STAT 208

BASIC STATISTICS

Spring 2013

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Office Hours: By Appt

Text: Intro Stats, Third Edition. by DeVeaux, Velleman, and Bock

STAT 208 has the following course objectives:

- To develop a basic notion of statistics and its role in today's world;
- An introduction to basic probability; its role in various disciplines and its usage in statistical calculations;
- To understand the concept of statistical inference of generalizing from a sample to the whole, while controlling the amount of error incurred in the process;
- To develop statistical reasoning and an ability to apply this reasoning to real-life problems;
- To appreciate the universal applications of statistical methods in every aspect of modern life;
- To interpret the statistical results appearing in the public media and other places.

GRADING

- Your final grade will be based on the following components:
  - Three midterm exams, each worth 100 points.
  - The final exam is cumulative and worth 150 points.
  - Average of homework assignments weighted to 50 points. The lowest three assignment grades will be dropped before computing the average. (e.g. After your drops, if your homework average = 90%, then you'll receive 0.9 x 50 = 45 pts)

- There is no extra credit except for what is mentioned in this syllabus.

- With a total of 500 points possible, the cut points for letter grades A, B, C, and D will be no higher than 450, 400, 350 and 300 points, respectively.

- Please note that mistakes in your grades on homework and/or exams may occur. You have one week from the time the paper been handed back to notify the instructor of the mistake. If you wait longer than the one week, no change will be made to the grade.

- A grade of incomplete (I) will only be considered for students who are passing the course, but cannot complete the course due to health or family reasons.

EXAMS

- The midterm exams will be given during regular class time. The exact dates for these exams will be announced in lectures.

- All exams are closed-book, but relevant formulas will be provided at the exam. You may also use a hand-held calculator at the exams.

- It is your responsibility to bring (i) NIU picture ID, (ii) pencil, (iii) eraser, and (iv) calculator for exams. Sharing of any of these items is not allowed. You would be expected to do all calculations by hand if you do not have a calculator. You cannot use calculators in cell-phones, PDAs or laptops. Cell phones are to be turned off (not just muted) and kept away during exams.

- It is important to be on time for exams. If you arrive late and one or more students have already submitted their exams and left the room, then you may (and probably will) be denied the opportunity to take the exam. In such cases, you may be given a zero on the exam, or you may be given a make-up. The decision will be up to the Instructor.

- Make-up exams will only be given when a student has a planned, documentable, and excusable absence on a test date and personally negotiates the make-up in advance. For sudden, documentable, and excusable absences (illness, death, etc), the points from the missed exam will be added to the final exam. Unexcused absences (oversleeping, forgetting, etc.) will result in a score of zero.

- The Final Exam is on Tuesday, May 7th, from 4p – 5:50p. This is a mass exam with different timing from the standard final exam schedule. The Final Exam room will be announced in lecture.
HOMEWORK
- Homework (even numbered problems only) is due in your recitation period, unless other arrangements are made with your TA. The assignments will be due in the week indicated. No late homework will be accepted. Please do not give any assignments to your instructor.

- Students are allowed to discuss homework assignments, but you should not look at another student’s paper. Each student must write his/her solutions in their own way, using their own words.

- Assignments are to be neat and presented logically on loose-leaf paper. If more than one sheet of paper is used, the assignment must be stapled together. Please do not ask your instructor or TA for use of a stapler. Spiral paper is unacceptable. If your assignments are messy, disorganized or do not follow the stated instructions, you will not receive credit for that assignment. You are to show all your work. Just stating an answer (for example, from the back of book) will not ensure full credit.

- Please note that because of the quick pace of this course it is unlikely that all of your homework will be graded and returned to you before the exams. You may want to make copies of your homeworks before turning them in.

QUIZZES
- Announced quizzes and/or pop quizzes will be given. The average of all quizzes will be weighted to 25 points. These points will be added to your total at the end of the semester as extra credit. No makeup quizzes will be given.

MISCELLANEOUS
- You are encouraged to ask questions and to participate in class discussions, however talking in class while the instructor is lecturing is highly frowned upon.

- Cell phones are to be muted or turned off during lectures, recitations and visits to office hours and kept away during exams and quizzes. Violations will be considered as class disruptions, or worse, and will be treated accordingly.

- Texting during class is not allowed. If you are caught, your phone will be confiscated for the remained of the class period. If you are caught texting a second time, you will be asked to leave the class for that day.

- It is your responsibility to be sure that your work is turned in and that you receive the notes and announcements (all announcements are made at the beginning of class). Missing an announcement will not be accepted as a valid excuse for missing an event (test, quiz etc.). If you frequently miss class the instructor reserves the right to deny office hour privileges to you.

- Late arrivals and early departures from class are strongly discouraged, except in cases of emergency.

- Students are to remain for the entire session unless excused by the instructor beforehand or confronted with a serious personal emergency. For instance, it is not acceptable for students to walk in and out of class to answer cell phones, take casual bathroom and smoking breaks, or attend to other personal matters.

- It is not acceptable to use an iPod, read a newspaper, use a laptop for anything other than taking class notes, study for other classes, or engage in other behavior that distracts one from the class proceedings one the session has started

- The Statement of Academic Integrity in the Undergraduate catalog will be strictly enforced with regard to homework assignments, quizzes, and exams.

- If you have a disability, please make arrangements with the Disability Resource Center early in the semester, and let me know.

- The syllabus may be changed at any time. Changes will be announced in lecture.
• Suggestions
  o To do well in this course, you should attend class regularly.
  o Please try to keep up with the class. If you fall behind, then you will have to work much harder to catch up.
  o Note that homework and quizzes combined are 15% of the total points. You have the opportunity to score a lot of points there.
  o If your quiz scores are consistently poor, then that is a red flag that something is going wrong.
  o Please feel free to talk to your TA or instructor. If you are falling behind or getting lost, then do not wait; act on it as soon as possible. Get help, spend more time studying, form study groups, go to your instructor's office hours, go to the Statistics Assistance Center (DuSable 326) - do whatever works for you.

*** More information in regards to the Universities policy on Academic Integrity, Attendance, and Accommodations for Students with Disabilities can be found on the Statistics Division website at the following location, http://niu.edu/stat/courses/pdfs/Policy-Academic-Integrity-Attendance-Accommodations-for-Students-with-Disabilities-Fall2012.pdf.
<table>
<thead>
<tr>
<th>Week of</th>
<th>Material Covered</th>
<th>Assignment – Submit even-numbered problems (Odds are for your practice)</th>
</tr>
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<tbody>
<tr>
<td>January 14</td>
<td>Chapters 1, 2 &amp; 3: Data/Variables and Categorical Variables</td>
<td>Read Chapters 1 &amp; 2</td>
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</table>
| January 21      | Chapters 3 & 4: Categorical Variables and Displaying and Summarizing Quantitative Data | Ch 2: 15, 16, 17, 22, 23  
Ch 3: 13, 14, 19, 25, 26, 27, 28, 29, 31, 37, 38, |
| January 28      | Chapter 4, 5 & 6: Understanding and Comparing Describing Distributions, and Standard Deviation as a Rule | Ch 4: 5, 6, 7, 8, 9, 11, 12, 23, 24, 29, 30, 31, 34, 37, 38, |
| February 4      | Chapter 6: Normal Curves, Exam 1                                                | Ch 5: 20, 21, 29, 30, 33, 34  
Ch 6: 7, 8, 9, 11, 12, 14, 19, 20, 21, 22, 27, 28, 32, 33 |
| February 11     | Chapter 7: Scatter plots, Association and Correlation                           | Ch 6: 39 thru 48 (all), 51, 52, 53, 54                                 |
| February 18     | Chapter 8: Linear Regression                                                    | Ch 7: 1, 4, 5, 6, 11, 12, 23, 24, 25, 26, 36, 39                      |
| February 25     | Chapters 12 & 13: Sample Surveys & Experiments and Observational Studies        | Ch 8: 11, 12, 15, 16, 19, 20, 27, 28, 29, 30, 33, 34, 39, 40, 55(omit f), 62(a-d) |
| March 4         | Chapter 13: Experiments and Observational Studies, Exam 2                      | Ch 12: 1, 2, 3, 4, 7, 8, 13, 14, 19, 20, 21, 23, 25, 29, 30, 31, 34, 36 |
| March 11        | Spring Break                                                                     |                                                                        |
| March 18        | Chapter 14: Probability                                                          | Ch 13: 1, 2, 7, 8, 9, 10, 16, 17                                      |
| March 25        | Chapter 18: Sampling Distribution Models                                        | Ch 14: 1, 2, 4, 6, 7, 11, 12, 13, 14, 15, 16, 19, 21, 23, 26, 28, 31, 32, 33, 34, 35, 36, 37, 38 |
| April 1         | Chapter 19: Confidence Intervals for Proportions                                | Ch 18: 5, 6, 7, 8, 11, 16, 21, 22, 28, 29, 30, 33, 37, 38, 48, 49, 50, 51 |
| April 8         | Chapter 20: Testing Hypotheses about Proportions, Exam 3                       | Ch 19: 1 thru 10, 13, 14, 17, 22, 24, 28, 35, 38, 40                  |
| April 15        | Chapters 20 & 23: Inferences about Means                                        | Ch 20: 1 thru 5, 8, 15, 16, 19, 23, 25, 27, 28, 30, 32, 34            |
| April 22        | Chapters 23 & 24: Comparing Means,                                              | Ch 23: 1, 2(round of down to a value in the table), 5, 6, 13, 14, 18, 33, 34, 35(only b), 36(only b), 37, 38, 42(remove outlier, s=3.55) |
| April 29        | Chapter 24 & Review (Reading day May 3rd)                                       | Ch 24: 7, 9, 11, 27, 29, 33, 35, 43                                   |
| Final Exam      | Tuesday May 7, 4:00 PM                                                           | Room TBA                                                               |
\[ \bar{y} = \frac{\sum y}{n} \quad s = \sqrt{\frac{\sum (y - \bar{y})^2}{n-1}} \quad z = \frac{y - \mu}{\sigma} \quad y = z\sigma + \mu \quad z = \frac{y - \bar{y}}{s} \]

\[ r = \frac{\sum z_x \cdot z_y}{n-1} = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}} \]

\[ \hat{y} = b_0 + b_1 x \quad b_1 = \frac{r \cdot s_y}{s_x} \quad b_0 = \bar{y} - b_1 \bar{x} \quad e = y - \hat{y} \]

If event A and B are disjoint then \( P(A \text{ or } B) = P(A) + P(B) \)

If events A and B are independent, then \( P(A \text{ and } B) = P(A) \cdot P(B) \)

\( P(A) = 1 - P(A^c) \)

\[ \mu_{\hat{p}} = p \quad \sigma_{\hat{p}} = \frac{p(1-p)}{n} \quad z = \frac{\hat{p} - \mu}{\sigma_{\hat{p}}} \]

\[ \mu_{\bar{y}} = \mu \quad \sigma_{\bar{y}} = \frac{\sigma}{\sqrt{n}} \quad z = \frac{\bar{y} - \mu}{\sigma_{\bar{y}}} \]

\[ \hat{p} \pm z \cdot \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}} \quad n = \left( \frac{z^*}{M.E.} \right)^2 \hat{p}(1 - \hat{p}) \]

\[ z = \frac{\hat{p} - p}{\sqrt{p(1-p)}} \]

\[ \bar{y} \pm t^* \frac{s}{\sqrt{n}} \quad t = \frac{\bar{y} - \mu}{\frac{s}{\sqrt{n}}} \quad \text{df} = n-1 \]