

Statistics 6910 (Autumn 2018): Applied Statistics I

Instructor: Dr. Jennifer A. Sinnott

Office: 204C Cockins Hall

Office Hours: Tuesday 1:00 - 2:00 pm; Wednesday 12:00 - 1:00 pm; and by appointment

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Prerequisite: Statistics 6801 (may be taken concurrently), or permission of instructor

Lectures: Tuesday and Thursday 9:35 - 11:25 am in Baker Engineering (BE) 130

Credit Hours: 4

Grader: Zilu Liu, **E-mail:** liu.6536@osu.edu

Required Text: *Design and Analysis of Experiments*. Angela Dean, Daniel Voss, and Danel Draguljić, Springer, Second Edition. <http://www.wright.edu/~dan.voss/DeanVossDraguljic.html>

Course Description, Learning Goals, and Objectives:

Statistics 6910 is a course on applied statistics. It will quickly cover material on descriptive statistics and on the basic techniques of inference (hypothesis tests and confidence intervals), including techniques appropriate for samples from normal distributions and techniques for simple, tabular data. Following the introductory material, we will move on to experimental design. We will cover the basic principles of design and the techniques used to analyze experiments that follow standard experimental designs. Specific designs to be covered include one-way ANOVA, two-and-higher-way ANOVA, factorial designs, and block designs.

Upon successful completion of the course, students will be able to

1. Grasp the basics of descriptive and inferential statistics from an applied perspective
2. Appreciate the importance of the assumptions that the models are based on
3. Make sound decisions for an analysis
4. Understand and use appropriate statistical notation and terminology
5. Implement formal techniques flawlessly
6. Summarize an analysis appropriately

Topics:

- Topic 1: One- and Two-Sample Problems
- Topic 2: Two-Way Tables
- Topic 3: One Way Analysis of Variance (Ch. 3)

- Topic 4: Contrasts and Multiple Comparisons (Ch. 4)
- Topic 5: Checking Model Assumptions (Ch. 5)
- Topic 6: Multifactor Analysis of Variance (Ch. 6)
- Topic 7: More Multifactor Analysis of Variance (Ch. 7)
- Topic 8: Block Designs (Ch. 10 & 11)
- Topic 9: Factorial Experiments (Ch. 13 & 15)
- Topic 10: Random Effects (Ch. 17)

Class Attendance Policy: You are expected to attend all lectures.

Homework: Homework problems will be assigned for each topic, and will be due about a week after the conclusion of each topic. Homework must be turned in at the beginning of lecture on the date it is due. There is a penalty of 10% per day for homework turned in late. If you are unable to attend lecture when the homework is due, you must bring it to me in my office beforehand. **Please write your name on the top of each page of your assignment, and staple the pages together. Write clearly and make your homework easy to grade!**

Class Notes: Copies of class notes will be available on Carmen. You are responsible for printing notes if you want paper copies. (And be sure to thank the current second year graduate students who helped me last year to type up the notes for this class!)

Exams: There will be two in-class exams and a final exam. Statistical tables will be provided as needed. Calculators may be used on the exams, but the calculators on cell phones, PDAs, or any other communication device are NOT allowed.

Full credit on homework and exam problems: You need to show your justification for or work on each homework or exam problem. Answers without work will not receive full credit.

Evaluation: Your final course grade will be based on the following weighting of assessment components:

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|---|-----|
| Homework | 20% |
| Midterm 1 (currently: Thursday, September 20) | 25% |
| Midterm 2 (currently: Thursday, November 8) | 25% |
| Final Exam (Friday, December 7, 8:00 - 9:45 am) | 30% |

Effort, class attendance, and class participation will be taken into account in borderline cases.

Grading Scale: The following grading scale will be used:

| | |
|--------|---------|
| >90% | A/A- |
| 80-90% | B-/B/B+ |
| 70-80% | C-/C/C+ |
| 60-70% | D/D+ |
| <60% | E |

Re-grading: Should there be any concerns with grading, students must proceed as follows. Any grade dispute must be clearly stated (in complete sentences) in a note submitted to me in writing along with the test or assignment within one week of the date on which the grade was returned. Any such resubmitted

test or assignment will undergo a full re-grading. That is, there is the possibility that your grade may increase or decrease as a result.

Website: The course website will be available at <http://www.carmen.osu.edu>. Check the website periodically for announcements about the class and other class material.

R Software: The R and RStudio software will be used for the course. This software is installed in most computer labs on campus. It is free software that you can download and install on your personal machines as well.

Academic Misconduct: Please help us to maintain an academic environment of mutual respect, fair treatment, and personal growth. You are expected to produce original and independent work for exams. Although students are encouraged to work together on homework and lab assignments, all students must submit their own written work **IN THEIR OWN WORDS**. It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct <http://studentlife.osu.edu/csc/>.

E-mail Correspondence: In order to protect your privacy, all course e-mail correspondence must be done through a valid OSU name.nn account.

Special Accommodations: Students with disabilities (including mental health, chronic or temporary medical conditions) that have been certified by the Office of Student Life Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office of Student Life Disability Services is located in 098 Baker Hall, 113 W. 12th Avenue; telephone 614-292-3307, slds@osu.edu; slds.osu.edu.

Diversity: The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

TENTATIVE LECTURE SCHEDULE

Please note that topics covered may change depending on the pace of the course.

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|---------|-------|----------------------------|-------------------------|---------|
| Week 1 | | | | |
| Tu | 8/21 | Topic 1 | | |
| Th | 8/23 | Topic 1 | HW1 assigned | |
| Week 2 | | | | |
| Tu | 8/28 | Topic 2 | | |
| Th | 8/30 | Topic 2 | HW2 assigned | HW1 due |
| Week 3 | | | | |
| Tu | 9/4 | Topic 3 | | |
| Th | 9/6 | Topic 3 | | HW2 due |
| Week 4 | | | | |
| Tu | 9/11 | Topic 3 | HW3 assigned | |
| Th | 9/13 | Topic 4 | | |
| Week 5 | | | | |
| Tu | 9/18 | Topic 4 | | HW3 due |
| Th | 9/20 | Midterm 1 (Topics 1-3) | | |
| Week 6 | | | | |
| Tu | 9/25 | Topic 4 | | |
| Th | 9/27 | Topic 4 | HW4 assigned | |
| Week 7 | | | | |
| Tu | 10/2 | Topic 5 | | |
| Th | 10/4 | Topic 5 | | HW4 due |
| Week 8 | | | | |
| Tu | 10/9 | Topic 5 | HW5 assigned | |
| Th | 10/11 | Autumn Break | | |
| Week 9 | | | | |
| Tu | 10/16 | Topic 6 | | |
| Th | 10/18 | Topic 6 | | HW5 due |
| Week 10 | | | | |
| Tu | 10/23 | Topic 6 | HW6 assigned | |
| Th | 10/25 | Topic 7 | | |
| Week 11 | | | | |
| Tu | 10/30 | Topic 7 | HW7 assigned | HW6 due |
| Th | 11/1 | Topic 8 | | |
| Week 12 | | | | |
| Tu | 11/6 | Topic 8 | | HW7 due |
| Th | 11/8 | Midterm 2 (Topics 4-7) | | |
| Week 13 | | | | |
| Tu | 11/13 | Topic 8 | HW8 assigned | |
| Th | 11/15 | Topic 9 | | |
| Week 14 | | | | |
| Tu | 11/20 | Topic 9 | HW9 assigned | HW8 due |
| Th | 11/22 | Thanksgiving | | |
| Week 15 | | | | |
| Tu | 11/27 | Topic 10 | | |
| Th | 11/29 | Topic 10 | HW10 assigned (not due) | HW9 due |
| Week 15 | | | | |
| Tu | 12/4 | Bonus Topic! | | |
| Th | 12/6 | No class | | |
| Fr | 12/7 | Final Exam (8:00 - 9:45am) | | |