

Statistics 511 – Fall, 2006 (Section 2)

Experimental Design and Data Analysis for Researchers I

Instructor Information:

Location: A206 Clark
Instructor: Dr. Phillip Chapman
Professor of Statistics and Experiment Station Statistician
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Lecture: Tuesday and Thursday 2:10-3:25
Recitation: Tuesday and Thursday 3:26-3:50
(To allow time for a 10-minute break (3:00-3:10) we will extend the class to 4:00)
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Office Hours:

Tuesday	4:00-5:00 p.m.	Chapman
Thursday	4:00-5:00 p.m.	Chapman
Wednesday	9:00-10:00 a.m.	Chapman
Thursday	TBA	Maggie
Friday	TBA	Maggie
Thursday or Friday	TBA	Grader

Students are also encouraged to send questions by e-mail.

Objectives:

This course (together with ST512) is designed to provide an introduction to statistical thinking and statistical methods for researchers. ST511/ST512 will provide researchers with a basic “toolbox” of methods for use in their research programs. Commonly used statistical methods will be covered (see course outline below). Emphasis throughout will be on the principles of design and inference, rather than the mechanics of the computations. Data analysis will use the computer package SAS, which runs on Windows PC’s. (Sorry, there is no Mac version of SAS.) No prior knowledge of SAS is assumed. Section 1 (Boardman) and Section 2 (Chapman) will cover the same material, but adapted to each instructor’s own experience and viewpoint. Students in both sections will be equally prepared for ST512 in the spring (only one section of ST512: TuTh 1-3, tentative)

This course is intended for graduate students who have had one statistics course, perhaps some time ago. ST511/ST512 will cover much of the material of ST301 (Introductory Methods), ST302 (Design of Experiments) and ST304 (Multiple Regression), but will allow more advanced treatment of many topics and better integration of topics than the usual three-semester sequence. Attendance by graduate students will allow an interdisciplinary exchange of research ideas and experiences.

Prerequisites:

1. Graduate standing,
2. One statistics course (EH307, ST301, ST309, ST311, or equivalent), or consent of instructor,
3. An interest in research.

Course Outline:

1. Gathering data and statistical inference (Chapter 2)
2. Random variables and probability distributions (Selected parts of Ch 3 and 4)
3. Inferences about the population central values (Chapter 5)
4. Comparing two population central values (Chapter 6)
5. Inferences about population variances (Chapter 7)
6. Inference about more than two population central values (Ch 8 and parts of Ch 15)
7. Multiple comparisons (Chapter 9)
8. Categorical Data (Ch 10 and parts of Ch 4)
9. Linear regression and correlation (Chapter 11)
10. Logistic regression (Chapter 12)
11. Multiple regression and the General Linear Model (Chapters 12 and 13)

Required Text: Ott, R. Lyman and Longnecker, Michael, *An Introduction to Statistical Methods and Data Analysis, Fifth Edition*, Duxbury, 2001.

Required Course Notes:

Lecture notes and examples will be posted on WebCT in Adobe "pdf" format. Students are **required** to print a copy of the notes **prior to class** and **bring them to class**. Adobe Acrobat Reader will be needed to download and print course notes and examples (Acrobat Reader can be obtained free from <http://www.adobe.com>.)

Computing:

Students will need access to a computer connected to the Internet, with SAS installed. The current version of SAS is 9.1, which is available on PC's (Windows) in the Math/Stat Computer Lab (206 Weber) and several other computing labs around campus. (There is an adjacent lab in room 205 Weber, but SAS is installed only in room 206). Information about the Math/Stat Computer lab, including an online calendar, is available at: <http://www.stat.colostate.edu/Laboratories.html>. You will need a login name and password to use the lab. I will give out that information in class.

Students are encouraged to use SAS on their department or home computers. Copies of SAS can be leased through the Software Cellar (on the east side of the Lory Student Center) for approximately \$65/yr. for individuals, \$47 for a department on an A-card, or \$47/yr when charged to a departmental account. When you lease SAS, you take home their SAS CD's for one night, and return them by noon the following day. SAS is a huge program (>1 GB). It is possible to only install parts of it, but I recommend installing the whole product. **Keep your receipt, in case you need to re-install the program during the year. You receipt also entitles you to free upgrades as they become available.**

WebCT: <http://webct.colostate.edu> (WebCT home page)

Course resources will be administered by a program called WebCT, which can be accessed through any computer connected to the Internet and running Internet Explorer, Netscape, or Mozilla. To use WebCT you will need an electronic ID (which is the same as your lamar or holly computer account name). I cannot add you to the class list or give you a WebCT account until you have an electronic id. I will communicate with you by sending mail to your class WebCT mail account. **If you do not check that account regularly, you should have WebCT forward class mail to an account that you do check regularly.**

Video lectures:

In 2003 the lectures were recorded for the University's distance learning program. Streaming video of these lectures is available students through a link on WebCT. Viewing the video will require a high speed internet connection (e.g. cable or DSL; a modem won't suffice) and Windows Media Player. The WebCT link only works correctly in Internet Explorer. (If you are using another browser, you will have to copy the link from WebCT, starting with "mms", and paste it into the "Open URL" box in Windows Media Player. Even though these lectures are now somewhat out of date, I have posted them because previous students found them useful when they had to miss class due to conflicts with their research obligations. You may find the tapes useful, **but it is your responsibility to talk to your classmates and identify any updates, corrections or changes from year to year.**

Homework:

Homework will be assigned weekly, typically assigned on Thursday and due on Friday of the following week. **You are encouraged to work together on homework, but the work turned in should be your own. By that I mean that all computer output should be generated by you, and the answers should be written by you. (e.g., it is not acceptable for a study group of three to submit three printouts of the same MSWord document.)** Homework solutions will be posted each week.

Grading:

	% of grade	Comments – all dates are tentative
Weekly homework	10%	one homework score dropped
Two 2-hour exams	30% each	September 28 and November 2
2-hour final exam	30%	Thur., Dec. 14, 11:20-1:20

Course Policies:

1. Homework/exam grading disputes: See the grader for homework grading problems and the lecturer for exam grading problems.
2. Late homework: No credit unless prior permission.
3. Exam conflicts: Prior permission and prior arrangement only.