

**Stat 1040: Introduction to Statistics
Syllabus**

Spring Semester 2018
Tuesday 5:15 – 7:45 PM

INTRODUCTION

Statistics the collection, display, and analysis of data; it is the art of making wise decisions in the face of uncertainty. The purpose of this class is to teach you how to think critically about data – how it was collected and analyzed – and its uses in addressing interesting questions. Some of the issues we will touch on are:

- How should experiments be designed to measure the effects of new treatments (medical or other)?
- Why does a casino make a profit at roulette?
- How can the Gallup poll predict election results so accurately using samples of only a few thousand people?
- How can we tell if medical treatments or other interventions really work or if the results we observe are simply due to chance error?
- How can we tell if sex bias or race bias has occurred?

Along the way you will learn some basic techniques that statisticians (and many non-statisticians) use to visualize and summarize data, some methods for determining what can be due to chance and what cannot, and the limitations as well as the value of these procedures.

INSTRUCTOR:

James (Jim) Pugsley
Brigham City Regional Campus
Phone: 435-279-6485
Email: jamespgsl@gmail.com

COURSE DESCRIPTION:

This broadcast course will provide students with opportunities to gain the knowledge about and skills with descriptive and inferential statistical methods. Major topics include experimental design, regression, chance, sampling methods and distributions, confidence intervals, and hypothesis tests.

PREREQUISITE:

MATH 1010 Intermediate Algebra, or equivalent, with a grade of C- or better within the past academic year (or MATH 1010 and a sufficient grade on the math placement exam).

COURSE RESOURCES:

Textbook(s)

Statistics by Freedman, Pisani, Purves, Fourth Edition (W.W.\ Norton, 2007). You will be responsible for learning all sections except Chapter 11 sections 4 and 5, Chapters 15, 22, 24, and 25, Chapter 28 section 3, and the finite population correction factor.

Calculator

A TI-83 or TI-84 graphing calculator is **required**. The TI-85 and TI-86 do NOT have the functions you will need for your work in this class.

Canvas

Canvas is USU's Learning Management System which we will use for our course. You will use Canvas to access course content, turn in assignments, check your grades, and communicate with the instructor and other students in the class. If at any time your use of the program becomes anti-productive or destructive your access to it will be blocked. Keep in mind that **all** access, including messages, mail, and chat is visible to and monitored by the instructor. **Nothing you do within the Canvas course system is private.** Make sure that all your contributions are civil, respectful of other students and the instructor, and on topic.

You can login to Canvas at <http://online.usu.edu>. Your username is your A#, and your password is your global password (the same one you use for Banner or Aggiemail).

The website: <https://online.usu.edu/support/canvasStudent.cfm> is provided to give you information on how to set up your computer in order to use Canvas and how to use the various tools in Canvas.

Software

The website <https://online.usu.edu/docs/technicalDocs/TechnicalUserRequirementsforCanvas.pdf> provides information on the software you need for Canvas.

Documents in this course will be presented in .pdf format where possible. You will need Adobe Reader to view these files, which you can obtain for free at <http://get.adobe.com/reader/>.

Some written assignments need to be turned in as .pdf files. Instructions for converting your files to .pdf format are available in Canvas.

Tutor

Online tutoring is available. Hours and links are posted on Canvas.

TOPICS

1. **Design of experiments:** controls, randomization, blind and double-blind. The Salk vaccine trial, the portacaval shunt, historical controls.
2. **Observational studies:** association and causation, confounding factors, the clofibrate trial, sex-bias in graduate admissions.
3. **Descriptive statistics:** bar charts, pie charts, the histogram, the density scale, cross-tabulation, the average and the SD and their relationship to the histogram, the median, the normal approximation for data, percentiles, percentiles and the normal curve, measurement error, outliers, bias versus chance error, plotting points and lines, the slope and the intercept of a line.
4. **Correlation:** the scatter diagram, the correlation coefficient, properties of the correlation coefficient (invariance to change of location and scale, symmetry), ecological correlations, correlation does not imply causation, examples, the SD line.
5. **Regression:** the graph of averages, regression to the mean, the regression method for individuals, the regression fallacy, there are two regression lines, the r.m.s. error, plotting residuals, heteroscedasticity, the slope and the intercept, the method of least squares, does regression make sense?
6. **Probability:** the long run argument, conditional probabilities, the multiplication rule, independence, the Collins case, listing the ways, the addition rule the Paradox of Chevalier de Mere, are real dice fair?
7. **Chance variability:** What does the law of averages really say? chance processes, the sum of the draws, making box models, the expected value and the standard error, using the normal curve, probability histograms, the normal approximation for probability histograms and its scope.
8. **Sampling:** The Literary Digest poll, the year the polls elected Dewey, using chance in survey work, how well do probability methods work, a close look at the Gallup poll, telephone surveys, chance error, bias, quota samples, samples of convenience, standard errors and bias, the quality of the data.
9. **Chance errors in sampling:** the standard error, the correction factor, the Gallup poll, the accuracy of percentages, confidence intervals and their interpretation, the accuracy of averages, the SE and expected value of an average.
10. **Tests of significance:** null and alternative hypotheses, test statistics and significance levels, the role of the box model, zero-one boxes, the one-sample z- and t-tests, the standard error for a difference, comparing two sample averages, comparing two proportions, experiments, the χ^2 -tests for independence and goodness-of-fit, was the result significant? was it important? data snooping, the importance of the box model.

COURSE OUTLINE:

Quizzes

There will be ten weekly quizzes (5 points each). The quiz will be a randomly selected homework problem, you will turn it in at the beginning of class (no more than 2 minutes). You will not be allowed to take the quizzes at a different time.

Midterms

There will be two midterms, both will be closed book. Your calculator is required for the midterms.

First Midterm: Chapters 1-12 (inclusive) February 6, in class

Second Midterm: Chapters 13-23 (inclusive) March 27, in class

Final Exam The final exam is closed book and comprehensive, but it will emphasize the material in chapters 26-28. The final exam is May 1, in class.

Schedule Class will meet every Tuesday from January 9 through May 1 from 5:15PM – 7:45PM.

GRADING:

Your grade will be based on the following:

Component	Percentage
Bell Ringer Quizzes	10%
Homework Projects	10%
Midterm Exams (2 @ 100 each)	40%
Comprehensive Final Exam	40%
Total Points	100%

Assignment and Exam points are awarded **only** for correct answers. You must earn at least 60% of the total points to receive a non-failing grade. The final breakdown may be adjusted slightly to account for test difficulty, etc. Any questions about the grading policy or your standing in the class can be directed to the instructor outside of class time.

Your grade will be calculated using the following scale:

Grade	Percentage Range
A	100 – 93%
A-	92 – 90%
B+	89 – 87%
B	86 – 83%
B-	82 – 80%
C+	79 – 77%
C	76 – 73%
C-	72 – 70%
D+	65 – 69%
D	60 – 64%
F	Below 60%

THERE WILL BE NO EXTRA CREDIT!

A request for an incomplete grade will be considered ONLY if the extenuating circumstances occur after the last day to drop and you have a passing grade of at least 60% when you make the request.

COURSE POLICIES:

Instructor Feedback/Communication

I am happy to answer your questions and address your concerns and will make every effort to respond to your emails in a timely manner.

All important course announcements will come through Canvas announcements. It is your responsibility to make sure your communication preferences are set up in Canvas such that you receive these announcements in a timely manner.

Late Work

Make-up exams will be given only with PRIOR consent and arrangement with the instructor and then ONLY in instances of military duty, University-sponsored events, jury duty, serious illness treated by a physician, or death in the immediate family. All excuses must be supported by written documentation.

UNIVERSITY POLICIES:

Honor Pledge

As stated in The Student Code, “Each student has the right and duty to pursue his or her academic experience free of dishonesty. The Honor System is designed to reenforce the higher level of conduct expected and required of all Utah State University students.” Upon admission to the university, you agreed to abide by this Honor Code by signing the Honor Pledge, which reads: “I pledge, on my honor, to conduct myself with the foremost level of academic integrity.”

Academic Dishonesty

The Instructor of this course will take appropriate actions in response to Academic Dishonesty, as defined the University’s Student Code:

Acts of academic dishonesty include but are not limited to:

1. Cheating: (1) using or attempting to use or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity, including working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done “individually”; (2) depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments; (3) substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work; (4) acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission; (5) continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity; (6) submitting substantially the same work for credit in more than one class, except with prior approval of the instructor; or (7) engaging in any form of research fraud.
2. Falsification: altering or fabricating any information or citation in an academic exercise or activity.
3. Plagiarism: representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.

Full text of the Student Code available at available at available at <http://www.usu.edu/studentervices/pdf/StudentCode.pdf>:

Special Needs

Students with ADA-documented physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations. Veterans may also be eligible for services. All accommodations are coordinated through the Disability Resource Center (DRC) in Room 101 of the University Inn, (435)797-2444 voice, (435)797-0740 TTY, (435)797-2444 VP, or toll free at 1-800-259-2966. Please contact the DRC as early in the semester as possible. Alternate format materials (Braille, large print or digital) are available with advance notice.

Grievance Process

Students who feel they have been unfairly treated...may file a grievance through the channels and procedures described in the Student Code:

<http://www.usu.edu/student-services/pdf/StudentCode.pdf#page=3> (Article VII. Grievances, pages 27-36).

Diversity Statement

Regardless of intent, careless or ill-informed remarks can be offensive and hurtful to others and detract from the learning climate. If you feel uncomfortable in a classroom due to offensive language or actions by an instructor or student(s) regarding ethnicity, gender, or sexual orientation, contact one of the following: at USU Brigham City, contact Jill Rasmussen, Room 170B, (435) 734-2277 ext 246; at other RCDE sites, contact your advisor, or; Moises Diaz, Director of Multicultural Student Services (435) 797-1733 moises.diaz@usu.edu; James Morales, Vice President of Student Services (435) 797-1712 james.morales@usu.edu; Ann Austin, Vice Provost for Faculty Development and Diversity, ann.austin@usu.edu; Maure Smith, GLBTA Services, maure.smith@usu.edu; Steven Russell, Student Advocate (435) 797-1720 s.r.@aggiemail.usu.edu. You can learn about your student rights by visiting: www.usu.edu/student-services/studentcode

Classroom Civility

All RCDE courses are governed by the USU policy on Classroom Civility. The official policy on Classroom Incivility can be accessed at the following link:

<http://www.usu.edu/policies/pdf/Classroom-Incivility.pdf>. In addition, to ensure a productive learning environment for all class members, please abide by the following guidelines for classroom behavior:

- Cell phones and pagers:
 - Volume must be switched to **silent** or **vibrate** while class is in session.

- **Outgoing calls should not be made** while class is in session.
- **Incoming calls should be taken outside of the classroom**, and should be completed in a timely manner.
- Cell phones and pagers are **strictly prohibited during testing**.
- Classroom conversations:
 - Unsolicited conversations should not take place while class is in session.
- Computers:
 - Computers are to be used for course purposes only while class is in session.
- **Please be courteous to your fellow classmates.**

STAT 1040 Assignments and Test Schedule

Date	Assignments	Quiz	HW*
January 9	Chapters 1, 2, 3		
January 16	Chapters 4, 5, 6	1	
January 23	Chapters 7, 8, 9	2	1
January 30	Chapters 10, 11, 12	3	
February 6	Review and Exam 1		2
February 13	Chapters 13 and 14	4	
February 20	No class President's Day Monday Classes		
February 27	Chapters 16 and 17	5	
March 6	Spring Break		
March 13	Chapters 18 and 19	6	3
March 20	Chapters 20, 21, and 23	7	
March 27	Review and Exam 2		4
April 3	Chapter 26		
April 10	Chapter 27	8	
April 17	Chapter 28	9	
April 24	Chapter 29 and Review	10	5
May 1	Final Exam		

Exams: All exams are in class. Exam 1 and Exam 2 you will have the last 55 minutes of class to complete (6:50PM – 7:45PM). The Final Exam you will have 110 minutes to complete (5:15PM – 7:05PM).

HW*: There will be five Homework Projects, each worth 10 points each (50 points possible). Homework Projects will be posted in Canvas well before their completion dates.

Quizzes: There will be ten Bell ringer quizzes, each worth 5 points each (50 points possible).

Chapter 2 A: 1,3,5,6,8,11,12,13 Review: 1,12	Chapter 10 A: 2,4 B: 1 ac,3 C: 3 D: 1,2 E: 2 Review: 4,6	Chapter 19 A: 1,2,4,6,8,11 Review: 4,12
Chapter 3 A: 2-7 B: 1-2 C: 1,4 D: 1 E: 1 Review: 4	Chapter 11 A: 6 B: 1 C: 1,2 Review: 9,10	Chapter 20 A: 1,2,4,7 B: 1,2,3,4 Review: 1,2
Chapter 4 A: 2-4,7,8 B: 1-2,5-6 D: 1,3,6,7 E: 4,5,11 Review: 6,12	Chapter 12 A: 1,3 B: 1 Review: 1,3	Chapter 21 A: 2,3,4 B: 1,2 C: 1,6 Review: 5,12
Chapter 5 A: 1 B: 1,3 C: 2 D: 1,3,4 E: 1-3 Review: 1,4	Chapter 13 A: 1,2,5 B: 1,3,4 C: 3,7 D: 1,3 Review: 1,9	Chapter 23 A: 1,3,4,9 B: 1,4,5,6 C: 1,3 D: 1,2,6 Review: 1,2
Chapter 6 Review: 1,2	Chapter 14 A: 1,3 B: 3,4,5 C: 3 D: 4,5 Review: 1,7	Chapter 26 A: 4,5 B: 1,2,5 C: 4,5 D: 1,2 E: 7,8 F: 1,3,4 Review: 2,4
Chapter 7 A: 1,2 B: 2,4 C: 1 D: 1 E: 2,4	Chapter 16 A: 1,2,4 B: 2,3 C: 1 Review: 3,8	Chapter 27 A: 3 B: 1,2 C: 2,5 D: 2 Review: 6
Chapter 8 A: 1,6 B: 1,2,6 C: 1,2,3 D: 1 Review: 1,6	Chapter 17 A: 1,6 B: 1,4,6 C: 2,5 Review: 1,7	Chapter 28 A: 1,2,7,8 C: 2,3,5 Review: 2,3
Chapter 9 A: 1,2,6 C: 1,4 E: 3,4 Review: 1,8,10	Chapter 18 A: 5 B: 1,5	Chapter 29 A: 2 B: 2a,3a,6,7 C: 1,5,7 Review: 2,4,5

STAT 1040 Homework Assignments