STATISTICS 2331
Introduction to Statistical Methods
May Term 2019 (May 16 - May 31, 2019)

Course Description:

STAT 2331, Intro to Statistical Methods, covers the basics of statistical analysis techniques and adequately prepares students for the quantitative components of various degree plans. In this course students learn about common techniques of basic statistical inference, with a focus on applications in business and the social sciences. Descriptive and inferential statistics by means of hypothesis testing and confidence intervals are major topics. Students learn how to calculate these, how to interpret them, and how to use them with data in business and the social sciences. The motivation behind these important procedures is examined.

Students in this class benefit from Dr. Robertson’s first-hand experience in industry, both in the social sciences and the financial sectors. To broaden each student’s learning experience, a variety of real-world applications of statistics are incorporated within the lectures. Prerequisites for this course include GEC Math Fundamentals or its equivalent.

Professor Background:

Dr. Stephen Robertson is a Senior Lecturer in the Department of Statistical Science at SMU. He has been at SMU for six years, and is the director of the MASDA (Masters in Applied Statistics and Data Analytics) program. He has extensive work experience in the financial sector, particularly in the area of risk management and predictive modeling for Citigroup, Fannie Mae, and Towers Watson Consulting. He has also worked as a statistician in the field of education and psychology. Dr. Robertson integrates his previous work experience into class lectures and assignments to give students a “real-world” perspective. In addition, he draws upon his experience teaching and tutoring numerous SMU students to create a positive, fun, and interactive learning environment in which to learn statistics.

Benefits of taking STAT 2331 during May Term:

- Stay productive over summer break with this challenging May Term course
- Complete a core prerequisite course in 11 efficient class days
- Prepare for future quantitative components of degree plan
- Focus on statistics course without juggling a typical heavy course load
- Avoid the crowds — Small class size and professor accessibility often improves performance
Statistics 2331- Section 001  
Introduction to Statistical Methods  
May Term, 2019 (May 16 – May 31)

Instructor: Dr. Stephen Robertson  
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Phone: (214) 768-4830  
e-mail: sdrobert@mail.smu.edu

Lecture Hours:  
Monday-Friday:  9:00–11:00 am, 12:00-2:00 p.m.  
Classroom Location:  Dallas Hall, Room 101

Office Hours:  
Mon-Fri:  8:00-9:00, and/or by appointment

Teaching Assistant: TBA  
Office: TBA  
Office Hours: TBA  
Email: TBA

COURSE OUTLINE:

Textbook:  
STAT 2331, Introduction to Statistical Methods, Southern Methodist University; Freeman.

Overview  
In this course we will learn about common techniques of basic statistical analysis. We will begin by introducing descriptive statistics, which will lead to the topic of inferential statistics. The two major types of statistical inference techniques are the confidence interval and hypothesis testing. You will learn how to calculate these, how to interpret them, and how to use them with data. We will also examine their motivation.
Lectures
Lectures are very important for understanding the material and doing well on the exams, so please attend!! Please participate via questions, answers, and comments. It is also important to do the homework assignments.

Attendance
Attendance is required. Failure to attend regularly will put your success in the course (and your grade) in serious jeopardy!

Grading:
Your semester grade will be determined as follows:
Exams (3 exams): 60%
Homework assignments: 20%
Labs: 15%
Short Project: 5%

A final percentage of 90% will guarantee at least an A-, 80% guarantees at least a B-, 70% guarantees at least a C-, and 60% guarantees at least a D-. There are NO EXTRA CREDIT opportunities available for this course, so make sure you understand what is required of you.

More details about the components of your grade......
• Exams: Three exams will be given in this class. Exams will cover material presented in class lectures, including textbook chapters, class discussions, and any other material assigned. NO MAKE UP EXAMS will be given, except in the case of a documented emergency or serious illness.
• Assignments (Labs and HW): During the May term you will be given several assignments to complete. Assignments to be completed outside of class are due at the beginning of class on the day they are due. Please check Canvas frequently to monitor recent assignments. Except in the case of a documented emergency or serious illness, NO LATE ASSIGNMENTS WILL BE ACCEPTED.

Getting Help
Please contact me or the teaching assistant if you have questions or are having difficulties. Office hours are regularly scheduled times that you can come by to ask questions or get help. If you are unable to visit during scheduled office hours, contact myself or the teaching assistant to set up an appointment. Additionally, the Learning Enhancement Center is an excellent resource for tutoring. See http://www.smu.edu/alec/home.html for location, hours, and other details.
Disability Accommodations
Students needing academic accommodations for a disability must first be registered with Disability Accommodations & Success Strategies (DASS) to verify the disability and to establish eligibility for accommodations. Students may call 214- 768-1470 or visit http://www.smu.edu/alec/dass.asp to begin the process. Once registered, students should then schedule an appointment with the professor to make appropriate arrangements. (See University Policy No. 2.4; an attachment describes the DASS procedures and relocated office.)

Religious Observance
Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester, and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence. (See University Policy No. 1.9.)

Excused Absences for University Extracurricular Activities
Students participating in an officially sanctioned, scheduled University extracurricular activity should be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation. It is the responsibility of the student to make arrangements with the instructor prior to any missed scheduled examination or other missed assignment for making up the work. (University Undergraduate Catalog)

SMU Honor Code
The SMU Honor Code will be strictly enforced. Students caught giving or receiving unauthorized help on examinations will either be given a course grade of zero or taken before the Honor Council.

Hints for Succeeding in Stat 2331:
1. USE OFFICE HOURS!! The best way to use office hours is to work on practice problems together. Before I help you with a problem during office hour, please put some effort into that problem on your own. Bring your paper with your partial work written out.
2. Make sure you complete and turn in all the homework and labs!
3. Get involved in lectures. Don't be afraid to ask for clarification on issues which confuse you.
4. Don't be a stranger. If you are confused see my TA or me, or both.
**TENTATIVE SCHEDULE OF TOPICS (See chapter descriptions/topics on next page):**

**Day 1:** May 16 (Thursday):
Lecture (Chapter 1). In-class assignment (Labs).

**Day 2:** May 17 (Friday):
Lecture (Chapter 1 continued- begin Chapter 2). In-class assignment (Labs).

**Day 3:** May 20 (Monday):
Lecture (Chapter 2). In-class assignment (Labs).

**Day 4:** May 21 (Tuesday):
Lecture (Chapter 2 continued- begin Chapter 3). Review Chapters 1-2. In-class assignment (Labs).

**Day 5:** May 22 (Wednesday): **(EXAM 1 DAY)**
Review Chapters 1-2. **Exam 1.** Lecture (Chapter 3).

**Day 6:** May 23 (Thursday):
Lecture (Chapter 3 continued- begin Chapter 4). In-class assignment (Labs).

**Day 7:** May 24 (Friday):
Lecture (Chapter 5). Review Chapters 3-5. In-class assignment (Labs).

**NO CLASS MEMORIAL DAY MONDAY, MAY 27!**

**Day 8:** May 28 (Tuesday): **(EXAM 2 DAY)**
Review Chapters 3-5. **Exam 2.** Lecture (Chapter 6).

**Day 9:** May 29 (Wednesday):
Lecture (Chapter 6 continued- begin Chapter 7). In-class assignment (Labs).

**Day 10:** May 30 (Thursday):
Lecture (Chapter 7 continued- Chapter 8). Review Chapters 6-8. In-class assignment (Labs).

**Day 11:** May 31 (Friday): **(EXAM 3 DAY)**
Review Chapters 6-8. **Exam 3.**
LEARNING OBJECTIVES
After studying each chapter, students should be able to:

Chapter 1:
- Picture distributions for categorical and quantitative variables
- Calculate mean, standard deviation, five number summary and interquartile range
- Find percentage points or proportions for any normal distribution using 68-95-99.7 rule or standard normal z-table (Table A)

Chapter 2:
- Use scatter plots to display datasets with two variables and calculate the correlation coefficient
- Calculate least-squares regression line and use it to make predictions
- Obtain marginal and conditional distributions from two-way tables and use a systematic structure to explain Simpson’s Paradox

Chapter 3:
- Design a good sampling method and avoid some common mistakes in sampling methods.
- Design a good experiment; learn three types of statistical experiments.
- Study the idea of randomization and why it is important.

Chapter 4:
- Understand the concept of probability and its importance to statistics
- Learn the rules of common probability
- Find probabilities for discrete and continuous random variables
- Distinguish between independent and mutually exclusive events
- Apply the Law of Large Numbers
- Calculate the mean and variance of random variables; apply this to a stock market application
- Learn conditional probability/Bayes Rule

Chapter 5:
- Introduce sampling distributions, bias, and variability
- Explain the sampling distribution of the sample mean
- Learn the Central Limit Theorem and its important applications

Chapter 6:
- Introduce statistical inference
- Calculate confidence intervals for the population mean, when population SD is known
- Calculate hypothesis tests for the population mean, when population SD is known
- Calculate the sample size necessary to estimate population mean with a given degree of accuracy
Chapter 7:
- Continue statistical inference; use the $t$-table
- Confidence intervals for the population mean, when population SD is unknown
- Hypothesis tests for the population mean, when population SD is unknown

STAT 2331 has been approved for the UC (University Curriculum) component in the category of “Quantitative Foundations.” The two student learning objectives for this component is as follows:

SLO (1): (Student Learning Objective 1): Students will be able to solve problems using statistical and computational methods.
SLO (2): (Student Learning Objective 2): Students will be able to interpret and draw inferences from mathematical/statistical models, data, graphs, and formulas.