
• Objectives	
• Description of the study area.	
Methods (5 marks)	
• Description of data used in the analysis.	
• Description of analysis approach.	
• Flowchart.	
Results - Graphics (5 marks)	
• Results of analysis (images, maps, graphs, or tables where relevant).	
Results - Documentation (5 marks)	
• Interpretation of results.	
• Statement of limitations.	
• Suggestions for further research.	
General Presentation (3 marks)	
• Neat and concise reporting.	
• Free from spelling and grammar errors.	
• Organization – Report is well laid-out using appropriate sections.	
Overall Quality (4 marks)	
• Including other background information to help introduce the problem and/or analyze the results.	
• Complexity of the analysis.	
• Can this paper be submitted to an academic journal for publication?	
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