

- **Instructor**

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Office Hours

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posted on courseworks

- **Teaching Assistant**

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posted on courseworks

- **Lectures**

Mon/Wed 6:10-7:25pm, 603 Hamilton Hall

- **Texts**

Stats: Data and Models, 2nd ed.
DeVeaux, Velleman, and Bock, ISBN: 0321433793

- **Course Description and Goals**

This course is an introduction to statistical thought and practice. Concepts covered include: elementary probability, sampling distributions, normal theory estimation and hypothesis testing, regression and correlation, and exploratory data analysis. Learning to do statistical analysis on a personal computer is an integral part of the course.

This course is designed to teach students the basic statistical tools required to formulate statistical questions, perform rudimentary analysis, and apply statistical thinking to their field of study.

- **Prerequisites**

There are no formal course prerequisites for this course; however, proficiency with basic arithmetic and algebra will be assumed and won't be covered as part of the course material.

There will be a mathematics pre-test during the first week of class. Students without a sufficient score on this exercise should speak with the instructor about whether or not the level of this course will be appropriate for their background.

• Course Components

– Homework

Homework is perhaps the most valuable tool for a statistics student. Homework problems are an opportunity to practice critical skills and receive valuable feedback.

Homework problems will be assigned out of the text book, with occasional supplemental problems. Numerical solutions will either be provided by the text or posted on the course webpage.

It is assumed that students have completed all homework assignments. Homework will not be collected. Questions regarding homework problems are welcomed and encouraged during office hours.

– Assigned Reading

Since the goal of this course is to introduce students to the basic theory *and* practice of statistics, students are required to read “non-statistical” material from various sources. Reading assignments will be posted periodically. As with homework, no part of these assignments will be collected, although *there may be quiz or exam questions based on assigned readings.*

Please email me with specific areas of interest and I will search for articles related to these areas.

– Quizzes

The goal of frequent quizzes is to be sure that students understand the material as the course progresses and to give the instructor feedback about any areas that need clarification.

Each Wednesday class will begin with a 10 to 15 minute quiz covering all material from the Monday and Wednesday of the previous week. Quizzes will be based *mostly* on homework problems and questions from assigned articles. Homework and class notes may be used on the quizzes (closed book).

The lowest quiz grade will be dropped when computing final grades.

– Computing

In nearly every situation statisticians face more data than can be feasibly managed by hand. This is a good thing! It does mean, though, that just knowing lots of statistical techniques isn't enough! Learning how to represent and analyze large amounts of data is a crucial component of statistical analysis.

There are two computing components to this course—computing labs and the final project. There will be four computing labs, each lasting approximately one hour. The labs will consist of a series of exercises to familiarize students with analyzing data using standard statistical computing software.

Each computer lab assignment is worth 2.5 possible points. The sum of the four lab scores is then counted as a quiz grade.

– Exams

There will be a midterm exam and a final exam. The exams are in-class and will be cumulative. One standard sized (front and back) sheet of paper can be used for the midterm and two for the final.

– Final Project

For their final project, students will work individually or in groups to answer a statistical question of interest. Students will formulate research questions, collect (either directly or from available sources) and analyze data and present results to their classmates. More information will be provided as the semester progresses.

• Schedule

Week of	Topic	Assigned Reading	Homework	Notes
Jan 21	Introduction, Obtaining and Exploring Data,	ch 1, 2, 3	2.5, 2.8, 2.16, 2.19, 2.24, 3.9	math pretest
	Part 1: Learning from Data			
Jan 26	Graphical Descriptive Techniques, Measures of Central Tendency and Dispersion	ch 4,5,6	4.5,4.6,4.7,4.11,4.12,4.15,4.23,4.38,4.44,5.3,5.5,5.10, 5.18,5.21,5.23,5.24,ch.6-1,9,11,13,23,25,29,33,35,39,43,49	
Feb 2	Linear Regression, Scatterplots, Correlation	ch 7,8,9,10	7.11, 7.12, 7.26, 7.27, ch.8-1,5,9,15,17,21,23,25,31,41 ch.9-9,11,13,15,17,19,21; ch.10-1,3,4,5,6	Lab 1, Feb 3 7:30-8:30 407 Math
	Part 2: Probability			
Feb 9	Sampling, Observational Studies, Experiments	ch 11, 12, 13	ch.11-9,11,15,17,19,21,23,33,35,12.11,12.13,12.14,13.5,13.11, 13.20, 13.43,12.17,12.18,12.19,12.23,12.28,12.29,12.31,12.32	Lab 2, Feb 10 7:30-8:30 407 Math
Feb 16	Probability Rules, Independent Events Conditional Probability, Bayes's Rule	ch 14, 15	14.1, 14.11, 14.13, 14.15-19, 14.20-22, 14.27 15.6, 15.9, 15.10, 15.15-17, 15.27-28, 15.31, 15.41-42	Project Group Form due Feb 16
Feb 23	Probability Distributions and Models Expected Value	ch 16, 17	16.1, 16.7-8, 16.21-23, 16.31-32 17.7-11, 17.19-22, 17.33-38	
	Part 3: Making Inferences			
Mar 2	Recap: Probability, Sampling Distributions Central Limit Theorem	ch 16, 17 (review), ch 18	18.7-14,25,27,29 18.35-39 old mid-term exams	
Mar 9	Catch-up and Review Midterm is Wednesday, March 11			
Mar 16	Spring Break			
Mar 23	Hypothesis Tests, Confidence Intervals Tests for Proportions	ch 19, 20	19.7-10, 19.18-20, 19.34-35 20.10-19, 20.29	Project Proposal Due Mar 25
Mar 30	More Hypothesis Tests Inference for the Mean	ch 21, 23	21.2-8, 21.12, 21.17, 21.26 ch.23-1, 5,11,15,17,19,21,31,36	
Apr 6	Comparing Means and proportions Paired Samples and Blocks	ch 22, 24, 25	ch.22-1,3,5,11,13,15,21,23,25,29; ch.24-11,19,21,23,25,31,33 ch.25-9,11,19,23,29	Lab 3, April 7 7:30-8:30 407 Math
Apr 13	Inference for Linear Regression, Multiple Regression	ch 27, 30, 31	ch.27-1,3,5,19,21,23,34,36 ch.30-1,3,5,9,17	Lab 4, April 14 7:30-8:30 407 Math
Apr 20	Inference for Linear Regression, Multiple Regression	ch 30, 31	ch.31-3,5,7,11	
Apr 27	Project Presentations			
May 4	Chapter 26, Review	ch 26	26-1,3,5,7,9,13,15,17,25 old final exams	
Final Exam	Date set by university exam schedule			

• Policies and Grades

- grades are determined as follows: Midterm 30%; Quizzes 20%; Final Project 15%; Final Exam 35%
- there will be curving on final grades only
- an overall average of 90% guarantees a final grade that starts with the letter A; 80% guarantees a final grade that starts with a B, 70% at least C and so on (though the actual cut-off points will likely be lower)
- There will be no make-up exams or quizzes. If a student is excused from quiz or exam, the remaining grades will be re-weighted to compensate. Except in the case of emergency, you must notify me *before* you miss a quiz or exam.
- Textbook assignments are posted for each class period. Students are responsible for the material covered in all reading assignments, although emphasis on quizzes and exams will be proportional to the amount of time spent on the topic in class.
- Grading is based on *demonstrated* mastery of statistical procedures. No credit is given for numerical solutions and no marks are deducted for mathematical errors.
- You may use a basic calculator on quizzes and exams. You do not need to purchase a special calculator for this course.

• Statistics Help Room

The statistics department operates a help room on the ninth floor of the Social Work building. Students can utilize teaching assistants working with any section of W1111. Hours and exact locations are listed at <http://www.stat.columbia.edu/misc-pages/help-room.html>. Students are encouraged to use this resource to supplement TA and instructor office hours for this section.

• Academic Integrity

All students are expected to adhere to the highest standards of academic integrity, specifically the policies set forth by the university administration.

Violations of these policies result in referral to the dean's office without discussion, and without exception.

• Students with Special Needs

I will happily make every effort to accommodate students' unique situations and learning styles. Students who need special modifications (extra time, athletes who will be missing classes for events, etc.) should let me know before the end of drop-add so that we can make plans for accommodations.