Data Analysis for Climate Sciences (ESS 116)

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Overview: This is a 4-unit course that is required for the major in Earth and Environmental Science. This year's course will focus on two software packages that have complimentary capabilities. We will spend the first five weeks using Excel, which is good for the analysis of relatively small time series, and the next three weeks using ArcGIS, a Geographic Information System (GIS) that is excellent for the analysis of spatial data. We will focus on these programs in part because they are widely used, and in part because they have easy interfaces. There are other, more powerful programs available, but these "hard core" programs have much, much steeper learning curves.

What you need: The course will use one textbook, which you should order from the web:
Data Analysis with Microsoft Excel, Kenneth N. Berk, Partrick Carey
Textbook Paperback - BK & CD-ROM, March 2003
ISBN: 0534407145, About $45
Additionally, you will need a way to easily store and transfer large amounts of data. The "save here" folder, which you can use while working in the lab, is automatically emptied every 24 hours (Do'h!). Your options for longer-term storage include a USB JumpDrive (the UCI bookstore has some; Costco has them cheaper) and blank cds (the computers in the classroom are equipped with cd burners).

Schedule: The class meets MWF from 1100-1150 (there's no Mon afternoon discussion). Most of the classes will be in MSTB 226. Some of the classes will held in the Croul Hall first floor conference room.

Assignments: The class is mostly hands on. We will have an assignment due every week or two, and grades will be based on how you do on these assignments. You can do the assignments on any computer with the appropriate software, including all of the NACS machines (see http://www.nacs.uci.edu/computing/labs/). There will be 6 assignments and a final project. The final project will be weighted more heavily, and will be graded based on your write up and a final presentation you make to the class.

Each person has two "Late assignment free passes", which will give you a 7-day extension on the due date. Spend your passes wisely – don't waste them on the first or second assignment unless necessary. You can't use a pass for the final project. Assignments that are late will be graded down. (But it's a whole, whole lot better to have partial credit than no credit. Trust me, I know.)

You are encouraged to work in groups of 2 or 3, but you can work alone if you want. You can only work with the same person on 3 assignments, and then you have to move on and make new friends. You can work with anyone on the final project.

Introduction

Sept 24	Overview of course, computer lab, and useful software utilities

Excel

Sep 27	Demonstration: Finding and transferring data. Introduction to Excel. Berk&Carey Chp 1,2.
Sep 29	Start assignment: Find and import 10 data sets (due Oct 1)
Oct 1	Finish and hand in assignment
Oct 4	Demonstration: Plotting in Excel. Berk&Carey Chp 3.
Oct 6	Start assignment: Use plots to answer questions (due Oct 11)
Oct 8	Class cancelled
Oct 11	Demonstration: Probability and statistics in Excel. Hand in plotting assignment.
Oct 13	Class cancelled
Oct 15	Lecture: Statistics, probability and significance. Berk&Carey Chp 4,5,6
Oct 18	Start assignment: Calculating summary statistics and determining whether differences are statistically different (due Oct 20)
Oct 20	Finish and hand in assignment
Oct 22	Lecture: regressions and other tricks for dealing with complex data sets Berk&Carey Chp 8
Oct 25	Demonstration: taking apart a complex data set.
Oct 27	Start assignment: Analyzing data from the marsh (due Oct 29)
Oct 29	Finish and hand in assignment

ArcGIS

Nov 1	Demonstration: Introduction to ArcGIS
Nov 3	Work through ArcGIS tutorial
Nov 5	Demonstration: California spatial data sets
Nov 8	Start assignment: Analyze effects of Southern California wildfires, continue tutorial (due Nov 12)
Nov 10	Class cancelled
Nov 12	Finish and hand in assignment
Nov 15	Lecture: A wider perspective on the types of spatial data
Nov 17	Start assignment: To be announced (due Nov 19)
Nov 19	Finish and hand in assignment

Final Project

Nov 22–24	Discuss and plan projects (writeup due Dec 1)
Nov 29–Dec 3	Groups present projects