

**GIS APPLICATIONS IN EARTH SCIENCE (ES492/592)
POLICIES AND PROCEDURES**

Winter Term 2006 - Western Oregon University
3 CR W 4:00 – 7:00 PM Natural Sciences Bldg, Rm 216/218

INSTRUCTOR: Dr. S. Taylor
OFFICE HOURS: M T 3-5 PM, F 4-5 PM
By Appointment

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COURSE DESCRIPTION:

This course focuses on the application of Geographic Information Systems (GIS) to relevant problems in the Earth Sciences. 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 introductory GIS concepts, digital cartography, database functions, map projections, spatial data models, vector / raster data structure, spatial data analysis, image processing, and terrain modelling.

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 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:

Chang, K., 2004, Introduction to Geographic Information Systems, 2nd Edition: McGraw Hill, 400 p.

NOTE: The text book includes a fully-working trial version of ArcView GIS 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 120 days (4 months).

ADDITIONAL READING:

Getting to Know ArcView Tutorial – each student will be assigned a photocopied version of an ArcView tutorial manual. (Note: I want these back!).

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 "ES492" 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:

Quizzes (2 x 15 ea)	30 pts
Mid-Term Exam	100 pts
Final Exam	120 pts
Midterm Lab Portfolio	60 pts
Final Lab Portfolio	60 pts
Weekly Class Participation	40 pts
Final Project	30 pts
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TOTAL:	440 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: Quizzes and 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.**

Weekly Class Participation: ES492/592 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. Four points per week are available to students who demonstrate adequate weekly progress on their in-class assignments (a total of 40 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".

LAB PORTFOLIOS-ASSIGNMENT/LAB EXERCISE SUBMISSION PROCEDURE: In-class assignments, homework, and lab exercises are to be completed by the prescribed due date (to be determined as term progresses). Your assignments will be compiled into a lab portfolio consisting of the three-ring binder, with organized tabs / labels. Your lab portfolios will be graded once at midterm and once at finals time. Prior to the midterm and final portfolio submissions, you will scan your assignments by the due date and make digital copies as acrobat *.pdf files. A scanner is available for student use in NS218A – the GeoData Processing Laboratory. The digital copies will be electronically submitted to the instructor by the prescribed due date using the WebCT software interface. You will retain your originals and compile them into a lab portfolio which will be submitted and graded at the midterm and final, respectively. Timely completion and electronic submission of your scanned assignments will comprise a portion of your lab grade.

The following are procedures for electronically submitting your homework assignments:

- (1) You will have an individual student account set up on WebCT with a username and password.
- (2) The WebCT website may be accessed in the following ways:
 - (a) from the class homepage (www.wou.taylor ... follow the links to ES492 ... then follow the links to "WebCT" in the "Assignment Submission" section), or
 - (b) by surfing to <http://www.wou.edu/webct>
- (3) Once at the site, choose the "Log On to My WebCT" option. DO NOT CHOOSE "Create myWebCT", this has already been done for you.
- (4) Enter your WebCT student username- This will be the same as your student server username (the first letter of your first name + the first 6 letters of your last name, for e.g. jsmith or jwoodwa) Use all lower case letters only!!!
- (5) Enter your username again for the password. Use all lower case letters only!!! Your password will be the last 4 digits of your V#, just like your student server account.
- (6) Once you are logged in, look for the "Change Password" icon... you can change your password at any time!
- (7) Click on the "Electronic Assignment Submission" icon.
- (8) Click on the homework assignment you wish to submit, type in the relevant information, and choose "upload" to browse to your *.pdf scanned copy.

- (9) Make sure you save a hard copy of your assignments to include in your portfolio. Pay attention to the assignment availability and due dates.

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 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 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 rocks 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.

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 “KC” = Chang text, “GTAV” = Getting to Know ArcView Tutorial.

<u>Week</u>	<u>Dates</u>	<u>Class Content</u>	<u>Reading Assignment</u> (author / page)	<u>Lab / In-Class Assignments</u>
1	Jan 11	Class Policies, Introduction	KC Ch 1, GTAV Ch7	Intro to Maps Intro to Vector/Raster Map Elements
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 18.				
2	Jan 18	Overview / Basics (cont.) Relational Databases	Instructor Notes	In-Class Ex: Spatial Scales and Image Resolution In-Class Ex: Great Circle Distances GTAV Section 1 (p. 7-1 to 10-21)
3	Jan 25	Map Projections / Coordinates	KC Ch 2	Map Projection Exercise In-Class Ex: Geometric Elements and Topology GTAV Section 2 (p. 11-1 to 12-20)
4	Feb 1	Vector Data Input / Editing	KC Ch 3-5	In-Class Ex: Map Scale / Resolution Problem In-Class Ex: RMS Calculations GTAV Section 3 (p. 13-1 to 14-20)
5	Feb 8	Attribute Data, Raster Data	KC Ch 6-7	In-Class Ex: DEM Problem Working with Vector/Raster Data GTAV Section 4-5 (p. 15-1 to 17-1)
6	Feb. 15	Open Schedule Mid-Term Exam, Wed. February 15; Midterm Portfolios Due		Spatial Analyst Tutorial Quick Start: Image Analyst Tutorial Quick Start: 3D Analyst Tutorial
7	Feb. 22	Data Display and Cartography	KC Ch 8	Tutorial: Attribute Data and Management In-Class Ex: Geoprocessing with ArcView GTAV Section 5 (p. 18-1 to 20-13)
8	Mar 1	Data Analysis with GIS	KC Ch 9-10	In Class Ex: Editing Polygons with ArcView Data Display Tutorial GTAV Section 6-7 (p. 21-1 to 24-20)
9	Mar 8	Data Analysis with GIS	KC Ch 11	Data Exploration Tutorial In-Class Ex: Map Algebra Start Final Project
10	Mar 15	Terrain Mapping / Spatial Interpolation	KC Ch 12-13	Terrain Mapping Tutorial Avenue Scripting Tutorial Work on Final Project
11	Mar 22	FINAL EXAM; Final Project Due; Final Portfolios Due		