

Syllabus for: Spatial Data Analysis in GIS	
Semester & Year:	Spring 2014
Course ID and Section Number:	FNR 66 Section E4812
Number of Credits/Units:	3
Day/Time:	MW 18:05 – 20:30
Location:	AT 107
Instructor's Name:	Patton
Contact Information:	Office location and hours: no office Phone: 707.407.0021 Email: Jason-Patton@redwoods.edu
Course Description (catalog description as described in course outline):	
A continuation of the introductory course to GIS and covers more advanced concepts of analyzing spatial data in Geographic Information Systems (GIS). Students will learn techniques for rectifying data sources, acquiring, structuring, and importing data sets and developing more advanced queries and maps.	
Student Learning Outcomes (as described in course outline) :	
<ol style="list-style-type: none"> 1. Explain how to acquire, rectify, convert, and utilize GIS data from various sources. 2. Analyze and explain complex spatial data. 3. Lab specific outcome: Acquire, manipulate, and analyze spatial data from a variety of sources and develop complex map products and reports. 	
Special accommodations: College of the Redwoods complies with the Americans with Disabilities Act in making reasonable accommodations for qualified students with disabilities. Please present your written accommodations document to me as promptly as possible so that necessary arrangements can be made. If you have a disability or believe you might benefit from disability related services and may need accommodations, please see me or contact Disabled Students Programs and Services.	
Academic Misconduct: Cheating, plagiarism, collusion, abuse of resource materials, computer misuse, fabrication or falsification, multiple submissions, complicity in academic misconduct, and/ or bearing false witness will not be tolerated. Violations will be dealt with according to the procedures and sanctions proscribed by the College of the Redwoods. Students caught plagiarizing or cheating on exams will receive an "F" in the course.	
<p>The student code of conduct is available on the College of the Redwoods website at: http://redwoods.edu/District/Board/New/Chapter5/AP%205500%20Conduct%20Code%20final%2002-07-2012.pdf</p> <p>Additional information about the rights and responsibilities of students, Board policies, and administrative procedures is located in the college catalog and on the College of the Redwoods homepage.</p>	
College of the Redwoods is committed to equal opportunity in employment, admission to the college, and in the conduct of all of its programs and activities.	

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Course Syllabus
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Spring 2014 Section E4812
M&W 6:05-8:30PM Room AT 107

Instructor: Jason Robert Patton

email: jason-patton@redwoods.edu

Required Text: Christopher D. Lloyd, [Spatial Data Analysis](#), 1st ed., 2010

Required Supplies: three ring binder for class handouts including blank paper for taking notes during class

Contact: Please don't hesitate to email me with any questions, comments, or concerns. I welcome any feedback or suggestions. Please do not use myCr messaging to get in contact with me. The best way to contact me for any reason is by sending an email directly to my College of the Redwoods email jason-patton@redwoods.edu

Course Description

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Classroom Conduct

Side conversations among classmates are disrespectful and disruptive to the instructor and your fellow students. Questions or comments about the course material are welcome at all times but should be approached in a respectful manner.

The use of cell phones, iPods, or other items that may distract you, your instructor, or your classmates are not permitted during class. All such devices must be turned off.

You may not leave the room during an exam or quiz unless you are ready to turn in your finished exam.

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Grading

Your final grade will be comprised of:

<u>Required</u>	<u>Points</u>
Discussion Leader	100
Discussion Review (2)	50
Paper Review (2)	50
Participation	50
Project Proposal	50
Data Layer Creation	50
Final Project Report	100
Project Presentation	100
Labs (10)	200
<u>Exams (3)</u>	<u>150</u>
Sub-Total	900
<u>Optional (choose)</u>	<u>Points</u>
Paper Review	25
Literature Review	25
Logical Data Model	50
Draft Report	50
<u>Data Layer Creation</u>	<u>25</u>
Sub-Total	100
Total	1000

There are 1000 points available and grades are assigned by the percentage of total points as follows:

1000-940=A 939-900=A- 899-870=B+ 869-830=B 829-800=B-
799-770=C+ 769-700=C 699-670=D+ 669-600=D <599=F

Academic Honesty

You are encouraged to work together on assignments. However, all work you turn in must be your own independent, original work.

In the event that any work is copied from another student, zero credit will be given to all students involved (regardless of who copied from whom).

Any sources of information used in your written work must be referenced (regardless of whether the material was copied word-for-word). This includes your text book and all internet sources (reference these by including the name and URL). Any work including

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un-referenced material from another source (regardless of whether it was copied word-for-word) will be given zero credit.

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Academic dishonesty in any form may be reported to the vice president of CR, as per the student code of conduct available at <http://www.redwoods.edu/District/Board/New/Chapter5/Ap5500.pdf> See in particular page 9, Article VIII which begins "Students are expected to demonstrate qualities of morality, integrity, honesty, civility, honor, and respect."

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Tentative Class Schedule*

<u>Date</u>	<u>Topic</u>	<u>Readings</u>
Week 1	Lecture 1: Martin Luther King Jr. Day Lecture 2: Orientation, Logistics, Project Report Outline	CH-1
Week 2	Lecture 3: Basic GIS review <u>Basic GIS Lab (1)</u> Lecture 4: Basic GIS review cont.	CH-2
Week 3	Lecture 5: Basic GIS statistics <u>GIS Statistics Lab (2)</u> Lecture 6: Basic GIS statistics cont.; paper review #1 due	CH-3
Week 4	Lecture 7: Spatial Data Analysis <u>THP Lab (3)</u> Lecture 8: Quiz ; Spatial Data Analysis cont.	CH-4
Week 5	Lecture 9: President's Day Lecture 10: Proposal Due ; Review Quiz 1; Combinations of Data <u>Flood Hazard and Risk Lab (4)</u>	CH-5

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Week 6	Lecture 11: Network Analysis <u>Network Analysis Lab (5)</u> Lecture 12: Network Analysis cont.; paper review #2 due	CH-6
Week 7	Lecture 13: Source Variation in Points <u>LiDAR Measurement Lab (6)</u> Lecture 14: Quiz 2	CH-7
Week 8	Lecture 15: Review Quiz 2; Spatial Patterns <u>Seismic Hazard and Risk Lab (7)</u> Lecture 16: Spatial Patterns cont.	CH-8
SPRING BREAK		
Week 9	Lecture 17: Spatial Interpolation <u>Seismic Hazard and Risk Lab cont. (8)</u> Lecture 18: Spatial Interpolation cont.	CH-9
Week 10	Lecture 19: Raster Analysis <u>Bathymetry Lab (9)</u> Lecture 20: Raster Analysis cont.	CH-10
Week 11	Lecture 21: Case Study: Tsunami Modeling <u>Sea-Level Rise Hazard and Risk Lab (10)</u> Lecture 22: Quiz 3 ; Case Study: Readers Choice	
Week 12	Lecture 23: Review Quiz 3; Case Studies: Landslide Modeling Lecture 24: Case Study: Readers Choice	
Week 13	Lecture 25: Final Project Work Lecture 26: Final Project Work	
Week 14	Lecture 27: Project Presentations Lecture 28: no class	
Week 15	Lecture 29: Project Presentations Lecture 30: Project Presentations	
Week 16	FINALS WEEK: Final Report due online	

*** Note: Instructor reserves the right to make changes to course schedule as deemed necessary.**

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College of the Redwoods Resources and Information

Special accommodations: College of the Redwoods complies with the Americans with Disabilities Act in making reasonable accommodations for qualified students with disabilities. Please present your written accommodation request at least one week before the first test so that necessary arrangements can be made. No last-minute arrangements or post-test adjustments will be made. If you have a disability or believe you might benefit from disability related services and may need accommodations, please see me or contact Disabled Students Programs and Services. Students may make requests for alternative media by contacting DSPS.

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Course Information and Assessment

Required Exercise Descriptions (900 points):

Discussion Leader (100):

One or two students will sign up to lead the class discussion for many of the class meetings. Leading class discussion will involve the following:

1. Select appropriate topics and readings for discussion. Readings should be provided to the class at least one week in advance so they may be made available to the class. Email pdfs of the papers to the instructor so they can distribute them to the class.
2. Discussion leader(s) should begin the class period with a 5-10 minute introduction and summary of the topic and readings.
3. Provide a written outline for the day, including topics/questions for discussion and any key points that you wish to highlight from the readings.
4. Mediate the discussion (not dominate it) and involve classmates in a fair/equitable manner.

Discussion Review (50):

Students will review two class discussions. These reviews will be summarized on the review sheet provided by the discussion leader. These are intended to be constructive criticism for the discussion leader, as well as a measure of the student's comprehension. There is also space to provide a paragraph summary of the class discussion. Students who take good notes during our discussion sessions will have material with which to base their review.

Topical Paper Reviews (50+):

These are intended as a means for you to get into the GIS literature. The goal is for you to learn more about the current research and applications of GIS to fields or disciplines beyond what we are able to cover in the context of this course.

Each review is worth 25 points. You should locate and read a paper in a scientific or professional journal or a chapter in an edited text or GIS textbook. This assignment consists of a 3-4 page typewritten summary and critique of the selected reading.

Participation (50):

Meaningful involvement in class discussions is the primary component of the participation grade. Although it would be desirable for all students to actively participate in every class session, this is not always feasible. In rough terms, you will receive points for each class session your participation meets the standard of meaningful involvement. Thus, for full credit, you will need to actively participate in at least 20 class sessions. Of course, if you are normally present and participating in class you will receive full credit for participation without having to worry about it!

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Participation will be evaluated as an ongoing process throughout the semester.

Project proposal (50):

A formal, written project proposal is due at the end of the fifth week of classes. You are encouraged to propose a topic related to your present activities or interests. Remember to use topic sentences for your paragraphs.

The format for the proposal is as follows:

1. Cover page: Including proposed title and your name.
2. Project Description / Objectives: What is the purpose or need for your project? What are you doing, and why? What is your hypothesis or question? What are you modeling with the GIS system?
3. Data sources: This section should specify the necessary maps, aerial photos, field data etc. you will be using. DO NOT assume data is available! Locate the specific sources and materials in advance.
4. Timeline: The schedule you will follow to complete your project during the semester. If you intend to submit a draft as part of your contract, be sure this is included in the timeline.
5. Anticipated Products/Outcomes: What will your outputs be (in addition to the written report)? For example, will you produce maps, graphs, tables, recommendations, etc?

Data Layer Creation (50+):

This may be a useful or necessary step in your project. Up to two newly digitized and attributed layers and/or data layers imported from a nonnative GIS format (e.g. scanned analog maps) are eligible for credit. Submitted data layers must include a data dictionary and complete metadata. These layers are due with the final report.

Final Project Report (100):

The final report should sufficiently discuss all aspects of your project and be no more than 15 pages typed. Tables, graphs, or figures should be attached in an appendix. Please include a minimum of three figures, one table, and one plot. Reports should follow scientific writing conventions appropriate to your discipline. The report must be submitted electronically.

The basic format for the written report is as follows:

- I. Cover page: Including project title and your name.
- II. Objective of the project: What is the purpose or need for your project? (real or hypothetical) What are you doing, and why? What is your hypothesis or question? What are you modeling with the GIS system?

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- III. Materials, tools, concepts: What materials software tools and GIS techniques were used to accomplish the project? What data did you use and where did it come from? (who collected it, when, and why?)
- IV. Methods: Steps followed to produce the final product or result (i.e., outline, written description, flow chart, etc.)
- V. Results: What were your findings, statistics generated, maps, tables and graphs produced?
- VI. Discussion and Conclusion: What do your results show? What problems were encountered? How did you deal with them? How would you advise someone who was now going to do the same or similar project? Would the cost of data specific to your project needs be justified or was the available data adequate?
- VII. References: Including references to book, journals, photos and maps in proper bibliographic form.
- VIII. Appendices: Relevant attachments, including graphs, tables, maps.

Final Project Presentation (100):

Presentations should be done in the style of a professional/conference presentation, including appropriate visuals (posters, slides, overheads or computer projection). Presentations will be announced and open to the CR community. You should plan to speak for 10 to 12 minutes followed by 3 to 5 minutes of question and answer from the class or others in attendance.

Labs (200):

Each week we will focus on a specific topic and we will use some of the class time to develop these themes with laboratory exercises. You may need to spend some time out of class completing the labs. There are 10 labs throughout the course, each worth 20 points and they are due by the beginning of class the following week.

Exams (150):

The 3 exams are worth 50 points each. The exams are a mix of multiple choice, true/false, short answer, and essay questions based on the lectures, activities, homework, and course reading. Some parts of the exams are also GIS exercises similar to the lab exercises. Exams cover the material since the beginning of the course or the last exam, or whatever is most recent.

Missing an exam: All make-up exams should be arranged for in advance when possible. In the event of an emergency or sudden illness that prevents you from attending the exam, you must contact me as soon as possible and arrange a time for the exam to be completed before our next regular class time. If you miss an exam (and do not contact

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me to make it up) or if you arrange a makeup that you do not take, you will receive a zero for that exam.

Reading:

In this syllabus I provide a list of required reading in the Lloyd text *Spatial Data Analysis* textbook for each week. The student is expected to read the assignment before class. This reading provides the theoretical background for the material in this course and will be a key to your success. The Lab assignments will be applications of these theoretical concepts from the text. Periodically I will ask you questions from the reading at the beginning of class, before we have covered the material in lecture.

Optional Exercise Descriptions (Choose 100 points):

Topical Paper Review (25):

Literature Review for the Final Project (50):

In some cases it may be important to complete an extensive review of the literature to justify and describe the relevance of GIS to your particular project. The literature review is an in-depth process by which you will locate and review the GIS literature specifically related to your goals.

To receive full credit for this option you must locate and write a coherent literature review including no fewer than 10 sources which directly or indirectly relate to the use of GIS (or associated analysis) in your project. You may include literature you have used in meeting the requirements of other portions of your contract, however, the goals/purpose of the literature review are somewhat different and thus your reuse of these materials will take on a different perspective for this assignment.

Logical Data Model (50):

Some students may wish to complete a logical data model as a means for organizing and applying the various concepts of GIS to their individual project. To receive full credit for this option you must complete a flowchart including all data components and GIS concepts that will be utilized in your project. The chart should be prepared with a flowcharting software package or neatly drawn by hand using a flowcharting template and ruler.

Draft report (50):

A draft version of your final report may be submitted for comments and suggestions. To receive full credit the draft must contain at least sections I - IV and VII and demonstrate progress on sections V, VI and VIII as described in the requirements for the final project.

Data Layer Creation (25):

*** Please note that this document is informational and subject to change.**

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Course Expectations

Class will start on time at 6:05 PM. You are responsible to be present for and be attentive to all the material covered in class. If you need to leave the class early, please let me know before the class starts.

This is a college-level science class, and will require a commitment of your time outside of class. This at-home time will enable you to digest the material we cover in class and help when you are asked on the exams to apply these concepts to different problems and applications.

You will spend 6 to 9 hours per week on course material outside of class. You are encouraged to set aside a specific time each week outside of class devoted solely to each course:

- o Reviewing lecture notes and in-class exercises each week
- o Reading the textbook
- o Working on the recommended exercises from the textbook
- o Completing experiment write-ups and homework assignments
- o Studying for exams

Note that 6 hours per week at home is the average minimum to pass. Some students may require more time at home just to pass; for some in this course that may be enough to get an A. A student who is very attentive in class, asks questions, and takes careful notes will need less at-home time.

Absences: It is difficult to do well in this class without attending all the lectures. I understand there will be an occasional absence due to illness or emergency, however I consider more than two to three absences per semester excessive. If you do miss a class:

1. Obtain the course material online (PowerPoint slides, extra reading, and handouts). The slides will include information about any homework or in-class exercises that were assigned. Most assignments and handouts referenced by the slides will be in your handouts.
2. Next, try to obtain a copy of lecture notes from a classmate since there are many things we cover that are not spelled out directly on the slides or handouts.
3. Read the required reading covering the material you missed.
4. After this, feel free to contact me by email with any questions.

Final grade active attendance boost: If your final course grade after rounding to the nearest whole number is within 1 point of a grade transition (C to C+, D to C, A- to A, etc.) I will give you the boost needed to obtain the higher grade if you have actively attended most classes and succeeded in many of the in-class pop quiz questions.

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Course Expectations

More than 2-3 unexcused absences is considered excessive and will disqualify you from this opportunity. Conduct not in accordance with that outlined below will also prevent you from receiving this bonus.

Computer skills: This class will require computer use outside of class. Activities involving the 4 skills listed below will be included throughout the semester. In addition, you will be expected to check myCR regularly for announcements. If any of the items listed below seem foreign to you, you are encouraged to sign up this semester for CIS 100 "Basic Computer Skills", a beginning computer literacy course at CR.

1. Send and receive email from your CR Google email account.
2. Open a web browser, and access a web page if you are given the web address.
3. Access course material (handouts, slides, announcements, etc.).
4. Open Microsoft word (.doc or .docx), Microsoft Excel (.xls or .xlsx) and Adobe .pdf documents to read their contents.

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