Elementary Statistical Methods (MATH 1342)

Credit: 3 semester credit hours (3 hours lecture)

Prerequisite/Co-requisite: A score of 350 or above on the TSI-Assessment placement test (effective Fall 2013) or a "C" or better in MATH 1314.

Course Description

Collection, analysis, presentation and interpretation of data, and probability. Analysis includes descriptive statistics, correlation and regression, confidence intervals and hypothesis testing. Use of appropriate technology is recommended.

Required Textbook and Materials

1. *Fundamentals of Statistics*, 4th edition, by Michael Sullivan, III, with MyStatLab access card (Books a la Carte Edition packaged with code)
    a. May be purchased online at **www.mystatlab.com**
    b. May be purchased at a local bookstore: **ISBN-10: 032186946X**
2. A basic six-function calculator (+, –, ÷, x, √, %) with a ± key

Objectives

Course Objectives

Upon completion of this course, the student will be able to:

1. Explain the use of data collection and statistics as tools to reach reasonable conclusions.
2. Recognize, examine, and interpret the basic principles of describing and presenting data.
3. Compute and interpret empirical and theoretical probabilities using the rules of probabilities and combinatorics.
4. Explain the role of probability in statistics.
5. Examine, analyze, and compare various sampling distributions for both discrete and continuous random variables.
6. Describe and compute confidence intervals.
7. Solve linear regression and correlation problems.
8. Perform hypothesis testing using statistical methods.

Core Objectives

1. Critical Thinking Skills: To include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.
2. Communication Skills: To include effective development, interpretation and expression of ideas through written, oral, and visual communication.
3. Empirical and Quantitative Skills: To include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.

Course Outline

A. Data Collection
   1. Introduction to the Practice of Statistics
   2. Observational Studies versus Designed Experiments
   3. Simple Random Sampling
   4. Other Effective Sampling Methods
   5. Bias in Sampling
   6. The Design of Experiments

B. Organizing and Summarizing Data
   1. Organizing Qualitative Data
   2. Organizing Quantitative Data: The Popular Displays
   3. Graphical Misrepresentations of Data

C. Numerically Summarizing Data
   1. Measures of Central Tendency
   2. Measures of Dispersion
   3. Measures of Position and Outliers
   4. The Five-Number Summary and Boxplots

D. Describing the Relation Between Two Variables
   1. Scatter Diagrams and Correlation
   2. Least Squares Regression

E. Probability
   1. Probability Rules
   2. Addition Rule and Complements
   3. Independence and the Multiplication Rule

F. Discrete Probability Distributions
   1. Discrete Random Variables
   2. The Binomial Probability Distribution

G. The Normal Probability Distribution
   1. Properties of the Normal Distribution
   2. Applications of the Normal Distribution
   3. Assessing Normality

H. Sampling Distributions
   1. Distribution of the Sample Mean
   2. Distribution of the Sample Proportion

I. Estimating the Value of a Parameter
   1. Estimating a Population Proportion
   2. Estimating a Population Mean
   3. Putting It Together: Which Procedure Do I Use?

J. Hypothesis Tests Regarding a Parameter
   1. The Language of Hypothesis Testing
   2. Hypothesis Tests for a Population Proportion
   3. Hypothesis Tests for a Population Mean
   4. Putting It Together: Which Method Do I Use?

K. Inferences on Two Samples *(If time permits; coverage subject to teacher discretion)*
   1. Inference About Two Population Proportions
   2. Inference About Two Means: Dependent Samples
   3. Inference About Two Means: Independent Samples

Grade Scale

90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
0 – 59	F

Course Evaluation

Final grades will be calculated according to the following criteria:

Tests	60%
Comprehensive Final Exam	10%
Course Assignments	20%
Participation	10%

Course Requirements

1. Attendance is mandatory.
2. The student must purchase all of the required course materials.
3. The student will be expected to have access to the Internet and a computer.
4. Additional course requirements as defined by the individual course instructor.

Course Policies

1. Cheating of any kind will not be tolerated.
2. No food, drinks, or use of tobacco products in class.
3. Beepers, telephones, headphones, and any other electronic devices must be turned off while in class.
4. The students are responsible for initiating and completing the drop process. Students who stop coming to class and fail to drop the course will earn an "F" in the course.
5. Additional class policies as defined by the individual course instructor.

Technical Requirements (for courses using Blackboard)

The latest technical requirements, including hardware, compatible browsers, operating systems, software, Java, etc. can be found online at: https://help.blackboard.com/enus/Learn/9.1_2014_04/Student/015_Browser_Support/015_Browser_Support_Policy. A functional broadband internet connection, such as DSL, cable, or WiFi is necessary to maximize the use of the online technology and resources.

Course Schedule (subject to change)

(*Tests and the assessment of core objectives activity will be assigned by each individual instructor*)

Week	Topic	Reference
1	Course introduction and policies Section 1.1: Introduction to Statistics Section 1.2: Observational Studies and Designed Experiments	Data Collection; MyStatLab
2	Section 1.3: Simple Random Sampling Section 1.4: Other Effective Sampling Methods	Data Collection; MyStatLab
3	Section 1.5 : Bias in Sampling Section 1.6: Design of Experiments	Data Collection; MyStatLab
4	Section 2.1: Organizing Qualitative Data Section 2.2: Organizing Qualitative Data: Popular Displays Section 2.3: Graphical Misrepresentations of Data	Organizing and Summarizing Data; MyStatLab
5	Section 3.1: Measures of Central Tendency Section 3.2: Measures of Dispersion	Numerically Summarizing Data; MyStatLab
6	Section 3.4: Measures of Position and Outliers Section 3.5: The Five-Number Summary and Boxplots	Numerically Summarizing Data; MyStatLab
7	Section 4.1: Scatter Diagrams and Correlation Section 4.2: Least Squares Regression	Describing the Relation Between Two Variables; MyStatLab
8	Section 5.1: Probability Rules Section 5.2: The Addition Rule and Complements Section 5.3: Independence and the Multiplication Rule	Probability; MyStatLab
9	Section 6.1: Discrete Random Variables Section 6.2: The Binomial Probability Distribution	Discrete Probability Distributions; MyStatLab
10	Section 7.1: Properties of the Normal Distribution Section 7.2: Applications of the Normal Distribution Section 7.3: Assessing Normality	The Normal Probability Distribution; MyStatLab
11	Section 8.1: Distribution of the Sample Mean Section 8.2: Distribution of the Sample Proportion	Sampling Distributions; MyStatLab
12	Section 9.1: Estimating a Population Proportion Section 9.2: Estimating a Population Mean Section 9.3: Putting It Together: Which Procedure	Estimating the Value of a Parameter; MyStatLab

Week	Topic	Reference
	Do I Use?	
13	Section 10.1: The Language of Hypothesis Testing Section 10.2: Hypothesis Tests for a Population Proportion	Hypothesis Tests Regarding a Parameter; MyStatLab
14	Section 10.3: Hypothesis Tests for a Population Mean Section 10.4: Putting It Together: Which Method Do I Use?	Hypothesis Tests Regarding a Parameter ; MyStatLab
15	Section 11.1: Inference About Two Population Proportions *(If time permits; teacher discretion)* Section 11.2: Inference About Two Means: Dependent Samples *(If time permits; teacher discretion)*	Inferences on Two Samples; MyStatLab
16	Section 11.3: Inference About Two Means: Independent Samples *(If time permits; teacher discretion)*	Inferences on Two Samples; MyStatLab
Final Exam	Final Exam: *Given on the date and time specified by the official exam schedule.*	

Disabilities Statement

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409) 880-1737 or visit the office in Student Services, Cecil Beeson Building.

Student Code of Conduct Statement

It is the responsibility of all registered Lamar Institute of Technology students to access, read, understand and abide by all published policies, regulations, and procedures listed in the *LIT Catalog and Student Handbook*. The *LIT Catalog and Student Handbook* may be accessed at www.lit.edu or obtained in print upon request at the Student Services Office. Please note that the online version of the *LIT Catalog and Student Handbook* supersedes all other versions of the same document.

Course schedule varies by instructor.

Contact information varies by instructor.