ECEC 205: Statistics for Managers

Prerequisite(s): None
Credits: 3

I. Course Description

This course is designed to offer students the skills necessary to interpret and critically evaluate statistics commonly used to describe, predict, and evaluate data in an information-driven environment. The focus is on the conceptual understanding of how statistics can be used and on how to evaluate statistical data.

II. Course Objectives

1. Explain the fundamentals of a statistical study.
2. Describe data sets and their measures in different forms.
3. Use statistics to describe and summarize data that has both qualitative and quantitative components.
4. Calculate probabilities by using counting principles.
5. Identify various discrete probability distributions and calculate corresponding probabilities.
6. Interpret a normal distribution and make calculations using standard scores.
7. Construct confidence intervals and use them to interpret population means.
8. Formulate null and alternative hypotheses for claims made about population means.
9. Use an appropriate statistical technique to test a hypothesis.
10. Describe the linear association for a set of paired data.

III. Course Textbooks and Required MyStatLab Access Card

***Students must purchase in advance texts and/or materials for this course.**

Students must purchase the text and a MyStatLab access card, and may do so either online or in the CSU bookstore. If you purchase a used text, you must still purchase a new MyStatLab license.

Elementary Statistics: Picturing the World – 6th Edition
Authors: Larson and Farber
Bundled Digital text and MyStatLab access – ISBN: 978-0-321-92252-6
Bundled Unbound text and MyStatLab access – ISBN: 978-0-133-87623-9
Bundled Hardbound text and MyStatLab access – ISBN: 978-0-133-86499-1

Module One – Week 1

An introduction to the field of statistics, and to data collection and classification

Objectives

At the end of this lesson, you should be able to:

1.1 Define the fundamental terms used in statistics.
1.2 Classify qualitative and quantitative data with regard to four levels of measurement.
1.3 Explain the different types of data collection and sampling techniques.
1.4 Identify the sampling technique for a given sample.
1.5 Evaluate various data display methods.

Reading

Chapter 1, Section 1.1, "An Overview of Statistics," pp. 2-8.
Chapter 1, Section 1.2, "Data Classification," pp. 9-16.
Chapter 1, Section 1.3, "Data Collection and Experimental Design," pp. 17-26.

Lecture

Chapter 1 PowerPoint slides and video lectures

Deliverables

Discussion: Introductions
MyStatLab: Lessons 0 and 1
Test

Module Two – Week 2

An introduction to presenting and summarizing data to extract information

Objectives

At the end of this lesson, you should be able to:

2.1 Graph paired data sets using a scatter plot.
2.2 Evaluate graphs and their effectiveness in conveying information.
2.3 Calculate descriptive statistics for a data set.
2.4 Calculate approximate descriptive statistics using the distribution for a data set.
2.5 Describe a distribution in terms of its summary measures for center, shape, and spread.
2.6 Calculate the interquartile range for a given data set.
2.7 Use calculated values of descriptive statistics to make accurate statements about a data set.

Reading

Chapter 2, Section 2.1, “Frequency Distributions and Their Graphs,” pp. 38-54.
Chapter 2, Section 2.2, “More Graphs and Displays,” pp. 55-66.
Chapter 2, Section 2.3, “Measures of Central Tendency,” pp. 67-81.
Chapter 2, Section 2.4, “Measures of Variation,” pp. 82-101.
Chapter 2, Section 2.5, “Measures of Position,” pp. 102-114.

Lecture

Chapter 2 PowerPoint slides and video lectures

Deliverables

MyStatLab: Lesson 2
Test

Module Three Week 3

An introduction to probability as an essential tool for statistics

Objectives

At the end of this lesson, you should be able to:

3.1 Explain and use basic terms and concepts in probability to find the probability of an event.
3.2 Distinguish between independent and dependent events.
3.3 Recognize whether or not events are mutually exclusive.
3.4 Use the Multiplication Rule and the Addition Rule to compute the probability of compound events

Reading

Chapter 3, Section 3.1, “Basic Concepts of Probability and Counting,” pp. 128-145.

Chapter 3, Section 3.2, “Conditional Probability and the Multiplication Rule,” pp. 147-156.

Chapter 3, Section 3.3, “The Addition Rule,” pp. 157-165.

Lecture

Chapter 3 PowerPoint slides and video lectures

Deliverables

MyStatLab: Lesson 3
Test

Module Four – Week 4

An introduction to probability distributions, including some special discrete distributions and the Normal distribution

Objectives

At the end of this lesson, you should be able to:

4.1 Construct a discrete probability distribution.
4.2 Calculate the mean of a discrete probability distribution using the expected value formula.
4.3 Calculate the variance and standard deviation of a discrete probability distribution.
4.4 Calculate mean, variance, and standard deviation for binomial distributions.
4.5 Calculate probabilities and values for the Normal probability distribution using the z-table and z-scores.
4.6 Interpret the Central Limit Theorem to make an inference about a population mean.
4.7 Use the Empirical Rule to estimate probabilities.

Reading

Chapter 4, Section 4.1, “Probability Distributions,” pp. 188-200.
Chapter 4, Section 4.2, “Binomial Distributions,” pp. 201-213.
Chapter 4, Section 4.3, "More Discrete Probability Distributions," pp. 216-222.
Chapter 5, Section 5.1, “Introduction to the Normal Distributions and the Standard Normal Distribution,” pp. 232-245.
Chapter 5, Section 5.2, “Normal Distribution: Finding Probabilities,” pp. 246-251.
Chapter 5, Section 5.3, “Normal Distribution: Finding Values,” pp. 252-259.
Chapter 5, Section 5.4, “Sampling Distributions and the Central Limit Theorem,” pp. 261-273.
Chapter 5, “Summary,” p. 285.

Lecture

Chapters 4 and 5 PowerPoint slides and video lectures

Deliverables

MyStatLab: Lesson 4 parts 1 & 2
Test

Module Five – Week 5
An introduction to confidence intervals

Objectives

At the end of this lesson, you should be able to:

5.1 Explain the basic terminology relevant to confidence intervals.
5.2 Construct a confidence interval for a population mean using normal distribution and t-distribution.
5.3 Find the minimum sample size needed to estimate the population mean for a given confidence interval.
5.4 Construct a confidence interval for a population proportion.
5.5 Find the minimum sample size needed to estimate a population proportion.

Reading

Chapter 6, Section 6.1, "Confidence Intervals for the Mean (σ Known)," pp. 296-309.
Chapter 6, Section 6.2, "Confidence Intervals for the Mean (σ Unknown)," pp. 310-317.

Lecture

View the PowerPoint slides and video lectures for Chapter 6.

Deliverables

MyStatLab: Lesson 5
Test

Module Six – Week 6
An introduction to hypothesis testing

Objectives

At the end of this lesson, you should be able to:

6.1 Define the basic terms of hypothesis testing.
6.2 Construct hypotheses for a statistical test, and identify the associated type I and type II errors.
6.3 Complete a z-test for a single population mean.

6.4 Complete a **t**-test for a single population mean using a small sample.
6.5 Interpret results of one- and two-tailed tests for claims about a population mean.
6.6 Complete a **z**-test for the difference between two population means.
6.7 Complete a **t**-test for the difference between two population means using small samples.
6.8 Given a hypothesis, identify the appropriate statistical technique for testing it.

Reading

Chapter 7, Section 7.1, "Introduction to Hypothesis Testing," pp. 346-362.
Chapter 7, Section 7.2, "Hypothesis Testing for the Mean (σ Known)," pp. 363-376.
Chapter 7, Section 7.3, "Hypothesis Testing for the Mean (σ Unknown)," pp. 377-385. Chapter 8, Section 8.1, "Testing the Difference Between Means (Independent Samples, σ_1 and σ_2 Known)," pp. 416-427.
Chapter 8, Section 8.2, "Testing the Difference Between Means (Independent Samples, σ_1 and σ_2 Unknown)," pp. 428-435.

Lecture

View the PowerPoint slides and video lectures for Chapters 7 and 8.

Deliverables

MyStatLab: Lesson 6 parts 1 & 2
Test

Module Seven – Week 7
An introduction to linear regression

Objectives

At the end of this lesson, you should be able to:

7.1 Calculate the correlation for a data set of paired observations.
7.2 Find the best-fitting line for a scatter plot of bivariate data.
7.3 Calculate a predicted **y**-value given an **x**-value for a given set of bivariate data.

Reading

Chapter 9, Section 9.1, "Correlation," pp. 468-484.
Chapter 9, Section 9.2, "Linear Regression," pp. 486-495.
Chapter 9, Section 9.3, "Measures of Regression and Prediction Intervals," pp. 498-508.

Lecture

View the PowerPoint slides and video lectures for Chapter 9.

Deliverables

MyStatLab: Lesson 7

Test

V. Course Information and Grading

Course Requirements

Each lesson includes graded homework and a lesson test. The homework assignments are equally weighted and account for 60% of your final course grade. The lesson tests are equally weighted and account for 35% of your final course grade. Participation in the discussion post for Lesson 1 accounts for the final 5% of your final course grade.

Class Discussions

Please refer to the Discussion Board Rubric located within course syllabus for specific requirements and guidance on delivering a substantial discussion.

Late and Make-up Assignments

All deliverables are due by 11:59 PM on the due dates indicated. When substantive emergencies occur, acceptance of late submissions is left to the discretion of the course instructor.

Assignments that are submitted after the due date with prior written approval (text or email) from the instructor may receive the following deductions:

1. Late assignments are subject to a deduction of 10% of the available points for each day late.

2. Assignments submitted later than one week after due date will not be accepted and will receive a zero (0).

3. No work may be submitted after the last day of the course.

4. See Class Discussions for late discussion post policy.

Grading Scale and Assigned Letter Grades

Charleston Southern Online classes follow the following numerical and letter grading scale. Grades will be posted by the Sunday night following the closing of the lesson. No grades will be given to students over the phone.

A = 90-100

B+ = 87-89

B = 80-86

C+ = 77-79

C = 70-76

D = 60-69

F = <60

Undergraduate Discussion Board Rubric – Introduction (First week only)

Criteria	**Minimal**	**Effective**
Percent Possible: 0 or 50 Initial Post Introduction.	Percent Possible: 0 No post or did not follow instructions at all.	Percent Possible: 50 Posted following instructions.
Percent Possible: 0 or 50 **Response Posts** Welcome.	Percent Possible: 0 No post or did not follow instructions at all.	Percent Possible: 50 Posted following instructions.

Discussion Board Initial Post Rubric – Undergraduate

Initial Post Rubric	**Content**	**Support & References**	**Mechanics & Length**
Mastery **90-100%**	• Relevant and thought-provoking viewpoints • Innovative and indicates a high level of thought • High level of critical thought, analysis, and application of concepts and ideas	• Student cites 2 peer-reviewed sources in the body of the posts • Proper APA format	• Post exceeds 200 words • Very well written
Effective **80-89%**	• Advances the discussion and body of knowledge providing relevant, original thoughts to the question	• Student cites 2 peer-reviewed	• Post 178-200 words • Well written

	• Conveys thoughts in a well-rounded manner that show understanding, critical thought, and application of concepts	sources in the body of the post • Not in appropriate APA format	
Competent **70-79%**	• Makes mostly complete response to the questions • Mostly restatement of materials • Conveys thoughts adequately; however, need to further develop critical aspects	• Student cites 1 peer-reviewed source. • Not in appropriate APA format	• Post is 158-178 words • A few writing errors
Minimal **0-69%**	• Provides weak contribution to the discussion board • Does not convey concept understanding • Shows evidence of critical thought but is not concise or complete	• Does not cite any peer-reviewed sources • Addresses questions in a manner that is unclear • Not appropriate APA format	• Post is less than 158 words • Poorly written • 0 points for posts submitted after 11:59 PM EST on Thursday

Discussion Board Peer Response Rubric – Undergraduate

Peer Response Rubric	Content	Support & References	Mechanics & Length
Mastery **90-100%**	• Advances discussion providing additional commentary that is relevant or offers an alternative • Critical thought development is evidenced by thoughtful and meaningful responses • Source is relevant and published in last 3 years	• Student cites 2 peer-reviewed sources in the body of the posts • Proper APA format	• Post exceeds 150 words • Very well written
Effective **80-89%**	• Advances discussion providing additional commentary and critique • Responses are correct but mostly restate the peers' viewpoints	• Student cites 2 peer-reviewed sources • Not in appropriate APA format	• Post is 133-150 words • Well written

	without development of critical thought • Source is relevant and published in last 3 years		
Competent **70-79%**	• Shows adequate understanding of the knowledge and concepts posted by peers • Responses are mostly, "I agree…" • Source is somewhat relevant and published in last 5 years	• Student cites 1 peer-reviewed source • Not in appropriate APA format	• Post is 118-132 words • A few writing errors.
Minimal **0-69%**	• Shows minor comprehension of concepts and viewpoints from peers. • Responses are vague and do not show understanding or comprehension	• Does not cite any peer-reviewed sources • Not appropriate APA format	• Post 0-118 words • Poorly written • 0 points for posts submitted after 11:59 PM EST on Sunday

Assignment/Case Study/Course Project Rubric

Assignment Rubric	**Critical Thinking**	**References & Organization**
Mastery **90-100%**	• Relevant use of vocabulary throughout • Demonstrates superior knowledge of concepts and theories • Addresses problem/issue directly • Demonstrates active critical thinking relevant to problem identification and effective solutions	• Professional writing structure. • Well-organized response. • Student cites appropriate, current peer-reviewed sources • Proper APA format • Exceeds 500 words
Effective **80-89%**	• Demonstrates satisfactory understanding • Lacks answer to all questions/full scenario • Demonstrates some knowledge of content and professional vocabulary	• Student cites some relevant, current peer-reviewed sources. • Follows directions • APA formatting demonstrated but not extensive. • 450-500 words

	• Content needs additional focus for innovative responses other than restatement of text.	
Competent **70-79%**	• Inconsistent comprehension • Marginal responses • Content, concepts, ideas/responses are not fully developed	• Sources are outdated or ineffective. • Lacks focus on content • Unorganized • Some writing errors • Not in appropriate APA format. • 400-449 words
Minimal **0-69%**	• Consistently below expectations • Lacks significant details of the assignment • Lacks critical thought, analysis, and application. • Partially addresses the topic	• Does not cite any peer-reviewed sources • Not appropriate APA format • 0-399 words • Poorly written. • 0 points for late assignments

Quantitative Assignment Rubric

Criteria	Minimal	Competent	Effective	Mastery
0 – 100 Percent Complete and Accurate Completes the Problems with correct responses. Demonstrates active critical thinking relevant to problem identification, correct and effective solutions.	0 – 69% Work was not complete or fewer than 60% of the solutions were correct. Written responses show lack of critical thought, analysis and application.	70 – 79% Work was generally complete, and at least 70% of responses were correct. Written answers had marginal responses; content, concepts, responses not fully developed.	80 – 89% Demonstrates satisfactory understanding but does not answer all questions/scenario in full. At least 80% of responses were correct. Demonstrates some knowledge of the content and business vocabulary.	90 – 100% Demonstrates superior knowledge of concepts and theories. 90-100% of the responses were correct. Written responses show critical thought and understanding of terminology.