COMPUTER APPLICATIONS IN THE GEOSCIENCES
-- FALL 2012 --

INSTRUCTOR: Dr. Bridget Konter
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COURSE LECTURE DAY/TIME: Tuesday/Thursday 12:00 – 1:20 pm
LOCATION: GEOL. 4th floor computer lab
COURSE REF. NUMBER: 16415 16416 16417
COURSE WEB PAGE: **http://www.geo.utep.edu/pub/bkonter/geol_4315**
COURSE DESCRIPTION: This course will consist of weekly hands on computer exercises designed to expose you to common software and computational methods frequently utilized in the geological sciences. Topics will include introductory webpage design, Unix applications, general MS Office and Adobe suite tips/tricks, computational techniques using MATLAB, and digital mapping/visualization using Surfer, GMT, and Fledermaus, software. The course will also focus on the development and presentation of a final visualization project where you will be required to develop a visualization scene (a 3-D interactive map) of a research area of your choosing.

WEEK	DATES	LECTURE TOPIC	DUE DATES/ ETC.
1	Aug. 28/30	Dept. Computing + Web Pages	Lab 1, due 9/4
2	Sep. 4/6	MSO: Data Processing + Power Point	Lab 2, due 9/11
3	Sep. 11/13	Illustrator + Photoshop	Lab 3, due 9/18
4	Sep. 18/20	MATLAB I (Basic operation)	Lab 4, due 9/25
5	Sep. 25/27	MATLAB II (Digitizing, Raster files)	Lab 5, due 10/2
6	Oct. 2/4	Google Earth	Lab 6, due 10/9
7	Oct. 9/11	Surfer	Lab 7, due 10/16
8	Oct. 16/18	Unix basics	Lab 8, due 10/23
9	Oct. 23/25	GMT I	Lab 9, due 10/30
10	Oct. 30/1	GMT II / GMT III	Lab 10, due 11/6
11	Nov. 6/8	Fledermaus I	Lab 11 due 11/13
12	Nov. 13/15	Fledermaus II / Viz Lab Field Trip	Lab 12, due 11/20
13	Nov. 20/22	Project work day / Thxgiving holiday	
14	Nov. 27/29	Presentations I / Presentations II	
15	Dec. 4/6	AGU meeting – no classes	
16	Dec. 11	Finals week (1-3) – Presentations III	

CLASS WEBSITE: http://www.geo.utep.edu/pub/bkonter/geol_4315
The website is a key part of the class and will be the venue for a lot of important class business.

TEXTBOOK: No text will be used for this course. Handouts will be given in class when applicable.

ATTENDANCE: Attendance is expected each week and counts as 20% of your grade. As class meetings will be ~100% "hands on" practice, it is highly recommended that you not only bring your body to class, but your mind and your concentration as well. If you need to miss a class, you must let me know ahead of time and plan accordingly. It will be your responsibility to collect notes from a fellow classmate. **PLEASE BE ON TIME!**

GRADING:

ATTENDANCE AND PARTICIPATION	**20%**
LAB ASSIGNMENTS	**60%**
VISUALIZATION PROJECT	**20%**

WEBPAGE: An integral part of this course will be the development and maintenance of a personal webpage. Your webpage will be hosted on the Department server at http://www.geo.utep.edu/pub/username. You will use this webpage to 1) showcase YOU, 2) showcase your research, 3) communicate (and archive) computer exercises and materials in this course. Your webpage should be professional and organized.

HOMEWORK: Lab assignments will be assigned weekly. Each assignment will be due the following week at the beginning of class. You will be required to post each completed assignment to the class server (more information to come), where I will then grade each assignment and provide any necessary feedback.

- **No late homework will be accepted!**
- *Free-homework-pass:* Your lowest graded homework will not be counted in your final grade tally. This means that you have ONE no-questions-asked excused homework, so use it wisely.
- *Working together on homework:* Studies have shown that students learn best when they work together. I encourage you to work with each other on assigned homeworks. However, each student must turn in his or her own assignment, using his or her own words. Any student who fails to follow this rule will receive zero credit for homework assignment.

VISUALIZATION PROJECT: The goal of the Visualization Project is to learn how to gather, display, and present research quality data to both technical and general

audiences using 3-D visualization and multimedia techniques. You will be given the opportunity to choose a geographic region to "visualize". If you are already working on a research project for your thesis, I highly recommend that you develop your visualization project around this topic. The fundamental goal for your visualization project should be to develop a 3-D interactive map of data and images that you can use in future settings (i.e., scientific presentations, poster displays, general education talks, classroom teaching). We will work toward building a final visualization scene that will be presented and displayed at the UTEP Cyber-ShARE Visualization Center. Tentative benchmarks for this process are described below:

- DISCUSSION OF POSSIBLE VISUALIZATION PROJECT TOPICS/REGIONS: **NOVEMBER 6**
- SHORT OUTLINE (LIST OF DATA) FOR VISUALIZATION PROJECT DUE: **NOVEMBER 13**
- VISUALIZATION PRESENTATIONS: **NOVEMBER 27, NOVEMBER 29, AND DECEMBER 11**

The basis of your visualization project will be SRTM topography, which will serve as the backdrop setting for your visualization. ***Your primary task throughout the semester will be to search for data resources that you can include in your visualization scene. These can be from the Internet, or you may already have a dataset ready to go, or you may have to make a dataset from scratch.***

An example visualization of the San Andreas Fault might include the following elements:

1) SRTM topography
2) San Andreas fault locations
3) Major cities/county lines
4) Coastlines
5) Earthquake locations, color-coded according to magnitude
6) Imbedded aerial images of the tectonic landscape

Your final visualization project will include the following:

1. A "packaged" visualization scene, which must contain at least 5 "layers" of interactive data.
2. A short digital movie of your visualization "fly-through".
3. A short summary of your visualization and any conclusions that you are able to make about the data you are presenting (a few paragraphs to 1 page in length is fine).
4. A reference list of data used in the visualization.