STATISTICS 211 (#13971)
Statistical Methods I
Spring 2015

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656-4329(O), 879-0721(R), 734-2521(CP)
Office Hours: TR: 2:30 – 4:00 pm or by appointment.
Basically I keep an open door policy.

GTF: Ms. Yi Ba, yi.ba@uvm.edu
Rm. 301, Pearl House (12 Colchester Ave., Bldg. between Math Dep’t and Dewey Bldg.),
656-3372(O); Office Hours: TR: 12 – 2 pm.

CLASSROOM & CLASS HOURS: TR: 10:00 am - 11:15 pm, LAFAYE L311.

TEXTBOOK: An Introduction to Statistical Methods and Data Analysis, 6th Ed. by R. Lyman Ott, Michael Longnecker, Brooks/Cole
(ISBN -10= 0-495-01758-2)

JMP and SAS, computer statistics software will be used.

JMP is available to all UVM students for free -- you do not have to buy it.
Go https://www.uvm.edu/software/ and choose your platform (PC or Mac -- not available for Linux), then choose the latest JMP (not the Pro version). If you have trouble downloading, contact the helpline (802-656-2604) or check here for other types of help: http://www.uvm.edu/it/help/.

- You can sign up for an On-Demand Webcast called "Getting Started with JMP"
- at this URL: http://www.jmp.com/webforms/jmp_start_ondemand.shtml
- Live introduction to JMP webcasts are held weekly. You can register for one
- at: http://www.jmp.com/about/events/webcasts/index.shtml

Course description:
This course has two major objectives. (1) You will gain an understanding of several techniques used in the statistical analysis of data, including the underlying statistical models, and how they relate to specific research questions. (2) You will also learn how to implement and interpret analyses for different
types of studies using statistical software. Putting this information together will allow you to formulate a research hypothesis, determine an appropriate statistical analysis method, carry out the analyses, and interpret the results. We will discuss ways of determining appropriate numbers of subjects/units to include in experiments and methods for verifying assumptions that underlie the statistical models.

*I expect that you will read the material in the text before we discuss it in class.*

**COURSE OUTLINE:** Chap. 1 - What is Statistics?
   Chap. 2 - Using Surveys and Scientific Studies to Gather Data.
   Chap. 3 - Data Description.
   Chap. 4 - Probability and Probability Distributions.

   Chap. 5 - Inferences about Population Central Values.
   Chap. 6 - Inferences Comparing Two Population Central Values.
   Chap. 7 - Inferences about Population Variances.

   Chap. 8 - Inferences about more than Two Population Central Values. (Some Secs. will be skipped)
   Chap. 9 - Multiple Comparisons.
   Chap. 10 – Categorical Data.
   Chap. 11 - Linear Regression and Correlation.
   Chap. 15 – Analysis of Variance for Standard Designs.
      (Secs. 1-3 will be covered)

**GRADING:**
- Homework Assignments : 15%
- (Exercise Problems in the Textbook)
- Project(Due Tue, 4/21/15) : 05%
- Exam 1 (Tue, 2/10/15) : 25%
- Exam 2 (Tue, 3/24/15) : 25%
- Final(cum, Fri, 5/1/15, LAFAYE L311): 30%

**ADD/DROP:** 1/26(Mon), WITHDRAWAL: 3/27(Fri);
- Martin Luther King Holiday - 1/19(Mon); President’s Day Holiday – 2/16 (Mon);
- Town Meeting Day Recess – 3/3(Tue); Spring Recess: 3/2 – 3/6 (M-F);
- Honors Day – 4/17(Fri); Classes End – 4/29(Wed); Graduate Commencement – 5/16/2015(Sat).
- Undergraduate Commencement – 5/17/2015(Sun).

Early Registration for Fall 2015 begins in April.
P.S. – You can receive the tutoring help through the Learning Co-op. Please call the Co-op (656-4075), or visit their web site http://www.uvm.edu/~subtutor/

STAT 211 HW Assignments

Chapter 2: 9  14  15d  18a
Chapter 3: 11  12  13  15  21
Chapter 4: 11  12  26  27  29  34  40  41  45  54  55  56  63  66  69  75  83ab  96  98  99  109
Chapter 5: 10  12  14  16  18  19c  26  28  30  34  35  36  38  39  64  69
Chapter 6: 2  3  4  6  11  12  18  29  35  46  47  48  54d  55  64  65
Chapter 7: 3  5  12  14  18
Chapter 8: 4  6  29  35
Chapter 9: 1  5  6  14  18
Chapter 10: 9  15  18  28  30  42  43  67  68
Chapter 11: 4  7  15  30  33  34  44  52  57
Chapter :

Instructions for Project for Stat211A, Spring 2015
(Due Tuesday, April 21, 2015)

Data gathering and Analysis of your own choice of data
Worth 05% of course grade
Work individually, but you can help each other.

Gather some data from a published data base (via internet or by conducting either an observational study or a randomized experiment).
You should gather data on at least 4 variables:

> At least one variable must be quantitative (i.e., for each subject, you find a count or measurement). For best results, avoid quantitative variables that yield only a few values (e.g., number of cars you own will usually be 0 or 1 for UVM students)

> At least one variable must be categorical (each subject falls in a category: yes/no, M/F, Rep/Dem/Indep, etc). For best results, avoid categorical variables with a large number of categories, as they are hard to work with (e.g., students’ majors)
Take data on at least 50 individuals. If your goal is, for example, to compare genders, you should aim for data on 25 males, and 25 females.

**DO choose something that you’re interested in, so that you’ll enjoy doing the project.** You could choose a topic related to your major or some other interest. Before you proceed, do a literature search (on the web is ok) to look for background information on your topic and to see if other studies like yours have been done.

I. The project should include the following, typed neatly:

1. Your name.
2. The goal of your study: state clearly your questions of interest, what type of study you’re doing, and describe your population.
3. The sample you plan to use, and how you’ll select it.
4. The variables you plan to get (questions you’ll ask, or observations you’ll make), noting whether they are quantitative or categorical.
5. Your hypotheses: What results do you expect and why? This could be just a hunch, or based on some preliminary research.

II. The full project, due Tuesday, April 21, 2015, should include final versions of each of the following, typed neatly:

**Abstract:** A short summary of the study, your hypotheses, and results. Single-spaced; comes first in the paper, but you’ll write it last.

**Introduction:** Give the motivation for the study and some background. Do research your topic: You should provide a few references discussing similar data or studies, or providing useful background information. Present your hypotheses: what results do you expect, and why? Try to make this interesting for the reader – draw them in!

**Methods:** Describe carefully the intended population, the sample, the sample selection method, and the details of data gathering (when, where, how the questions were asked or measurements made, etc.) If you’re doing an experiment, describe also the treatment assignment method, blinding, and experimental controls. If you’re doing a survey, include a copy of the survey script. Give enough details so that the reader can understand exactly what you did.....

**Results:** Present your data using numerical and graphical summaries that we’ve discussed in class, done in JMP. Use confidence intervals and/or hypothesis tests as appropriate. The exact methods you use will depend on your study, but the JMP instructions (or other software) should cover most of what you need. You probably will not need to include every bit of computer output you produce, but you should still be thorough in describing your data. Describe statistical results in words, along with relevant computer output. Don’t make subject matter conclusions yet; just describe ... Output should
be presented in the form of tables and/or figures presented in the document near the text that describes it, and referenced in the text (e.g., Figure 1, Graph 2). A good format is to present each graph or table with descriptive text directly below it.

**Discussion:** Here is where you interpret your results in terms of your hypotheses. Did results come out as you had expected? If so, to what extent? (e.g., How significant were relationships? How large were differences? How strong were correlations?) If results did not come out as expected, why do you think they did not? If results were “not statistically significant,” suggest why. Note: “not statistically significant” does not = “failure.” It’s a valid outcome and warrants explanation.

**Limitations/Recommendations:** What were some of the shortcomings in the data and/or the analyses? How could they be improved in a future study? What is the logical next step for study on this issue?

**Data Listing:** Include this as an Appendix.