FREC/STAT 608
Statistical Research Methods
Spring 2008 On-Line Version

Instructor:  Dr. Tom Ilvento
213 Townsend Hall
Townsend Hall
Voice:  302-831-6773    Fax: 302-831-6243
ilvento@udel.edu

Office Hours:  Monday
  3:00 to 5:00
  Or after class or by appointment

Required Text:  An Introduction to Statistical Methods and Data Analysis, 5th Ed.
R. Lyman Ott - Marion Merrell Dow, Inc., Retired
Michael T. Longnecker - Texas A&M University

COURSE DESCRIPTION:  Statistics are an important part of both physical and social science research. They enable us to examine and test important research questions concerning individual variables and relationships among a set of variables. The focus of this course is on understanding the basics of statistics. I would like you to gain an appreciation for how descriptive and inferential statistics are used in everyday life and in research; how to analyze a set of data; and how to critique the use of statistics by others.

STAT 608 On-Line retains many of the same elements of the live class offered in the Fall Semester. It is designed to give graduate students an appreciation and understanding of the use of descriptive and inferential statistics in the agricultural sciences. It is the first in a two-part sequence for nonSTAT graduate students (STAT 609 is the follow-up to this course). FREC/STAT 608 assumes that the students had limited prior exposure to statistics. It will be very much a hands on course - we are going to get down and dirty with the data. I firmly believe in looking at univariate statistics, graphing and plotting data, and in students interpreting the results. We will be using Microsoft Excel for calculations. I will also introduce other software packages such as Minitab and JMP.

COURSE OBJECTIVES:

• Understand the use of statistics in analyzing data
• Differentiate the descriptive versus inferential nature of statistics
• Feel comfortable in taking a set of data and understanding how it might be described and analyzed using various statistical techniques
• Gain an appreciation of the use of statistics in the research process
• Have the ability to critical look at statistical analysis and objectively assess the validity of the analysis

College of Agriculture and Natural Resources
COURSE WEB PAGE: This course will use WebCT to deliver all the materials, assignments, exercise, quizzes and exams. The WebCT site will contain the syllabus, Power Point files, on-line lectures, assignments, handouts, and other course material can be found at:

https://www.udel.edu/mycourses/

Power Point files with lecture notes will be available in pdf formats (you must use Adobe Reader).

SUPPLEMENTAL MATERIAL: I recommend that you have access to the following:
- A calculator which has multiple memory registers and the ability to take logs
- Access to Microsoft Excel
- Access to Minitab or JMP – students can download a full version for $30 for 6 months.

PREREQUISITE SKILLS: Statistics necessarily require the use of math and the computer. The level of math will not be beyond basic algebra. If you have any concerns about your math skills I suggest you get a review book much like is sold for the GRE test. We will be using Microsoft Excel spreadsheet for some of the assignments. I will use some class time to show you basic approaches to analysis on Excel. The book also provides descriptions of Excel and a short tutorial. If you feel weak in the use of a spreadsheet I expect you to build your skills. A spreadsheet is one of the more flexible computer programs for academic, business, and personal use and it is wise to feel proficient in its use.

ON-LINE COURSE STRATEGY: This course is an on-line course where the majority of the course content will be delivered via WebCT. I expect the majority of students to be on campus and I will explore opportunities to meet in a live setting or via a WebCT meeting technology. I will also hold office hours for this course. Any on-line version of a course requires a certain amount of discipline in order to keep current in the course. While there is a lot of built in flexibility, you will be responsible for reviewing the lectures and keeping up on quizzes, exercises, and quizzes. I will provide a detailed schedule that will keep us on track, and I will allow a certain amount of flexibility with deadlines in relation to this schedule, but ultimately you need to manage your progress in the course. I will be available in Townsend Hall on Monday afternoons (unless otherwise noted) for individual help and assistance, especially with computer packages.

The design for learning in the course will follow the following sequence of events. It is designed so that you will be exposed to material, have a chance to learn it on your own, practice in an exercise with guidance and help, and then demonstrate it on your own in a homework and exam. Here are the steps I expect.

1. Review the voiced-over Power Point on your own
2. Take an on-line quiz on the basic ideas of the lectures to see if you understand the material
3. Practice the material in a guided exercise
4. Review the material and retake the on-line quiz if needed
5. Complete a homework exercise on your own
6. Take an exam to demonstrate mastery of the material

GRADING POLICY: The course grade will be based on 11 Guided Exercises, 11 Homework Assignments, 12 Quizzes, and 4 exams, and one data report, which is the 12th homework worth 5 points. I will grade all assignments and exams based on 100 points and then weight each item based on the scale listed below.
The Guided Exercises will count for 11 percent of your grade (roughly one letter grade). You will get one point for each exercise you participate in.

You will complete **12 On-line Quizzes** on WebCT for 1 point each. Each quiz will have 5 to 10 questions and relate directly to the on-line lectures assigned for that week. The quiz should be attempted before the Guided Exercise. **As you might guess with two attempts to take a quiz, I expect you to get most of these points!**

The Homework Assignments will be worth 2 points each for a total of 22 points. You cannot do well in the course unless you complete the homework assignments. The assignments will be short - only a few problems to practice the material on your own. You will be given approximately one week to complete the assignment. Late assignments will be docked 25 percent, and there will be no exceptions without a valid excuse. **Assignments will be delivered on-line via WebCT so there will be no confusion on what is late.** However, I will accept any assignments late up to one week after the exam that relates to that assignment. Even with losing points, it is still in your best interest to finish the assignment. Since you will submit assignments on-line, it would be best if you used a Word Document. You can copy in output from Excel, Minitab, or JMP directly into a Word file.

I will discuss the last homework later in class. It will be a small data report on a data set of your choosing. I will ask you to do a brief, but complete analysis of the data leading toward a conclusion. It will be worth 5 points.

The four exams will be worth 50 percent of your grade (weighted 12.5 points each). The exams will be spaced evenly through out the semester and focus on a section of the course (see listing and times below). I will give you advanced notice if the date of an exam will change. The exams will primarily be problem solving. The exams will not be cumulative per se, but much of statistics is cumulative. The last exam will be given during the final exam week, but it will not be a cumulative exam. I will not require gross memorization of formulas for the exams, and will encourage you to construct a single sheet of notes to take with the exam, as long as they are your notes. All exams must be taken during the scheduled time unless extenuating circumstances, as approved by the instructor.
As a result, your final grade will be based on the following point breakdown:

- 4 exams worth 12.5 points each: 50.0 points
- 11 assignments worth 2 pts each: 22.0 points
- The 12th Assignment worth 5 pts: 5.0 points
- 11 Guided Exercises worth 1 point each: 11.0 points
- 12 Quizzes worth 1 point each: 12.0 points

TOTAL: 100.0 points

In terms of a final grade for the course, I will use the following breakdown:

- A: 93 to 100
- A-: 90 to 92.9
- B+: 87 to 89.9
- B: 83 to 86.9
- B-: 80 to 82.9
- C+: 77 to 79.9
- C: 73 to 76.9
- C-: 70 to 72.9
- D+: 67 to 69.9
- D: 63 to 66.9
- D-: 60 to 62.9
- F: Below 60

**ONE FINAL NOTE.** Statistics often scare students, particularly if they don't feel confident in their math skills. I personally feel it doesn't have to be that way as long as you commit to working at it. I will provide plenty of in-class examples to help take the mystery out of formulas and such. However, you will have to take good notes, do the assignments, and read the text. I don't require attendance, but the class lectures will be an important part of the course. I'm committed to working with you to help you learn the material. **If you feel in trouble, by all means come and see me - don't wait and fall behind.**
<table>
<thead>
<tr>
<th>Week</th>
<th>Class Date</th>
<th>Topics to Review by Class Time</th>
<th>Book</th>
<th>Lecture</th>
<th>Quiz</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2/11/08</td>
<td>Statistics, Data, Critical Thinking, and Describing Data</td>
<td>Chapters 1 and 2</td>
<td>pp01-06 pp02-06 pp03-06</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>2</td>
<td>2/18/08</td>
<td>Summarizing data using graphs and charts</td>
<td>Chapters 1 and 2</td>
<td>pp04-06 pp05-06</td>
<td>Quiz 1</td>
<td>Assign 1 due 2/22/08</td>
</tr>
<tr>
<td>3</td>
<td>2/25/08</td>
<td>Measures of Central Tendency and Measures of Variability Guided Exercise 1 on 2/27/08</td>
<td>Chapter 3</td>
<td>pp06-06 pp07-06 pp08-06 pp09-06 pp10-06</td>
<td>Quiz 2</td>
<td>Assign 2 due on 2/29/08</td>
</tr>
<tr>
<td>4</td>
<td>3/3/08</td>
<td>Table Approaches to Data Normal Distribution Group Exercise 2 on 3/05/08</td>
<td>Chapter 4.10</td>
<td>pp11-06 pp12-06 pp13-06 pp14-06</td>
<td>Quiz 3</td>
<td>Assign 3 due on 3/07/08</td>
</tr>
<tr>
<td>5</td>
<td>3/10/08</td>
<td>Sampling Distribution and the Central Limit Theorem Confidence Intervals for Proportions and Means Small Samples Confidence Intervals and the t-distribution Group Exercise 3 on 3/12/08</td>
<td>Chapter 4.12</td>
<td>pp15-06 pp16-06 pp17-06 pp18-06 pp19-06</td>
<td>Quiz 4</td>
<td>Assign 4 due on 3/14/08</td>
</tr>
<tr>
<td>6</td>
<td>3/17/08</td>
<td>Hypothesis Testing of Means and Proportions Group Exercise 4 on 3/19/08</td>
<td>Chapter 5 Chapter 10.2</td>
<td>pp20-06 pp21-06 pp22-06</td>
<td>Quiz 5</td>
<td>Assign 5 due on 3/21/08</td>
</tr>
<tr>
<td>7</td>
<td>3/24/08</td>
<td>Two Sample Test of Means and Proportions Group Exercise 5 on 3/26/08</td>
<td>Chapter 6 Chapter 10.3</td>
<td>pp23-06 pp24-06</td>
<td>Quiz 6</td>
<td>Assign 6 due on 3/28/08</td>
</tr>
<tr>
<td>Week</td>
<td>Class Date</td>
<td>Topics to Review by Class Time</td>
<td>Book</td>
<td>Lecture</td>
<td>Quiz</td>
<td>Assignment</td>
</tr>
<tr>
<td>------</td>
<td>------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------</td>
<td>---------</td>
<td>------</td>
<td>------------------</td>
</tr>
<tr>
<td></td>
<td>Friday 3/28/08</td>
<td>Exam 2 – sampling distributions, inferences from sample, confidence intervals, hypotheses tests for means and proportions, two sample mean and proportion problems</td>
<td>Chapters 4.2 (Sampling Distributions), 5, and 6 Power Points 15 to 24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>4/07/08</td>
<td>Chi- Square using Tables Group Exercise 6 on 4/09/08</td>
<td>Chapter 10.4 and 10.6-to 10.8</td>
<td>pp25-06</td>
<td>Quiz 7</td>
<td>Assign 7 due on 4/11/08</td>
</tr>
<tr>
<td>9</td>
<td>4/14/08</td>
<td>Introduction to ANOVA Group Exercise 7 on 4/16/08</td>
<td>Chapter 8, 9</td>
<td>pp27-06</td>
<td>Quiz 8</td>
<td>Assign 8 due on 4/18/08</td>
</tr>
<tr>
<td>10</td>
<td>4/21/08</td>
<td>ANOVA Continued Group Exercise 8 on 4/23/08</td>
<td>Chapter 15</td>
<td>pp29-06</td>
<td>Quiz 9</td>
<td>Assign 9 due on 4/25/08</td>
</tr>
<tr>
<td></td>
<td>Friday 4/25/08</td>
<td>EXAM 3 - Chi Square using Tables; ANOVA</td>
<td>Chapters 9 and 10 Power Points 25 to 30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>4/28/08</td>
<td>Correlation and Covariance Introduction to Regression Group Exercise 9 on 4/30/08</td>
<td>Chapter 11</td>
<td>pp31-06</td>
<td>Quiz 10</td>
<td>Assign 10 due on 5/02/08</td>
</tr>
<tr>
<td>12</td>
<td>5/05/08</td>
<td>Hypothesis Testing in Regression Dummy Variable Regression Group Exercise 10 on 5/07/08</td>
<td>Chapter 12</td>
<td>pp34-06</td>
<td>Quiz 11</td>
<td>Assign 11 due on 5/09/08</td>
</tr>
<tr>
<td>13</td>
<td>5/12/08</td>
<td>Multiple Regression Group Exercise 11 on 5/14/08</td>
<td>Chapter 13</td>
<td>pp36-05</td>
<td>Quiz 12</td>
<td>Assign 12 due at Final</td>
</tr>
<tr>
<td>TBA</td>
<td></td>
<td>EXAM 4 - Correlation, Covariance and Regression</td>
<td>Chapter 10; Power Points 31 to 37</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>