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
   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
MATH 1332  
Course Syllabus

Grade Scale

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>90 – 100</td>
<td>A</td>
</tr>
<tr>
<td>80 – 89</td>
<td>B</td>
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<tr>
<td>70 – 79</td>
<td>C</td>
</tr>
<tr>
<td>60 – 69</td>
<td>D</td>
</tr>
<tr>
<td>0 – 59</td>
<td>F</td>
</tr>
</tbody>
</table>

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)

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Reference</th>
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</thead>
</table>
| 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 |
# MATH 1332
## Course Syllabus

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