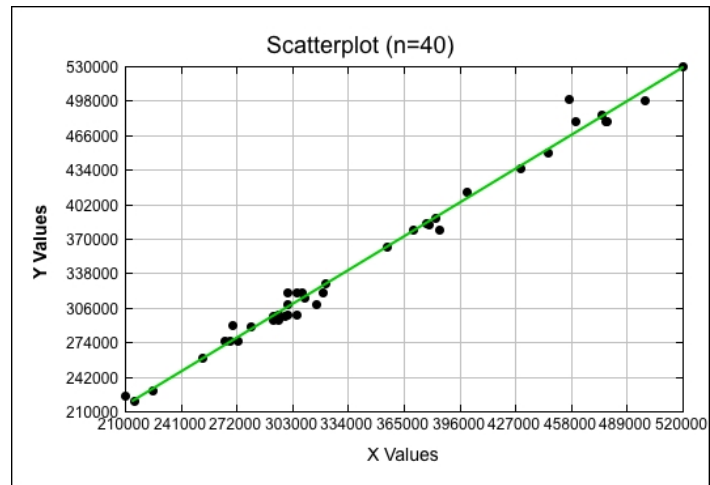


Histogram of Old Faithful geyser heights



Scatterplot of home sale price data relative to their list price

GEOG 2000: Geographic Statistics

Wednesday and Friday 10a – 11:30a; Lab section: Friday 11:30a – 1:30p

Spring Quarter 2016

Boettcher West Lab #126

Instructor: Prof. E. Eric Boschmann

Department of Geography & the Environment

Office: Boettcher West, room 112

tel: 303.871.4387 | **email:** eric.boschmann@du.edu

Office hours: Wednesday 12:00p – 1:00p & Thursday 2p – 3:30p; or by appointment

Course materials are available on Canvas.

Teaching Assistant: Nick Gilroy, kai.gilroy@du.edu

Office Hours: Tue. 3-5pm & Fri. 1:30-3:30pm, Boettcher West, room 136

Course Description & Goals

“An introduction to statistics primarily for Geography and Environmental Science students focusing on the scientific method, the nature of data, descriptive statistics, and analytical or inferential statistics.” (Course Catalog)

The goal of this course is for students to learn and understand an introductory level of basic statistics, with topics including: data issues; summarizing and graphing data; descriptive statistics; probability; inferential statistics; basics of correlation and regression; and analyzing categorical data. Some emphasis will be given to geographic-specific problems. Students will practice effective communication of statistical information through oral, written and visual methods. You will also become familiar with Excel and the JMP statistical software.

Like learning a foreign language, success in statistics requires near-daily exposure to, and engagement with, the material. To achieve the goals of ‘learning’ and ‘understanding’ basic statistics, students will encounter the fundamentals through several avenues: in class lecture-discussion, textbook readings, daily homework exercises and quizzes, lab exercises and exams.

While arithmetic computations (and good data) are important to deriving accurate statistical outcomes, this course will place emphasis upon understanding and interpreting computations.

Textbook

McGrew, Lembo, and Monroe. 2014 *An Introduction to Statistical Problem Solving in Geography*. **Third Edition**. Long Grove, IL: Waveland Press, Inc. ISBN 10: 1-4786-1119-7

Each student should have access to a copy of the **Third edition** of this book. One copy is available on closed reserve at Anderson Academic Commons. The textbook serves as supplement to lecture materials. Homework and lab exercises do not come from the textbook.

Format

This course will run as a combination of lecture-discussion, and independent lab work. Each instructional period (non-exam days) will take the following format:

- For each class period you are assigned a set of homework exercises (based on the previous class period), and a set of reading pages (to prepare for the new topic).
- At the beginning of class we can discuss any questions on the homework, then take a short quiz.
- Then we will discuss the new material for the day. This corresponds with the book sections outlined in the course calendar for that specific date. This will include lecture and in class exercises.
- Time permitting, you may be given class time to work on the next set of homework problems. This will be a good opportunity to work with others on difficult problems or concepts. **Do not plan to leave early!**
- On Fridays there is a lab section, where you are expected to complete the Lab exercises in full. **Do not plan to leave early.**
- Rinse, and repeat.

Will we use technology to “do” statistics in this class? Yes. As an introductory course, my pedagogical emphasis is upon learning the concepts and computations. The most important element is for you to know how to interpret and explain a statistical procedure and output. We will be using Microsoft Excel and JMP (a statistical software package) to practice our understanding of statistics. We will also use paper, pencil, and calculators throughout this course.

Course Requirements & Grading

Homework exercises: For each instructional period, a set of homework exercises will be given. The repetitive exposure and practice of ‘doing’ statistics is imperative to learning and understanding; it helps reinforce the necessary skills. Homework exercises will be ungraded.

Readings: Come prepared for each class period having completed the assigned readings. Readings are ungraded.

Homework Quizzes: Each day you will take a short quiz based on the homework exercises. The purposes of the quizzes are to enhance learning, reinforce homework material, and provide accountability. See the “Why daily quizzes” module in Canvas for more information. Quizzes constitute 25% of your overall grade.

Lab Exercises: Most weeks (Friday 11:30a – 1:30p) will include a computer lab exercise. Some will be independent exercises while others will be group efforts. Lab exercises constitute 25% of your overall grade.

Exams: There are three exams. See the calendar for scheduled dates. While the exams are non-cumulative, the nature of statistics requires the accumulation of knowledge that builds upon itself. The exams constitute 50% of your overall grade.

Overall Grade:

Exams	50%
#1 – 10%	
#2 – 20%	
#3 – 20%	
Homework Quizzes	25%
Lab Exercises	25%
	<hr/>
	100%

Course grading scale:

94 – 100% = A	73 – 76% = C
90 – 93% = A-	70 – 72% = C-
87 – 89% = B+	67 – 69% = D+
83 – 86% = B	63 – 66% = D
80 – 82% = B-	60 – 62% = D-
77 – 79% = C+	below 60% = F

Policies

[1] Attendance and punctuality is crucial to your success! Quizzes are only available if you are in class and on time. There are no make up quizzes.

[2] Make-up exams are not permitted, unless extreme circumstances arise.

[3] Technology is a powerful and useful resource in our lives. But like other luxuries, it has downsides. Primarily, technology *can be a major distraction* to yourself and people around you – including me! Since we are in the computer lab and using computers at times in class, please be conscientious of your non-class uses of the computer during class time. Also, please put smart phones away until break, or the end of class.

[5] All students and faculty are expected to adhere to the *University of Denver Honor Code* <http://www.du.edu/studentlife/studentconduct/> This includes issues related to academic integrity. Any suspected incidents of Academic Dishonesty will be reported Office of Student Conduct.

[6] Special accommodations for students with disabilities. Students who have disabilities or medical conditions and who want to request accommodations should contact the Disability Services Program (DSP); 303.871.2372/ 2278; 1999 E. Evans Ave.; 4th floor of Ruffatto Hall. Information is also available online at www.du.edu/disability/dsp; see *Handbook for Students with Disabilities*.

A note about geography and statistics:

What is “geographical” about statistics? How is it different and unique than non-geographical statistics? This course is an introduction to statistics, from a geographical perspective. *Most of the statistical procedures in this introductory course are not unique to geography.* But we will try to learn them using data sets and examples relevant to geography and environmental science. Statistical procedures that use spatial data are more advanced than this course can cover. For instance, we will not be addressing the topics in Chapters 4,13,14,15,18 of the textbook, as they are more advanced spatial statistical procedures. Upon completion of this course, students will be equipped to enroll in GEOG 3010 *Geographical Information Analysis* and learn about the procedures in Chapters 4, 13, 14, 15, or GEOG 3000 *Advanced Statistics* for multivariate regression (Chapter 18).

Spring 2016 Calendar

GEOG 2000 Geographical Statistics W/F 10a-11:30a (F 11:30-1:30p)

Week 1 Introduction and Data

W March 23 **Chapter 1 & 2** An Introduction to Statistics & Geographic Data
 F March 25 **Chapter 3:** Descriptive Statistics (Part 1 *Measures of Center*) *
Lab 1

Week 2 Descriptive Statistics

W March 30 **Chapter 7** Sampling*
 F April 1 **Ch. 3** Descriptive Statistics (Part 2 *Measures of Spread*) and **Ch. 4** Spatial Descriptive
 Statistics*
Lab 2

Week 3

W April 6 **Chapter 3 and 4** Review *
 F April 8 **Exam 1** (10% overall grade) 10am – 11:30am
Lab time (12pm – 1:30pm): *Lecture Chapter 5* Discrete Probability

Week 4 Probability

W April 13 **Chapter 5 & 6** Discrete Probability | Normal Probability *
 F April 15 **Chapter 6** Normal Probability *
Lab 3

Week 5 Transition to Inferential Statistics

W April 20 **Chapter 8** Estimation | Sample Size | Confidence Intervals *
 F April 22 **Chapter 8** Estimation | Sample Size | Confidence Intervals *
Lab 4

Week 6 Inferential statistics

W April 27 **Chapter 9** Hypothesis Testing*
 F April 29 **Chapter 9** Hypothesis Testing*
Lab 5

Week 7

(M) May 2 – Online quiz of April 29 homework*
 W May 4 **Exam 2** (20% overall grade)
 F May 6 **Chapter 10** Inference from two samples
Lab 6

Week 8 Analyzing Categorical Data

W May 11 **Chapter 11** ANOVA *
 F May 13 **Chapter 12** Goodness of Fit | Contingency Tables *
Lab 7

Week 9 Determining association between variables

W May 18 **Chapter 16** Correlation *
 F May 20 **Chapter 17** Simple Linear Regression *
Lab 8

Week 10

W May 25 **Chapter 19** / Review *
 F May 27 **Exam 3** (20% overall grade)

Final exam slot: Saturday, May 28, 10am- 11:50am

We will use this period only in the event of a University closure during Spring Quarter. Please do not make end-of-school year travel arrangements before this date.

* Indicates homework quiz