ES341 Fundamentals of Geographic Information Systems
Policies and Procedures

Winter Term 2009 - Western Oregon University
4 CR MW 4:00 – 5:50 PM Natural Sciences Bldg, Rm 216/218

INSTRUCTOR: Dr. S. Taylor
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COURSE DESCRIPTION:

This course focuses an introduction to Geographic Information Systems (GIS) using the ArcGIS software platform. GIS is comprised of computer hardware and software that links digital maps to spatial data. GIS systems provide the capability to store, retrieve, display, and quantitatively analyze map-based spatial information. Class topics include cartographic principles, coordinate systems, map projections, database concepts, vector/raster data models, attribute/feature editing, geocoding, geoprocessing, spatial analysis, and map production.

THE PROFESSOR'S PHILOSOPHY ON UPPER DIVISION EARTH SCIENCE / GEOLOGY COURSES:

The upper division Earth Science / Geology course sequence is designed for mature, serious students who are willing to work hard, play hard, have fun, and learn in-depth skills / concepts in a professional academic setting. By default, our student population is very diverse with a wide array of skills, interests, and career goals. The student population ranges from serious Earth Science majors with focused career objectives, to Geology / Earth Science minors, to Geography and Science Education majors. As such, the professor is charged with serving a diverse array of student interests and career goals in the most professional manner possible. The problem-solving and technical skills acquired via training in the Earth Sciences are highly valuable (and marketable), regardless of career track. Students are expected to actively participate in the learning process and make a significant contribution to the academic integrity of the Earth Science program at Western Oregon University. The ultimate goal of the program is to provide graduates with the academic skills that will enable them to be highly competitive in graduate school or the career marketplace. *GO TEAM!*

REQUIRED TEXTS / SOFTWARE:

Price, M., 2007, Mastering ArcGIS 3rd Edition: McGraw Hill, 607 p.

ArcGIS 9.2 Software: Students will be given a fully-working version of ArcGIS 9.2 software that you can install on your home PC. Insert the CD and the “start-run” function to the install the software and datasets on your computer. The installation is good for 1 year, you will need to register the software at www.esri.com. Follow the directions on the installation disks. ArcGIS 9.2 Software is also available in the GIS Lab NS218A and NS Computer Lab NS216.

ADDITIONAL READING:

Clarke, K.C., 2003, Getting Started with Geographic Information Systems, Prentice Hall (to be provided via instructor handouts)

Getting to Know ArcGIS Tutorial: We will also be working with these companion GIS tutorial products. Tutorial data will be available for download in the GIS Lab NS218A and NS Computer Lab NS216. Handouts and tutorial directions will be provided by the instructor.

CLASS NOTES:

A comprehensive set of instructor class notes are available for download via the internet. The class web site is at

URL http://www.wou.edu/taylor ... and follow the links to the "ES341" home page.

The class notes are available as Adobe Acrobat Reader files (*.pdf file). Acrobat Reader is free and is installed on many campus PC's. For home installation, Acrobat Reader is also available for download at the class web site, but you will be responsible for properly installing the software (and will do so at your own risk!).

Based on prior student suggestions, I have assembled my class notes and made them available. These notes may be freely printed at any campus internet station (e.g. ITC Bldg - Student Lab, Library, local department computer labs). The notes are in outline form and are very comprehensive. "Exam Study Guides" will also be posted on the web site as the term progresses.

EVALUATIONS AND EXPECTATIONS:
Student performance will be evaluated on the basis of 2 exams (Mid-term, Final), weekly lab exercises, and a final project. The following is a breakdown of evaluation points, dates, and letter grades:

Mid-Term Exam	100 pts
Final Exam	125 pts
Midterm Lab Portfolio	70 pts
Final Lab Portfolio	70 pts
Weekly Class Participation	30 pts
Final Project	30 pts
TOTAL:	425 pts

Final Grading Scale

Percent Range of Total Points	Letter Grade	Percent Range of Total Points	Letter Grade
94-100%	A	77-79%	C+
90-94%	A-	73-76%	C
87-89%	B+	70-72%	C-
83-86%	B	67-69%	D+
80-82%	B-	63-66%	D
		60-62%	D-
		<60%	F

Quizzes and Exams: Exams will be administered at evenly spaced increments throughout the semester; the final will be 20% comprehensive with test material drawn from throughout the term. Exams will largely consist of essay questions and homework-type problems. *Warning: the exams are very comprehensive and will likely require a full 2+ hours to complete, please plan accordingly*. You will be expected to use computers and software to complete the exams.

Make-Up Exams: Under NO circumstances will make-up exams be administered without prior arrangement (at least five days) and good reason. Please show up on exam day!

Class and Lab Assignments: Class and lab assignments will be worked BOTH during class time and outside of class time each week. You will have lab, reading, and homework assignments that **may** take up to 3 or 4 hours to complete outside of class time, maybe more in some cases, depending on your skill levels and ability. Please plan your schedule accordingly. Due dates for class exercises will be prescribed by the instructor. Late work will be accepted up to 1 week after the due date, but will be automatically assessed a penalty of -20% of the point total.

Due to the volume of students assigned to the instructor each term, he will not be able to grade the lab exercise work in detail. The homework and lab assignments will be checked for completeness, with questions randomly

chosen for content and accuracy. Grade points will be assigned on the basis of these two criteria. Exercise answer keys will be posted on the class web site by the instructor. **It is your responsibility to: (1) check your work against the lab / homework keys, (2) make sure you understand how to complete the exercises, (3) find help if you have trouble with lab exercises, and (4) study / learn the exercise skills and material for the exams.**

Lab Exercise Portfolio: The lab exercises represent a significant component of the class. Students will compile a professional-looking Lab Portfolio consisting of a well-organized 3-ring binder with completed lab exercises and tutorials. Lab portfolios will be checked and graded at midterm and finals. Students will be multi-tasking on several assignments at any given time. A portfolio checklist will be provided before the midterm and final times, so that students can organize, assemble and label their portfolio sections in an orderly manner.

Weekly Class Participation: ES341 is an interactive course that emphasizes hands-on activities and skill building. It is not a traditional "lecture" course, but one in which students are expected to actively engage inquiry-based learning with their peers and instructor. Successful completion of the course is based on in-class student participation and collective interaction. As such, student work activities and progress will be checked at the end of each three-hour class period. Students will be assigned weekly lab activities with a short introduction and overview of required methodology. Progress on weekly assignments will be assessed at the end of each class period, beginning in the last 20 minutes of class. Assessment will involve one-on-one debriefing with the instructor and clear demonstration of student achievement. Three points per week are available to students who demonstrate adequate weekly progress on their in-class assignments (a total of 300 points for the term). Students who are absent or leave class prior to the last 20 minutes of the class without instructor assessment will receive a "zero".

Final Project: Students will work in teams of two to use web resources to download and compile a complete set of GIS map themes for a select watershed in western Oregon. In addition to assembling and processing the map themes, students will calculate basic watershed statistics from the GIS compilation and create a poster using powerpoint to displaying the results of the exercise. Posters will be presented in a special watershed science theme session at the 2009 WOU Academic Showcase in May.

CHANGE OF SYLLABUS - POP QUIZZES - UNANNOUNCED HOMEWORK ASSIGNMENTS

The instructor reserves the right to modify the syllabus and class schedule at any time during the term. Students will be notified of such changes in a timely manner. The instructor also reserves the right to administer pop-quizzes and assign unscheduled homework / class assignments at any time. All students will be responsible for completing this work and it will comprise part of the final class grade.

A NOTE ABOUT INCOMPLETES: No incomplete grades will be given during the last week of class. If you have a problem that warrants an incomplete, make arrangements prior to the last week (no exceptions!!).

STUDENT HONOR POLICY:

Plagiarism and cheating will not be tolerated. Cheating includes copying others work, cutting-and-pasting computer results, and using cheat sheets on exams. However, students are encouraged to interact in small groups during class assignments, i.e. you can freely discuss concepts in all portions of the class, except exams. Students ARE NOT permitted to photo copy or cut-and-paste peer work. If you work on labs together, complete your own work independently and print out your own results in a format that differs from your colleagues. If you directly copy or cut-and-paste another student's work, you and your collaborator will receive a "0" for the exercise.

STUDENTS WITH DISABILITIES:

Any student who has a disability that requires accommodation, please make an appointment to see me.

A NOTE ABOUT THE LAST WEEK OF CLASS:

Given that the Oregon University System employs the "quarter method" of academic scheduling, upper division

courses are by nature "compressed" with much detailed information to cover in a relatively short period of time. Please note that most upper division text books are geared for courses at universities with a 16 week semester system (i.e. we are truly trying to pack 10 pounds of geospatial data in a 5 pound bag). As such, the 10th week of class is as critical to content coverage as the 1st week. Students should anticipate a full slate of "normal" activities during the last week of class, including lectures, lab exercises, written reports, etc. The class is not over until after the final exam! **Plan your schedule accordingly!**

A NOTE ABOUT COMPUTER-BASED COURSES:

This class will use hardware, software, and the campus network. As such, there are endless possibilities for software glitches, system failure, and total confusion. Your patience with lab exercises, assignments, course content, and software / hardware glitches will be greatly appreciated. **Our motto for this term: "expect the worst and hope for the best".**

A NOTE ABOUT LOST OR MISSING WORK

The instructor will only grade work that is received and physically visible. Any missing work (lab assignments, homework, quiz/test answer sheets) will receive a "0" on the grade sheet. This policy applies to work lost by the student or instructor. If the student demonstrates that the work was turned in, but is missing due to the instructor's incompetence, then the student will be afforded an opportunity to make up the work and resubmit it for graded credit. Otherwise, the student will not receive credit for lost or missing work.

OTHER REQUIRED MATERIALS:
Students will also need access to a scientific calculator, colored pencils, ruler, and protractor. You will be required to use these materials during lecture, lab, and exams.

TENTATIVE CLASS SCHEDULE: This outline should be considered tentative at best. The following schedule may be modified as class ideas evolve throughout the semester. Note Text Reading Abbreviations below "Price" = Price text, "GTA" = Getting to Know ArcGIS Tutorial, "Clarke" = Clarke text readings

Week	Dates	Class Content/Schedule	Textbook Assignment (author / chapter)	In-Class Exercises / Instructor Assignments
1	Jan 5,7	Class Policies, Introduction to GIS Introduction to ArcGIS Software	Price "Introduction", p. 1-18; Price Ch. 1, p. 19-64	-Introduction to Maps (Monmouth Quad) -Map Scaling Problems (p.4 vector notes) -Read Clarke Ch 1 (Introduction)
Homework assignment – Week 1: Print out all of the course notes available on the class web site and organize them in a three-ring binder. Class note binders will be checked Jan 12.				
2	Jan 12,14	Map Elements; Vector/Raster Data Models	Price Ch. 2, p. 65-108	-Introduction to Raster Grids and Vector Elements -Intro. to Contouring and Digital Elevation Models -Read Clarke Ch 3 (Data Formats)
3	Jan 21	Map Projections; Coordinate Systems	Price Ch. 3, p. 109-142 Price Ch. 4, p. 143-178	-GTA Chapter 13 – Projecting Data in ArcGIS -Read Clarke Ch. 2 (Projections and Scales)
NO CLASS JANUARY 19, 2009 - Martin Luther King Day				
4	Jan 26,28	Map Projections (Cont.) Database Functions and Tables	Price Ch. 5-6, p. 179-246	-Unknown map projection exercise (Newberry) -Importing data from Web Sources -GTA Chapter 19 Making Maps in ArcGIS -Read Clarke Chap 5 (Databases)
5	Feb 2,4	Database Functions (Cont.), Geoprocessing	Price Ch. 8, p 275-308	-GTA Chapter 11 – Geoprocessing Essentials
6	Feb. 9,11	Map Production and Data Display **Mid-Term Exam, Wed. February 11; Midterm Portfolios Due**	Price Ch. 9, p. 309-348	-GTA Chapter 18 – Working with Map Templates -Read Clarke Ch. 7 (Making Maps)
February 13 – Last Day to Drop Without Grade Penalty				
7	Feb. 16,18	Geocoding	Price Ch. 10, p. 349-378	-Read Clarke Ch. 6 (Spatial Analysis) -Assign Final Project
8	Feb 23,25	Spatial Data Input and Editing	Price Ch. 11-12, p. 379-454	-Geometric Elements and Topology (p. 3 Vectors) -RMS Calculation Exercise -Read Clarke Ch. 4 (Data Entry)
9	Mar 2,4	Raster Analysis / Spatial Analyst	Price Ch. 15, p. 523-566	-DEM Problem on p. 3 of "Raster Data" Notes -Introduction to Map Algebra -Read Clarke Ch. 8 (GIS Software Platforms)
10	Mar 9,11	Working with Geodatabases	Price Ch. 13, p. 455-488	-Read Clarke (Ch. 9 (GIS Case Studies)
11	Week of Mar 16	**FINAL EXAM – CHECK FINALS SCHEDULE; Final Project Due; Final Portfolios Due**		