

Statistical Methods in Agriculture

Agriculture 741

Department of Agriculture and Natural Resources
University of Tennessee at Martin

Course Syllabus

Class Schedule: Online
CRN/ Section No.: sec. NC1
Credit Hours: 3 semester hours
Prerequisite: Math 210 or equivalent or instructor's approval

Instructor: Dr. Barb Darroch
Office: 144 Brehm Hall
Office Phone: (731) 881-7279
Office Fax: (731) 881-7968
Email: bdarroch@utm.edu

Office Hours: Monday: 9:00 a.m. – 12:00 p.m. and 1:00 p.m. – 5:00 p.m.
Wednesday: 9:00 a.m. – 12:00 p.m. and 1:00 p.m. – 2:00 p.m.
Thursday: 8:00 a.m. – 12:00 p.m. and 1:00 p.m. – 2:00 p.m.
Friday: 9:00 a.m. – 12:00 p.m. and 1:00 p.m. – 2:00 p.m.
You can reach me by phone or email. I will be in on Tuesdays as well, but I will be in labs for most of the day. However, I will still check my email and voice mail messages. I may not always be in on Thursdays, but I'm sure I'll probably be here most Thursdays. If you want to come and see me in person, I recommend that you call first to make an appointment.

Textbooks: Freund, R.J., and Wilson, William J. 2003. Statistical Methods. Second Edition. Academic Press. 673 pages. ISBN: 0-12-267651-3. This textbook can be purchased through the University of Tennessee at Martin bookstore.

SAS Program: We will be using the SAS statistical package in this course. For those of you who work for UT Knoxville (including those in extension), you can purchase SAS directly from the computer store at Knoxville (use their website); this will probably be the cheapest option. For other students who don't work for UT, you can purchase the SAS program from the UTM Computer Store. We are still working on getting the cheapest price there so hold off on purchasing SAS until I let everyone know that it is available. (We won't be using SAS until later in the term anyway). If you have access to SAS on a computer at work, by all means use it there if you can and save yourself some money!

Other Computer Requirements: You will need Microsoft Office (preferably 2000 or later), specifically Microsoft Word, PowerPoint and Excel. You will also need to have Macromedia Flash installed on your computer. All of the audio-enhanced lectures will be in Flash format. You can download the Flash player from the Macromedia website.

Course Description

Statistical techniques used in design and analysis of experiments in agriculture and natural resources management. T-tests, analysis of variance, mean separation, regression and correlation, experimental design and analysis, interpretation of research results, analysis and interpretation of survey information. Prereq: Math 210 or equivalent or instructor's approval.

Course Objectives

At the end of this course, students should:

1. Have a general understanding of basic statistics and how it applies to research.
2. Have a basic understanding of experimental design; how to plan, conduct, analyze and interpret results of basic experiments.
3. Be able to interpret results of experiments as presented in scientific journals, technical reports and similar publications.
4. Be able to conduct and interpret the results of surveys.
5. Be able to input and manage data in a spreadsheet such as Excel.
6. Be familiar with SAS and be able to use SAS in data analysis.

Grading Procedures

The final letter grade in this course will be based on the total points accumulated throughout the semester calculated as a percentage of total possible points. I will use Blackboard to keep track of your grades in this course so you will be able to access your current grade in the course at any time by logging into the course site in Blackboard. Points are accumulated as follows:

10 to 12 Assignments	500-600
Midterm test (take home)	150
Final Exam (take home)	<u>150</u>
Total	800-900

Letter grades are assigned based on a percentage of the total points possible:

- A** = 90% or greater
- B** = 80% to 89.9%
- C** = 70% to 79.9%
- D** = 60% to 69.9%
- F** = Below 60 %

Note: Any student eligible for and requesting academic accommodations due to a disability is requested to provide a letter of accommodation from P.A.C.E. or Student Academic Support Center within the first two weeks of the semester.

Dates to Remember:

Aug. 30	Classes Begin
Sept 6	Labor Day (University closed)
Oct. 14-15	Fall Break
Nov. 24-26	Thanksgiving (University closed)
Dec. 10	Classes End
Dec. 13-17	Final Exams

Assignments will usually be due every week. I will announce exact dates later. The midterm test will probably be due the week of Oct. 11th or Oct. 18th and the final will be due during finals week.

Class Policies

Attendance: Class attendance will be determined through submission of your assignments and tests. If you cannot complete an assignment by the stated deadline, please contact me **before** that deadline to arrange an alternate time. I am willing to be flexible (within reason) but **only** for a good reason (such as illness, having to travel for work). Chronic lateness without prior approval will lead to reduction in your grades (10% per day late). It is important that you keep up with your weekly work! This is NOT a self-paced course.

Academic Honesty: Each student is expected to do all of his/her own work. I encourage you to use the discussion board to assist one another in completing your homework assignments. (You may also ask me for help with assignments.) However, I expect you to turn in your own work as the end product. For the midterm and final exam, I expect you to do all of your own work. You may use other reference materials at your disposal, such as the text book, other books, or the internet, to help you complete the exams. Academic dishonesty, in any form, will result in an "F" in the course.

Tentative Course Outline

Here is the tentative list of topics that I plan to cover in this course. This list is subject to change based on class progress and the instructor's discretion.

Module 1

- The scientific method
- Descriptive statistics

Module 2

- Probability
- Sampling distributions
 - Binomial, Poisson, Normal, Chi-squared t and F distributions
- Inference and hypothesis testing
- Type I and type II errors

Module 3

- Statistical Inference
 - Inferences on a single population
 - Inferences on two populations

Module 4

- Data collection and entry
- Data exploration
- Graphing data in Excel

Module 5

- Comparing variances of two populations
- Principles of experimental design
 - Experimental units
 - Error and error control
 - Replication
 - Planning experiments
 - Key assumptions of experimental design

Module 6

Analysis of Variance (ANOVA) – inferences for two or more means
Use of F-distribution
Single factor experimental design
Completely randomized design (CRD)
Introduction to SAS
For descriptive statistics
For ANOVA

Module 7

Treatment means comparisons
Contrasts
Post Hoc comparisons
Least significant difference (LSD)
Duncan's multiple range test (DMRT)
Other multiple range tests

Module 8

Single factor experimental designs continued
Randomized complete block designs (RCB)
Latin squares

Module 9

Multi-factor experimental designs
Factorial experiments
Split plot designs

Module 10

Linear correlation
Correlation coefficients
Analysis of Covariance

Module 11

Regression models
Linear regression
Multiple regression
Curvilinear regression

Module 12

Introduction to conducting surveys
Planning and data collection

Module 13

Analyzing and interpreting survey results
Goodness of fit tests
Contingency tables