

STAT 401 F STATISTICAL METHODS FOR RESEARCH WORKERS FALL 2007

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Time: Lectures from 9:00-9:50 a.m. MWF and lab from 2:10-4:00 p.m. on Mondays

Location: Town Engineering 296 (lecture). See the website for the lab location.

Course Assistant: Lisa Bramer (see contact information and office hours on the website).

Office Hours: MWF 10-11 am. Please don't hesitate to come see me during office hours, whether you have many questions or just a simple one. Alternatively, you could call or email me your questions.

Required Textbook—*The Statistical Sleuth: A course in Methods of Data Analysis*, Second Edition.
Authors: F.L. Ramsey and D.W. Schafer, Duxbury Press.

Purpose: You will understand variation and its consequences for drawing conclusions from data. You will be familiar with some standard statistical methods, when and how to use them, how to interpret statistical results. You will be able to apply statistical principles to novel problems, as well as understand and employ the statistical language when communicating with other researchers.

This section of Statistics 401 is designed primarily for graduate students in agriculture and biological sciences.

Prerequisites: A one-semester undergraduate statistics course.

Tests: There will be two in-class tests ('midterms'), during the LABS on the days specified below. There will be absolutely no make-up tests. If you must miss one of the midterms, I will use your grade on the other one instead. Exam dates:

- **Test 1: Monday, October 1, 2:10–4:00 p.m.**
- **Test 2: Monday, November 12, 2:10–4:00 p.m.**

Final project: More information will be posted on the website no later than the third week of classes. In summary, you and one or two of your class-mates will work on collecting data, analyzing it and presenting your findings in an oral presentation at the end of the term.

Grading: I will use a ten-point scale. That is, 90% will be at least an A-, 80% will be at least a B-, 70% will be at least a C-, 60% will be at least a D.

Test 1: 35%

Test 2: 35%

HW: 15%

Final project: 15%

Please let me know of any difficulties as soon as possible. I want you all to earn good grades in this class by learning the material well. If you have a disability that qualifies under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act and require accommodations, please contact me within the first **three weeks** of the semester. Retroactive requests for accommodations will not be honored. Before meeting with me, you will need to obtain a SAAR form with recommendations for accommodations from the Disability Resources Office, located in Room 1076 on the main floor of the Student Services Building. Their telephone number is 515-294-6624.

Course Topics*

Chapter 1: Drawing Statistical Conclusions
Chapter 2: Inference Using t -Distributions
Chapter 3: A Closer Look at Assumptions
Chapter 4: Alternatives to the t -Tools
Chapter 5: Comparisons Among Several Samples
Chapter 6: Linear Combinations and Multiple Comparisons of Means
Chapter 7: Simple Linear Regression: A Model for the Mean
Chapter 8: A Closer Look at Assumptions for Simple Linear Regression
Chapter 9: Multiple Regression
Chapter 10: Inferential Tools for Multiple Regression
Chapter 11: Model Checking and Refinement
Chapter 12: Strategies for Variable Selection
Chapter 13: Two-factor analysis of variance and analysis of randomized complete block designs
Chapter 18: Comparisons of Proportions or Odds
Chapter 19: Chi-Squared Tests
Chapter 20: Logistic Regression for Binary Response Variables
Chapter 21: Logistic Regression for Binomial Counts

* The first 13 chapters form the core of the course. Chapters 18 through 21 will be considered as time permits.

A Comment about the Text

The Statistical Sleuth is among the best statistics texts available for a course like Stat 401. The case studies at the beginning of each chapter involve real scientific problems. I find many of them interesting. Sometimes, however, these problems are more complicated than is optimal for introducing statistical concepts or methods. Please try not to be discouraged by this. Initially you are not expected to understand the results presented for case studies at the beginning of the chapter. You should expect to understand the results presented in the case studies only after reading the whole chapter, perhaps multiple times. Reading assignments will be indicated during each lecture. I encourage you to take these reading assignments seriously. I recommend that you read through each assignment once quickly to get a general idea of the concepts covered. Don't worry about the details the first time through. Take the time to understand the details on second or third reading.

Some Course Policies and Guidelines:

- There is not enough time to cover every detail in class. I assume that you do the assigned reading and ask questions about anything that is not clear.
- Read the case studies and main material in the assigned chapters prior to the start of the lectures. My lecture will cover the same concepts, but I will often use different examples and may use a different presentation.
- The homework assignment is to help you learn the course material.
- Homework is due each Wednesday at the beginning of class unless stated otherwise.
- No late homework is accepted, but your lowest homework score will be dropped.
- Answers to homework assignments should be neatly written or typed and well organized with no extraneous information and no attached computer output. Please read the homework guidelines posted on the course web page.
- You are encouraged to work with other students on homework problems, but you must write your OWN answer to the questions. Copying another's work is prohibited.
- The Laboratory time will be used for three different activities: some hands-on illustrations of statistical principles, use of statistical software, discussion and Questions & Answers on lectures and homework problems.
- All exams are closed book.
- Two mid-term tests will be given during lab. Be certain to bring a calculator and a pencil or pen. Students will be clearly notified of exam dates and formula sheet plans.
- Ask questions about anything that is not clear. Relax and learn as much as you can. The payoff will really come when you start your own research.