
Statistics 302: Statistical Methods

Spring 2019, Dr. Elizabeth Kolodziej

Sections 503, 504, 510 Texas A&M University, Department of Statistics

Statistical Methods is an introductory statistics course covering the basic concepts of data summary, sampling, and statistical inference. We will cover the following topics: descriptive statistics, sampling, sampling distributions, confidence intervals, z-tests, t-tests (one sample, independent samples and paired), analysis of variance, chi-squared tests, and simple linear regression.

This course focuses on understanding statistical concepts and applying them to real world problems. My goal is to teach you enough about statistics and statistical reasoning so that at the end of the semester you can understand and apply critical thinking to the statistical results presented in newspapers and journal articles in various medical, agricultural, and biological fields.

Instructor & TA

Instructor: Dr. Elizabeth Young Kolodziej
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TA: Dongbang Yuan
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Office Hours: 3-5pm Wednesdays
Help sessions: T 5-7, R 10-12, 5-7

Open Labs Blocker 162:
Mondays through Thursdays
10am-noon, 1-3pm, 5-7pm

Course Content

Meeting Times:

302-501: BLOC 150 TR 8:00-8:50am
302-504: BLOC 150 TR 12:45-2:00pm
302-502: BLOC 169 TR 2:20-3:35pm

Learning Objectives

By the end of the semester, the student should be able to:

- How to collect data for a statistical study. I hope you'll be able to describe different randomization mechanisms, discuss the consequences of failing to use blinding or control groups, and decide which groups study results apply to.
- How to describe data. We'll learn how to recognize which charts, graphs, and statistics are appropriate for a given data set. We'll also interpret these results.
- How to make appropriate inferences about the population based on data. We'll devise a non-subjective way to make inferences about a population based on data, and make those inferences on real data sets. We'll learn how to take random chance into account when interpreting these results.
- How statistics work. We'll learn how different results affect different computations.

Prerequisites

Math 141 or Math 166 or the equivalent high school algebra are required before this course. We use a little

high school algebra along with logical reasoning to come to conclusions about data. Be ready to think!

Topics

1. Introduction to graphs and summary statistics: Chapters 1-5
2. Probability and sampling distributions: Chapters 9-13
3. Confidence intervals: Chapters 14-19
4. Hypothesis tests: Chapters 14-19
5. Collecting Data: Chapters 7-8
6. Regression: Chapters 4, 23
7. ANOVA: Chapter 24
8. Chi-squared tables: Chapter 22

Materials

- Notes are available in eCampus. Print them and put them in a three ring binder, or have Copy Corner bind them for you.
- Piazza is the app we'll use for homework questions and polling. It's free, though they'll sell your email address. Bring a phone / computer / tablet to log in.
- Homework is on www.webassign.net. You must click on the link from eCampus. It costs \$23, and any code you got from the bookstore has nothing to do with WebAssign.
- For exams, you need 3 grey 8.5 X 11" scantrons (one for each exam), a scientific non-graphing calculator, and # 2 pencils for the scantrons.
- The textbook is Baldi and Moore's **The Practice of Statistics in the Life Sciences**. StatsPortal is not necessary. There's also an extra WebAssign package of homework problems that goes with our book, but we don't need that, either.

Grading Details

Grading Scale

There are not any extra credit projects offered to compensate for a poor average. Everyone must be given the same opportunity to do well in this class. The final grade is based on a scale no stricter than 90-100: A, 80-89.5; B, 70-79.5; C 60-69.5; D, below 60; F.

Grading

Attendance Grades 5%
Homework 20%
Exams 20% each - 2 exams
Final Exam 35%

I can weight the final exam slightly more heavily *if it helps you*.

Attendance

I expect attendance in each class. You should be on time and ready to take notes, use your calculator, and vote using Piazza. There's no such thing as an "excused absence;" you're either in class, or you're not. These cannot be made up, since they depend on being present in class. I'll drop the lowest 4 of these grades to make up for excused absences. If you need notes, ask a fellow student. Also see Rule 7 at <http://student-rules.tamu.edu/rule07>.

Homework:

The homework is designed to give you practice working problems and to check on your progress. It is weighted as heavily as one exam to encourage you to work hard on completing it. Statistics is learned much more by doing than by sitting passively in class. Working with a study group collaboratively is highly encouraged; however, you must do your own work. The lowest two homework grades are dropped; there is no makeup homework.

You may use your textbook and notes from this class and other related classes you have taken or are taking, textbooks and references available in the TAMU library and eCampus, JMP software, discussion with the instructor or grader, notes and homework from a related course, and voluntary and cooperative discussion with other students currently taking the class while working on homework. You may also use Wikipedia. There will be an online discussion board. You may post screen shots of JMP, especially as they pertain to discussion.

You may not use solutions manuals from our textbook, other textbooks, previous classes, other students who have taken our class. You may not copy from other students.

Exams:

We will have two midterm exams and a final exam, all multiple choice. Exams are designed to check that you are the one who has learned the material rather than a friend. If you miss exam 1 or exam 2, you must contact me within

2 working days of a university excused absence for a make-up exam. Unexcused absences will be dealt with on a case-by-case basis. Your exam solutions must be entirely your own work, consistent with the university rules on **academic integrity**. Each exam will be comprehensive, cumulative and closed book.

Final Exams: We will follow the official **university schedule** for final exams. If you have more than two finals on one day, please email me the week of April 15 to reschedule.

- Section 510: Friday, May 3, 1-3pm
- Section 503: Tuesday, May 7, 8-10am
- Section 504: Tuesday, May 7, 1-3pm

Makeup Exams:

This is based on university policy.

- If you must miss an exam due to illness or circumstances beyond your control, notify me or the Statistics Department (979-845-3141) (before, if feasible, otherwise within two working days after you return). Notify me as soon as possible to schedule a make-up exam.
- TAMU Student Rule 10.6: A temporary grade of I (incomplete) at the end of a semester or summer term indicates that the student has completed the course with the exception of a major quiz, final examination, or single major assignment. The instructor shall give this grade only when the deficiency is due to an approved university excused absence (see Rule 7 of TAMU Student Rules)... This grade is not to be given because you feel that you have too much other work or study or because you think that you will not earn an acceptable grade in the course.

Incompletes:

A temporary grade of I (Incomplete) at the end of the semester indicates that the student has completed the course with the exception of a major quiz, final exam, OR minimal other work. The instructor is only allowed to give this grade when the deficiency is due to an authorized absence or other cause beyond the control of the student.

Help and Resources

If you are feeling lost or overwhelmed:

1. Make an appointment with me. I will be in my office during office hours. (If I'm not there, I probably slipped away to the bathroom briefly and will be right back.) If you're not available during my office hours, email me for another time frame.
2. Ask lots of questions on the discussion board on Piazza. Answering other students' questions is, perhaps surprisingly, a great way to overlearn something for your own benefit: when you teach something to a friend, you keep it in long term memory much longer.
3. The Statistics Department has employed graduate students including our TA to help you with homework problems. Open lab times will be available in eCampus. The lab is in Blocker 162, down the hall from the coffee shop.
4. Visit the Academic Success Center website (successcenter.tamu.edu). They have lots of helpful information on math study skills, note taking skills, textbook reading skills, time management, and how to handle anxiety.

University Policies:

Academic regulations and procedures are governed by University policy. Academic dishonesty cases will be handled in accordance with the University's policies.

Aggie Honor System:

An Aggie does not lie, cheat, steal, or tolerate those who do. Academic dishonesty includes the commission of any of the following acts: cheating, fabrication / falsification, multiple submissions, plagiarism, complicity, and other types of misconduct. Please see the complete Aggie Honor Council Rules and Procedures at <http://aggiehonor.tamu.edu>.

- Cheating is intentionally using or attempting to use unauthorized materials, information, notes, study aids or other devices or materials in any academic exercise. Unauthorized materials may include anything or anyone that gives a student assistance and has not been specifically approved in advance by the instructor. Texas A&M complies fully with the Digital Millennium Copyright Act ("DMCA"). Users of the Texas A&M network found to have engaged in repeated infringement of copyright are subject to termination of their network access and may be reported to the appropriate Dean or Human Resources officer for disciplinary action. Please

see TAMU's Copyright Infringement Policies and Sanctions Notification for additional information at https://security.tamu.edu/protect_myself/CopyrightInfringement_Policies_and_Sanctions_Notifications.php

- As commonly defined, plagiarism consists of passing off as one's own ideas, words, writing, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section "Scholastic Dishonesty."
- Complicity is intentionally or knowingly helping, or attempting to help, another to commit an act of academic dishonesty. Examples include knowingly allowing another to copy from one's paper during an examination or test; distributing test questions or substantive information about the test without the instructor's permission; collaborating on academic work knowing that the collaboration will not be reported; taking an examination or test for another student; and conspiring or agreeing with one or more persons to commit, or attempt to commit, any act of scholastic dishonesty.

For more information about University policies and regulations, please see the following:

- Academic Integrity and Student Rules:
<http://student-rules.tamu.edu>
- Aggie Code of Conduct:
<http://compliance.tamu.edu/CodeConduct.aspx>
- Aggie Core Values:
<http://www.tamu.edu/about/coreValues.html>

Statement on Disabilities:

The Americans with Disabilities Act (ADA) Policy Statement - The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex

on west campus; call 979-845-1637 (video phone 866-860-7701); or email disability@tamu.edu. For additional information visit <http://disability.tamu.edu/>. If you have a disability requiring an accommodation, please contact me as soon as possible so that we can make appropriate arrangements.

Copyright Notice:

Faculty members own copyright in their educational work at Texas A&M University, as stated in the Texas A&M University System Policy for Intellectual Property Management and Commercialization (<http://policies.tamus.edu/17-01.pdf>). Students are not allowed to post or share any materials created by a faculty member unless given permission by that faculty member. This includes but is not limited to homework assignments, homework solutions, exams, exam solutions, lecture notes and any other supplemental materials. Any violation of this copyright policy could result in disciplinary actions as described in Student Rule 20.2: Procedures in Scholastic Dishonesty Cases and Student Rule 20.1.2.3.1

Schedule

Week	Chapters to Read	Tuesday	Thursday
Jan 14-18	1-2	Syllabus, Chapter 1	Graphs and Center Statistics
Jan 21-25	3-4	Spread Statistics and Box Plots	Scatterplots and Correlation
Jan 28-Feb 1	5, 11	Two-way tables	Probability
Feb 4-8	12	Distributions	Normal Distribution
Feb 11-15	13	Bayes's Rule	Sampling distributions: proportions
Feb 18-22	13	Sampling distributions: means	Review
Feb 25-Mar 1	14, 15, 17, 19 Ignore HT	Exam 1	Confidence Intervals (CI): Proportions
Mar 4-8	14, 15, 17, 19 Ignore CI	CI: Means	Hypothesis Tests (HT): Proportions
Mar 11-15		Spring Break	
Mar 18-21	7	HT: Means	Collecting Data: Sampling
Mar 25-29	8	Collecting Data: Experiments	2-sample CI and HT for proportions
Apr 1-5	20, 18	Finish 2-sample	Review
Apr 8-12	4, 23	Exam 2	Regression Inference
Apr 15-19	22	Regression Residuals	Chi-Square
Apr 22-26	24	ANOVA	Review
Apr 29-May 3		Attend Friday Classes	Final Exams
May 6-May 7		Final Exams	

*Schedule is only approximate, though exam dates will be adhered to.