STATISTICS 2331
Introduction to Statistical Methods
May Term 2018 (May 17 - June 1, 2018)

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 ???
Introduction to Statistical Methods
May Term, 2018 (May 17 – June 1)

Instructor: Dr. Stephen Robertson
Office: 135 Heroy Hall
Phone: (214) 768-4830
e-mail: sdrobert@mail.smu.edu

Lecture Hours:
Monday-Friday: 10:00 am–12 pm, 1:00-3:00 p.m.
Classroom Location: Dallas Hall, Room 101

Office Hours:
Monday-Friday: 9:00 a.m. - 10 a.m.

Teaching Assistant: **TBA**
                          Office: TBA
                          Office Hours: 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.

<u>Hints for Succeeding in Stat 2331</u> :

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:

Day 1: May 17 (Thursday):
Lecture (Chapter 1). In-class assignment (Labs).

Day 2: May 18 (Friday):
Lecture (Chapter 1 continued- begin Chapter 2). In-class assignment (Labs).

Day 3: May 21 (Monday):
Lecture (Chapter 2). In-class assignment (Labs).

Day 4: May 22 (Tuesday):
Lecture (Chapter 2 continued- begin Chapter 3). Review Chapters 1-2. In-class assignment (Labs).

Day 5: May 23 (Wednesday): **(EXAM 1 DAY)**
Review Chapters 1-2. **Exam 1.** Lecture (Chapter 3).

Day 6: May 24 (Thursday):
Lecture (Chapter 3 continued- begin Chapter 4). In-class assignment (Labs).

Day 7: May 25 (Friday):
Lecture (Chapter 5). Review Chapters 3-5. In-class assignment (Labs).

NO CLASS MEMORIAL DAY MONDAY, MAY 28!

Day 8: May 29 (Tuesday): **(EXAM 2 DAY)**
Review Chapters 3-5. **Exam 2.** Lecture (Chapter 6).

Day 9: May 30 (Wednesday):
Lecture (Chapter 6 continued- begin Chapter 7). In-class assignment (Labs).

Day 10: May 31 (Thursday).
Lecture (Chapter 7 continued- Chapter 8). Review Chapters 6-8. In-class assignment (Labs).

Day 11: June 1 (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

Chapter 2: Calculate mean, standard deviation, five number summary and inter-quantile range

Chapter 3: Find percentage points or proportions for any normal distribution using 68-95-99.7 rule or Table A

Chapter 4: Use scatter plots to display dataset with two variables and calculate correlation coefficient

Chapter 5: Calculate least-squared regression line and use it to do prediction

Chapter 6: Obtain marginal and conditional distributions from two-way table and use a systematic structure to explain Simpson's Paradox

Chapter 8: Design a good sampling survey and avoid some common mistakes in sampling survey.

Chapter 9: Design a good experiment; explain the concepts of double blind experiments.

Chapter 12: Manage the concepts of probability, discrete and continuous probability models and random variables. Find probabilities for discrete and continuous random variables.

Chapter 15: State and explain the law of large numbers, manage the concepts on sampling distribution, apply central limit theorem

Chapter 16: Explain the concepts and use the terminologies of confidence interval and hypothesis testing. Calculate, interpret and use confidence interval with data.

Chapter 17: Discuss the behavior of confidence intervals and calculate the required sample size for a study for specified values of margin of error and confidence level.

Chapter 18: Be able to use inference techniques in practice.

Chapter 20: Calculate confidence intervals and test statistical hypothesis for one mean.

Chapter 21: Calculate confidence intervals and test statistical hypothesis for two means.

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.