



# Advanced Placement® (AP®) Statistics (APSTATS) B Syllabus

## Course Name

APSTATS B

Advanced Placement® (AP®) Statistics – Semester B

## Course Information

APSTATS B is the second semester of this two-semester course.

AP Statistics gives students hands-on experience in collecting, analyzing, graphing, and interpreting real-world data. They will learn to effectively design and analyze research studies by reviewing and evaluating real research examples taken from daily life. The next time they hear the results of a poll or study, they will know whether the results are valid. As the art of drawing conclusions from imperfect data and the science of real-world uncertainties, statistics play an important role in many fields. The equivalent of an introductory college-level course, AP Statistics prepares students for the AP exam and for further study in science, sociology, medicine, engineering, political science, geography, and business.

**Prerequisite:** Algebra II or Math Analysis

This course has been authorized by the College Board® to use the AP® designation.

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## Course Delivery Method

Online

## Contacting Your Instructor

You may contact your instructor through the Blackboard messaging system. Technical support is available 24/7 at [www.k12.ttu.edu](http://www.k12.ttu.edu).

## Course Objectives

After completing this course, you should be able to:

1. collect, analyze, graph, and interpret real-world data;
2. effectively design and analyze research studies by reviewing and evaluating real research examples taken from daily life;
3. determine whether the results of a poll or study are valid; and
4. draw conclusions from imperfect data and the science of real-world uncertainties.

APSTATS addresses the required Texas Essential Knowledge and Skills (TEKS). These can be found at the [Texas Education Agency](http://www.tea.state.tx.us) website.

## Textbook and Materials

### **Textbook(s)**

There is no required text to purchase for this course.

### **Materials**

Required:

- TI-89, TI-84 Plus, TI-83, or TI-83 Plus calculator or equivalent

Optional:

- *Barron's AP Statistics*, 10th ed. Martin Sternstein (Barron's, 2019). ISBN-10: 1438011695 / ISBN-13: 9781438011691.  
Acceptable alternate: 9th ed. (2017). 1438009046 / ISBN-13: 9781438009049.  
Acceptable alternate: 8th ed. (2015). 1438004982 / ISBN-13: 9781438004983.  
Acceptable alternate: 7th ed. (2013). 1438002025 / ISBN-13: 9781438002026.
- *Introduction to Probability & Statistics*, 15th ed. William Mendenhall, Robert J. Beaver, and Barbara M. Beaver (Cengage, 2019). ISBN-10: 1337554421 / ISBN-13: 9781337554428.  
Acceptable alternate: 14th ed. (2015). ISBN-10: 1133103758.  
Acceptable alternate: 13th ed. (2009). ISBN-10: 0495389536.

## Technical Requirements

- Internet access – preferably high speed (for accessing Blackboard)
- Email
- Word processing software such as Microsoft Word
- Adobe Reader (download from [Adobe.com](http://adobe.com))
- Audio and video capabilities (for watching/listening to course content)
- PDF app (free options available)

## Technical Skill Requirements

Be comfortable with the following:

- using a word processor
- Internet search engines and browsers
- creating PDFs (see **Requirements for Creating PDFs** in the Syllabus section of your course)

## Coursework

The graded assignments within each unit are formative in nature. This means that they are designed to assist you in applying and demonstrating the unit concepts, as well as identifying areas in which you need additional review. You may use all the unit's learning activities to assist you as you complete the graded assignments.

## Submitting Assignments

You will submit all assignments through the Blackboard Assignment Tool, rather than by mail or email.

All course work will be completed in the Apex system (quizzes, discussions, practice assignments, journals, etc.). When submitting a Practice Assignment, you will submit it through the **Apex system > Messages > New Message** tool and choose your instructor. This will be the place where you upload file attachments showing your work on the assignment. Your instructor will receive the assignment submission and grade it, then provide feedback that will be sent back to you through Apex messages.

## Course Organization

This course consists of six units and a final exam. Each unit contains the following:

- Introduction and Instructions
- Learning Objectives and Curriculum Standards
- Learning Activities
- Assignments

Each unit includes several activities that present content knowledge. Each unit also includes multiple graded assignments to ensure that you learn the content that has been presented in the activities. Some of the assignments are automatically-graded quizzes, and some are written assignments or activities that your instructor will grade. Be sure you read all instructions carefully and ask your instructor for help if something is not clear.

## Course Outline

Please note that some assignments will be hidden from you when you start the course. As you move through the units and complete assignments, more will unlock for you.

Unit	Topic	Approximate Time for Completion
<b>Unit 6</b>	Binomials and Distributions	Three weeks
Lesson 1	Introduction to Inferential Statistics	
Lesson 2	Binomial Distributions	
Lesson 3	Geometric Distribution	
Lesson 4	Sampling Distributions: Means and Proportions	
Lesson 5	Wrap-Up	
<b>Unit 7</b>	Introduction to Inference	Four weeks
Lesson 1	Confidence Intervals for Means	
Lesson 2	Statistical Significance and P-Value	
Lesson 3	Significance and Hypothesis Testing: Means	
Lesson 4	Errors in Hypothesis Testing	
Lesson 5	Wrap-Up	
<b>Unit 8</b>	Distribution for Means	Three weeks
Lesson 1	Confidence Intervals and Hypothesis Testing for a Single Mean	
Lesson 2	Confidence Intervals for the Difference Between Two Means	
Lesson 3	Confidence Intervals and Hypothesis Tests for Two Independent Samples	
Lesson 4	Wrap-Up	
<b>Unit 9</b>	Inference for Proportions	Three weeks
Lesson 1	Confidence Intervals and Hypothesis Tests for a Single Population Proportion	
Lesson 2	The Difference Between Two Proportions	
Lesson 3	Wrap-Up	

Unit	Topic	Approximate Time for Completion
<b>Unit 10</b>	Inference for Tables and Least-Squares	Three weeks
Lesson 1	One-Way Tables: Chi-Square for Goodness-of-Fit	
Lesson 2	Two-Way Tables: Chi-Square for Association or Independence	
Lesson 3	Inference for the Least-Squares Line	
Lesson 4	Wrap-Up	
<b>Unit 11</b>	Final Preparation for the AP Statistics Exam	One week
Lesson 1	General Preparation Strategies	
Lesson 2	Strategies and Practice for Multiple-Choice and Free-Response Questions	
Lesson 3	Putting It Together: Practice Exam and Mixed Practice	
<b>Final Exam</b>	Units 6-11	

## Assignment Schedule

Each of the following must be completed to complete the course. Items with an asterisk (\*) indicate that these are summative assessments for the course.

Unit	Weeks	Assignments
<b>6</b>	1-3	6.1.3 Discuss: Uses of Inferential Statistics 6.2.3 Quiz: Binomial Settings and Binomial Probabilities 6.2.6 Quiz: Binomial Problems 6.2.7 Practice: Binomial Problems Using Two Methods 6.3.1 Discuss: When Are You Most Likely to Get Your First Red Candy? 6.3.4 Quiz: Geometric Distribution Problems 6.4.1 Discuss: Which Is More Likely? 6.4.5 Practice: Sampling Distributions 6.4.8 Practice: Sampling Distribution of $p$ -Hat 6.4.9 Quiz: Important Concepts From This Unit 6.5.1 Discuss: What Is Interesting? What Is Confusing? *6.5.3 Test (CS): Binomial Situations and Sampling Distributions

Unit	Weeks	Assignments
7	4-7	7.1.1 Discuss: Guessing an Estimate 7.1.4 Quiz: Confidence Intervals 7.1.6 Quiz: Finding Desired Sample Sizes 7.1.7 Practice: Creating Intervals 7.2.1 Discuss: How Good Is the Guess? 7.2.4 Quiz: Working With P-Values and Statistical Significance 7.3.1 Discuss: What Is an Impressive Prediction? 7.3.5 Practice: More Hypothesis Tests for Means 7.3.8 Quiz: Two-Sided Significance Tests and Confidence Intervals 7.4.1 Discuss: Innocent or Guilty? 7.4.5 Practice: Computing Probabilities for Type I and Type II Errors 7.4.6 Quiz: Concepts of Hypothesis and Significance Testing 7.5.1 Discuss: What Is Interesting? What Is Confusing? *7.5.3 Test (CS): Introduction to Inference
8	8-10	8.1.4 Quiz: Concepts Relating to Confidence t Intervals 8.1.6 Practice: t Intervals and Hypothesis Tests 8.2.3 Quiz: Matched Pairs or Not? 8.2.5 Quiz: Matched Pairs Confidence Intervals and t Tests 8.3.3 Quiz: t Intervals for Two Independent Samples 8.3.4 Practice: t Intervals for Two Independent Samples 8.3.7 Quiz: Two-Sample t Tests 8.3.9 Quiz: Confidence Intervals and Significance Testing for Means 8.4.1 Discuss: What Is Interesting? What Is Confusing? *8.4.3 Test (CS): t Distribution for Means
9	11-13	9.1.4 Quiz: Finding the Sample Size for a Given Margin of Error for a Single Population Proportion 9.1.5 Practice: Confidence Intervals for a Single Population Proportion 9.1.9 Quiz: More One- and Two-Tailed Significance Tests for a Single Population Proportion 9.2.3 Practice: Differences Between Two Proportions 9.2.5 Quiz: Inference for Means and Proportions 9.3.1 Discuss: What Is Interesting? What Is Confusing? *9.3.3 Test (CS): Inference for Proportions
10	14-16	10.1.1 Discuss: Roll of the Die 10.1.5 Quiz: Using Chi-Square for Goodness-of-Fit 10.2.3 Practice: Chi-Square Hypothesis Tests for Association or Independence 10.3.3 Quiz: t Test for the Slope of the Regression Line

Unit	Weeks	Assignments
		10.3.5 Practice: Inference for the Least-Squares Line 10.4.1 Discuss: What Is Interesting? What Is Confusing? *10.4.3 Test (CS): Inference for Tables and Least-Squares
11	17	11.1.2 Practice: Action Plan 11.1.3 Discuss: Statistics as a Cohesive Whole 11.1.4 Quiz: Interpreting MINITAB Output 11.2.1 Quiz: AP-Style Multiple-Choice Questions, Part 1 11.2.3 Quiz: AP-Style Multiple-Choice Questions, Part 2 11.3.1 Practice: Full-Length Practice Exam *11.4.1 Exam: Final Exam
		<b>11.4.2 Final Exam: Final Exam</b>

## Course Detailed Description

### UNIT 6: BINOMIALS AND DISTRIBUTIONS

#### LESSON 1: INTRODUCTION TO INFERENCE STATISTICS

##### 6.1.1 Study: Introduction to Inferential Statistics

Explore an overview of intervals, significance, inference and various applications.

*Duration: 50 mins*

##### 6.1.2 Practice: Introduction to Inferential Statistics

Explore an overview of intervals, significance, inference and various applications.

*Duration: 30 mins*

##### 6.1.3 Discuss: Uses of Inferential Statistics

Discuss how and where you've seen inferential statistics used.

*Duration: 30 mins; Scoring: 10 points*

#### LESSON 2: BINOMIAL DISTRIBUTIONS

##### 6.2.1 Study: Binomial Situations (Events)

Consider the definition of a binomial setting, and use the binomial calculations to solve problems. Examine binomial settings involving at least, at most, and between. Explore your graphing calculator to do binomial problems.

*Duration: 50 mins*

##### 6.2.2 Practice: Binomial Situations (Events)

Consider the definition of a binomial setting, and use the binomial calculations to solve problems. Examine binomial settings involving at least, at most, and between. Explore your graphing calculator to do binomial problems.

*Duration: 30 mins*

##### 6.2.3 Quiz: Binomial Settings and Binomial Probabilities

Solve binomial problems with and without a graphing calculator.

*Duration: 1 hr; Scoring: 10 points*

### **6.2.4 Study: The Normal Approximation to the Binomial**

Consider the normal approximation to the binomial distribution. Explore the cumbersome nature of calculating binomial probabilities exactly. Look at continuity correction.

*Duration: 50 mins*

### **6.2.5 Practice: The Normal Approximation to the Binomial**

Consider the normal approximation to the binomial distribution. Explore the cumbersome nature of calculating binomial probabilities exactly. Look at continuity correction.

*Duration: 30 mins*

### **6.2.6 Quiz: Binomial Problems**

Work on binomial problems and consider the criteria for using the normal approximation. Compare answers obtained with the normal approximation to the binomial to those obtained with the exact binomial.

*Duration: 1 hr; Scoring: 10 points*

### **6.2.7 Practice: Binomial Problems Using Two Methods**

Work on binomial, individual, and interval problems using both the normal approximation to the binomial and, on the graphing calculator, the exact binomial.

*Duration: 1 hr; Scoring: 25 points*

## **LESSON 3: GEOMETRIC DISTRIBUTION**

### **6.3.1 Discuss: When Are You Most Likely to Get Your First Red Candy?**

Discuss average waiting-time problems.

*Duration: 30 mins; Scoring: 10 points*

### **6.3.2 Study: Geometric Probability Distributions**

Look at geometric distributions. These are skewed distributions modeling the probability of getting doubles before a certain roll of dice, or the average waiting-time to get a certain answer to a polling question.

*Duration: 50 mins*

### **6.3.3 Practice: Geometric Probability Distributions**

Look at geometric distributions. These are skewed distributions modeling the probability of getting doubles before a certain roll of dice, or the average waiting-time to get a certain answer to a polling question.

*Duration: 30 mins*

### **6.3.4 Quiz: Geometric Distribution Problems**

Consider geometric distribution problems with and without your graphing calculator.

*Duration: 1 hr; Scoring: 10 points*

## **LESSON 4: SAMPLING DISTRIBUTIONS: MEANS AND PROPORTIONS**

### **6.4.1 Discuss: Which Is More Likely?**

Consider the question, "Which is more likely, that the next person you see will be taller than 6' 6" or that the next five people you see will have an average height above 6' 6?"

*Duration: 30 mins; Scoring: 10 points*

### **6.4.2 Study: Sampling Distributions and the Central Limit Theorem**

Go over sampling distributions and the sampling distribution of a sample mean. Study the mean and standard deviation of the sampling distribution of the mean. Explore the Central Limit Theorem.

*Duration: 50 mins*

### **6.4.3 Practice: Sampling Distributions and the Central Limit Theorem**

Go over sampling distributions and the sampling distribution of a sample mean. Study the mean and standard deviation of the sampling distribution of the mean. Explore the Central Limit Theorem.

*Duration: 30 mins*

### **6.4.4 Practice: Sampling Distributions**

Practice using the Central Limit Theorem to predict the means, standard deviations, and shapes of sampling distributions.

*Duration: 1 hr*

### **6.4.5 Practice: Sampling Distributions**

Use your graphing calculator to create sampling distributions. Calculate their means and standard deviations.

*Duration: 1 hr; Scoring: 25 points*

### **6.4.6 Study: Sample Proportions**

Look at the derivation of the mean and standard deviation of a sample proportion, based on the binomial.

*Duration: 50 mins*

### **6.4.7 Practice: Sample Proportions**

Look at the derivation of the mean and standard deviation of a sample proportion, based on the binomial.

*Duration: 30 mins*

### **6.4.8 Practice: Sampling Distribution of p-Hat**

Work on problems based on the mean and standard deviation of a sampling distribution of p-hat. Get additional practice dealing with the sampling distribution of means.

*Duration: 1 hr; Scoring: 25 points*

### **6.4.9 Quiz: Important Concepts From This Unit**

Review the concepts of sampling distribution, the Central Limit Theorem, and sampling distributions for the sample mean and p-hat.

*Duration: 1 hr; Scoring: 10 points*

## **LESSON 5: UNIT WRAP-UP**

### **6.5.1 Discuss: What Is Interesting? What Is Confusing?**

Discuss concepts you find interesting or confusing in an informal setting.

*Duration: 30 mins; Scoring: 10 points*

### **6.5.2 Review: Binomial Situations and Sampling Distributions**

Review your studies of binomial situations and sampling distributions.

*Duration: 3 hrs 30 mins*

### **6.5.3 Test (CS): Binomial Situations and Sampling Distributions**

Take a 20-minute test covering inferential statistics, binomial distributions, geometric distribution, and means and proportions.

*Duration: 20 mins; Scoring: 48 points*

*continued →*

## **UNIT 7: INTRODUCTION TO INFERENCE**

### **LESSON 1: CONFIDENCE INTERVALS FOR MEANS**

#### **7.1.1 Discuss: Guessing an Estimate**

Discuss how comfortable you are with guessing numbers within certain intervals. As the intervals widen, does your comfort level increase?

*Duration: 30 mins; Scoring: 10 points*

#### **7.1.2 Study: Using Sample Means to Estimate Population Means**

Consider how to estimate the mean of a population using a sample. Examine confidence intervals and the general form of a confidence interval. Find critical z-values for various confidence levels by using tables and the graphing calculator's InvNorm function.

*Duration: 50 mins*

#### **7.1.3 Practice: Using Sample Means to Estimate Population Means**

Consider how to estimate the mean of a population using a sample. Examine confidence intervals and the general form of a confidence interval. Find critical z-values for various confidence levels by using tables and the graphing calculator's InvNorm function.

*Duration: 30 mins*

#### **7.1.4 Quiz: Confidence Intervals**

Estimate population means, creating 95% and 99% confidence z-intervals for means. Find critical z-values for non-standard confidence levels.

*Duration: 1 hr; Scoring: 10 points*

#### **7.1.5 Practice: Confidence Intervals**

Build an understanding of the term statistical confidence.

*Duration: 1 hr*

#### **7.1.6 Quiz: Finding Desired Sample Sizes**

Look at how to find the desired sample size to create a z-interval with a given margin of error and confidence level. Consider the relationship between sample size, confidence level, and margin of error.

*Duration: 1 hr; Scoring: 10 points*

#### **7.1.7 Practice: Creating Intervals**

Create intervals for means using the formula and the graphing calculator's STAT TESTS function. Calculate the sample size n necessary to produce a given margin of error and a certain confidence level.

*Duration: 1 hr; Scoring: 25 points*

### **LESSON 2: STATISTICAL SIGNIFICANCE AND P-VALUE**

#### **7.2.1 Discuss: How Good Is the Guess?**

Discuss the following scenario: A psychic says she knows what time of day you were born. She tells you her guess and she's right! How would you quantify how good her guess is?

*Duration: 30 mins; Scoring: 10 points*

#### **7.2.2 Study: The Definition of P-Value**

Explore the concepts of statistical significance and significance levels. Consider what it means to say that a finding is different enough from what was expected that we can reject it as chance variation.

*Duration: 50 mins*

### **7.2.3 Practice: The Definition of P-Value**

Explore the concepts of statistical significance and significance levels. Consider what it means to say that a finding is different enough from what was expected that we can reject it as chance variation.

*Duration: 30 mins*

### **7.2.4 Quiz: Working With P-Values and Statistical Significance**

Find P-values for different distributions. Determine statistical significance.

*Duration: 1 hr; Scoring: 10 points*

## **LESSON 3: SIGNIFICANCE AND HYPOTHESIS TESTING: MEANS**

### **7.3.1 Discuss: What Is an Impressive Prediction?**

Look at cases where people make successful predictions. How do you know whether the successful prediction was just luck?

*Duration: 30 mins; Scoring: 10 points*

### **7.3.2 Study: The Hypothesis-Testing Procedure**

Look at the hypothesis-testing procedure and null and alternative hypotheses. Consider one- and two-sided hypotheses, and how to compute a P-value.

*Duration: 50 mins*

### **7.3.3 Practice: The Hypothesis-Testing Procedure**

Look at the hypothesis-testing procedure and null and alternative hypotheses. Consider one- and two-sided hypotheses, and how to compute a P-value.

*Duration: 30 mins*

### **7.3.4 Practice: Hypothesis Tests for Means**

Perform hypothesis tests for means and then support the conclusion.

*Duration: 1 hr*

### **7.3.5 Practice: More Hypothesis Tests for Means**

Apply your knowledge of significance and hypothesis testing to answer the questions in this Assignment.

*Duration: 1 hr; Scoring: 25 points*

### **7.3.6 Study: Two-Sided Significance Tests and Confidence Intervals**

Consider the relationship between two-tailed significance tests and confidence intervals. See examples of how a confidence interval for means can solve a two-tailed significance test for means.

*Duration: 50 mins*

### **7.3.7 Practice: Two-Sided Significance Tests and Confidence Intervals**

Consider the relationship between two-tailed significance tests and confidence intervals. See examples of how a confidence interval for means can solve a two-tailed significance test for means.

*Duration: 30 mins*

### **7.3.8 Quiz: Two-Sided Significance Tests and Confidence Intervals**

Work on parallel problems: a confidence interval and its corresponding significance test. Observe that the same conclusions are reached with each method.

*Duration: 1 hr; Scoring: 10 points*

*continued →*

## **LESSON 4: ERRORS IN HYPOTHESIS TESTING**

### **7.4.1 Discuss: Innocent or Guilty?**

Discuss the following scenario: A person is on trial. If your hypothesis is that the person is innocent, what kinds of errors can you make if you declare the person guilty or innocent?

*Duration: 30 mins; Scoring: 10 points*

### **7.4.2 Study: The Power of the Test, Type I and Type II Errors**

Look at two types of errors in hypothesis testing. Consider several concepts, including the power of a test, the relationship between significance level and a Type I error, and the relationship between power and a Type II error.

*Duration: 50 mins*

### **7.4.3 Practice: The Power of the Test, Type I and Type II Errors**

Look at two types of errors in hypothesis testing. Consider several concepts, including the power of a test, the relationship between significance level and a Type I error, and the relationship between power and a Type II error.

*Duration: 30 mins*

### **7.4.4 Practice: Dangers of Type I and Type II Errors**

Look at various situations and determine the dangers inherent in making Type I and Type II errors.

*Duration: 1 hr*

### **7.4.5 Practice: Computing Probabilities for Type I and Type II Errors**

Look at hypothesis-testing situations and compute the probabilities of Type I errors, Type II errors, and the power of the test. Emphasis is on the concepts of errors and power rather than on computation, although some computation will be done.

*Duration: 1 hr; Scoring: 25 points*

### **7.4.6 Quiz: Concepts of Hypothesis and Significance Testing**

Test of your understanding of concepts such as point estimate, P-value, null hypothesis, alternative hypothesis, statistical significance, result, conclusion, one-tailed, two-tailed, Type I and Type II errors.

*Duration: 1 hr; Scoring: 10 points*

## **LESSON 5: UNIT WRAP-UP**

### **7.5.1 Discuss: What Is Interesting? What Is Confusing?**

Discuss concepts you find interesting or confusing in an informal setting.

*Duration: 30 mins; Scoring: 10 points*

### **7.5.2 Review: Introduction to Inference: Confidence Intervals and Hypothesis Testing**

Review your studies of confidence intervals and hypothesis testing.

*Duration: 3 hrs 30 mins*

### **7.5.3 Test (CS): Introduction to Inference**

Take a 20-minute test covering confidence intervals for means, statistical significance and P-value, means, and errors in hypothesis testing.

*Duration: 20 mins; Scoring: 48 points*

*continued →*

## **UNIT 8: T DISTRIBUTION FOR MEANS**

### **LESSON 1: CONFIDENCE INTERVALS AND HYPOTHESIS TESTING FOR A SINGLE MEAN**

#### **8.1.1 Study: The t Distributions**

Examine what to do when you don't know the population standard deviation. Look at the important assumptions necessary to use the t distribution and notice how to use the t tables and a graphing calculator for the t distribution.

*Duration: 50 mins*

#### **8.1.2 Practice: The t Distributions**

Examine what to do when you don't know the population standard deviation. Look at the important assumptions necessary to use the t distribution and notice how to use the t tables and a graphing calculator for the t distribution.

*Duration: 30 mins*

#### **8.1.3 Practice: Creating Confidence Intervals**

Create 90%, 95%, and 99% confidence t intervals for means. Practice doing this using your graphing calculator.

*Duration: 1 hr*

#### **8.1.4 Quiz: Concepts Relating to Confidence t Intervals**

Create t intervals for means using the formula and the graphing calculator's STAT TESTS function. Calculate the sample size n needed to produce a given margin of error and a certain confidence level.

*Duration: 1 hr; Scoring: 10 points*

#### **8.1.5 Practice: Hypothesis Testing With the t Distribution**

Follow the steps for conducting hypothesis tests (both one- and two-sided) using the t distribution. Consider the relationship between confidence intervals and significance tests. Look at power and Type I and Type II errors.

*Duration: 1 hr*

#### **8.1.6 Practice: t Intervals and Hypothesis Tests**

Apply the calculations for t intervals and hypothesis tests from start to finish using realistic data sets. Justify use of the t procedures.

*Duration: 1 hr; Scoring: 25 points*

### **LESSON 2: CONFIDENCE INTERVALS FOR THE DIFFERENCE BETWEEN TWO MEANS**

#### **8.2.1 Study: Inference for Matched-Pairs Situations**

Look at when data should and should not be analyzed as a matched-pairs situation. Explore the hypothesis-testing procedures and t intervals for matched-pairs data.

*Duration: 50 mins*

#### **8.2.2 Practice: Inference for Matched-Pairs Situations**

Look at when data should and should not be analyzed as a matched-pairs situation. Explore the hypothesis-testing procedures and t intervals for matched-pairs data.

*Duration: 30 mins*

#### **8.2.3 Quiz: Matched Pairs or Not?**

Identify situations in which it's appropriate to use matched-pairs analysis.

*Duration: 1 hr; Scoring: 10 points*

#### **8.2.4 Practice: t Intervals and Hypothesis Tests With Matched Pairs Data**

Look at how to use your graphing calculator's LISTS and STAT TESTS to create confidence intervals and to conduct hypothesis tests for paired data.

*Duration: 1 hr*

### **8.2.5 Quiz: Matched Pairs Confidence Intervals and t Tests**

Solve problems using matched-pairs t tests.

*Duration: 1 hr; Scoring: 10 points*

## **LESSON 3: CONFIDENCE INTERVALS AND HYPOTHESIS TESTS FOR TWO INDEPENDENT SAMPLES**

### **8.3.1 Study: t Intervals for Two Independent Samples**

Use t intervals for two independent samples, and compute degrees of freedom using the conservative method, the software method, and pooled variances.

*Duration: 50 mins*

### **8.3.2 Practice: t Intervals for Two Independent Samples**

Use t intervals for two independent samples, and compute degrees of freedom using the conservative method, the software method, and pooled variances.

*Duration: 30 mins*

### **8.3.3 Quiz: t Intervals for Two Independent Samples**

Compute and interpret t intervals for two independent samples.

*Duration: 1 hr; Scoring: 10 points*

### **8.3.4 Practice: t Intervals for Two Independent Samples**

Practice techniques taught in this lesson. Create 90%, 95%, and 99% confidence t intervals for mean differences when the population standard deviation is unknown. Use a table to produce critical t values.

*Duration: 1 hr; Scoring: 25 points*

### **8.3.5 Study: Hypothesis Test for the Difference of Two Independent Samples**

Look at how to do significance testing for the difference of two independent samples. Compare different methods for computing degrees of freedom, including the conservative method, pooling variances, and software.

*Duration: 50 mins*

### **8.3.6 Practice: Hypothesis Test for the Difference of Two Independent Samples**

Look at how to do significance testing for the difference of two independent samples. Compare different methods for computing degrees of freedom, including the conservative method, pooling variances, and software.

*Duration: 30 mins*

### **8.3.7 Quiz: Two-Sample t Tests**

Work on two-sample t tests using the formula, tables, and your graphing calculator. Compare results using different degrees of freedom.

*Duration: 1 hr; Scoring: 10 points*

### **8.3.8 Practice: More Two-Sample t Tests**

Work on two-sample t tests for means, using the formula and tables. Solve the same problems using confidence intervals.

*Duration: 1 hr*

### **8.3.9 Quiz: Confidence Intervals and Significance Testing for Means**

Test your understanding of various significance tests. Review uses of confidence intervals.

*Duration: 1 hr; Scoring: 10 points*

## **LESSON 4: UNIT WRAP-UP**

### **8.4.1 Discuss: What Is Interesting? What Is Confusing?**

Discuss concepts you find interesting or confusing in an informal setting.

*Duration: 30 mins; Scoring: 10 points*

### **8.4.2 Review: t Distribution for Means**

Review your studies of t distribution for means.

*Duration: 3 hrs 30 mins*

### **8.4.3 Test (CS): t Distribution for Means**

Take a 20-minute test covering confidence intervals and hypothesis testing for a single mean and for two independent samples, and the difference between two means.

*Duration: 20 mins; Scoring: 48 points*

## **UNIT 9: INFERENCE FOR PROPORTIONS**

### **LESSON 1: CONFIDENCE INTERVALS AND HYPOTHESIS TESTS FOR A SINGLE POPULATION PROPORTION**

#### **9.1.1 Study: Confidence Interval for a Single Population Proportion**

Look at confidence intervals for a single population proportion and sample size for a given margin of error.

*Duration: 50 mins*

#### **9.1.2 Practice: Confidence Interval for a Single Population Proportion**

Look at confidence intervals for a single population proportion and sample size for a given margin of error.

*Duration: 30 mins*

#### **9.1.3 Practice: Creating z-Intervals for a Single Population Proportion**

Create 90%, 95%, and 99% z-intervals for problems using the formula and table or the InvNorm function on your graphing calculator.

*Duration: 1 hr*

#### **9.1.4 Quiz: Finding the Sample Size for a Given Margin of Error for a Single Population Proportion**

Practice finding the sample size for a given margin of error.

*Duration: 1 hr; Scoring: 10 points*

#### **9.1.5 Practice: Confidence Intervals for a Single Population Proportion**

Apply various techniques to solve problems and create intervals for proportions using the formula and the graphing calculator's STAT TESTS function. Calculate the sample size  $n$  needed to produce a given confidence interval.

*Duration: 1 hr; Scoring: 25 points*

#### **9.1.6 Study: Significance Testing for Proportions**

Examine one- and two-tailed significance-testing problems.

*Duration: 50 mins*

#### **9.1.7 Practice: Significance Testing for Proportions**

Examine one- and two-tailed significance-testing problems.

*Duration: 30 mins*

*continued →*

### **9.1.8 Practice: One- and Two-Tailed Significance Tests for a Single Population Proportion**

Perform one- and two-tailed significance tests for proportions. Work on parallel problems: a confidence interval for proportions and its corresponding two-tailed significance test. Justify that the conclusions match.

*Duration: 1 hr*

### **9.1.9 Quiz: More One- and Two-Tailed Significance Tests for a Single Population Proportion**

Perform one- and two-tailed significance tests for proportions.

*Duration: 1 hr; Scoring: 10 points*

## **LESSON 2: THE DIFFERENCE BETWEEN TWO PROPORTIONS**

### **9.2.1 Study: Differences Between Two Proportions**

Look at confidence intervals and significance testing for the difference between two proportions. Compare differences in computation of standard error. Study how to use your graphing calculator to test for a difference between two proportions.

*Duration: 50 mins*

### **9.2.2 Practice: Differences Between Two Proportions**

Look at confidence intervals and significance testing for the difference between two proportions. Compare differences in computation of standard error. Study how to use your graphing calculator to test for a difference between two proportions.

*Duration: 30 mins*

### **9.2.3 Practice: Differences Between Two Proportions**

Create 90%, 95%, and 99% confidence intervals and do significance tests for the differences between proportions.

*Duration: 1 hr; Scoring: 25 points*

### **9.2.4 Practice: Significance Tests for One and Two Proportions**

Choose confidence intervals and do significance tests on one- and two-proportion problems.

*Duration: 1 hr*

### **9.2.5 Quiz: Inference for Means and Proportions**

Identify elements of confidence intervals or significance tests needed in a variety of situations.

*Duration: 1 hr; Scoring: 10 points*

## **LESSON 3: UNIT WRAP-UP**

### **9.3.1 Discuss: What Is Interesting? What Is Confusing?**

Discuss concepts you find interesting or confusing in an informal setting.

*Duration: 30 mins; Scoring: 10 points*

### **9.3.2 Review: Inference for Proportions**

Review your studies of inference for proportions.

*Duration: 3 hrs 30 mins*

### **9.3.3 Test (CS): Inference for Proportions**

Take a 20-minute test covering confidence intervals and hypothesis tests for a single population proportion and the difference between two proportions.

*Duration: 20 mins; Scoring: 48 points*

*continued →*

## **UNIT 10: INFERENCE FOR TABLES AND LEAST-SQUARES**

### **LESSON 1: ONE-WAY TABLES: CHI-SQUARE FOR GOODNESS-OF-FIT**

#### **10.1.1 Discuss: Roll of the Die**

Discuss the following scenario: You're given the results of a single die rolled 60 times: how many ones, twos, threes, and so on came up? Try to decide if the die is fair. (How far can outcomes deviate from what's expected by chance alone?)

*Duration: 30 mins; Scoring: 10 points*

#### **10.1.2 Study: Chi-Square for Goodness-of-Fit**

Explore inference for univariate categorical data. Look at the chi-square statistic and the chi-square distribution, how to use them to test whether data fit expected values, and the assumptions needed to use the chi-square statistic.

*Duration: 50 mins*

#### **10.1.3 Practice: Chi-Square for Goodness-of-Fit**

Explore inference for univariate categorical data. Look at the chi-square statistic and the chi-square distribution, how to use them to test whether data fit expected values, and the assumptions needed to use the chi-square statistic.

*Duration: 30 mins*

#### **10.1.4 Practice: Goodness-of-Fit on Your Graphing Calculator**

Use the lists on your graphing calculator to compute a chi-square value for goodness-of-fit.

*Duration: 1 hr*

#### **10.1.5 Quiz: Using Chi-Square for Goodness-of-Fit**

Perform chi-square significance tests involving goodness-of-fit on problems involving dice, spinners, birthdays in different months, and the like.

*Duration: 1 hr; Scoring: 10 points*

### **LESSON 2: TWO-WAY TABLES: CHI-SQUARE FOR ASSOCIATION OR INDEPENDENCE**

#### **10.2.1 Study: Expected Values as an Ideal for Independence**

Study inference for bivariate categorical data in two-way tables. Look at the chi-square test for association or independence and the assumptions needed to use the test.

*Duration: 50 mins*

#### **10.2.2 Practice: Expected Values as an Ideal for Independence**

Study inference for bivariate categorical data in two-way tables. Look at the chi-square test for association or independence and the assumptions needed to use the test.

*Duration: 30 mins*

#### **10.2.3 Practice: Chi-Square Hypothesis Tests for Association or Independence**

Perform complete chi-square hypothesis tests for association or independence. Look at the assumptions needed to use chi-square.

*Duration: 1 hr; Scoring: 25 points*

### **LESSON 3: INFERENCE FOR THE LEAST-SQUARES LINE**

#### **10.3.1 Study: Inference for the Least-Squares Line**

Explore the linear regression line for a sample as an estimator of the least-square line for a population. Study and use the standard error of the slope, and the t test for the slope of a regression line.

*Duration: 50 mins*

### **10.3.2 Practice: Inference for the Least-Squares Line**

Explore the linear regression line for a sample as an estimator of the least-square line for a population. Study and use the standard error of the slope, and the t test for the slope of a regression line.

*Duration: 30 mins*

### **10.3.3 Quiz: t Test for the Slope of the Regression Line**

Choose a linear regression line from paired data as an estimate of the population regression line. Do t tests for the slope of the regression line.

*Duration: 1 hr; Scoring: 10 points*

### **10.3.4 Practice: Graphing Calculator and MINITAB Output for Inference for the Least-Squares Line**

Practice doing a t test on your graphing calculator for the slope of the regression line. Look at how to read MINITAB output for regression.

*Duration: 1 hr*

### **10.3.5 Practice: Inference for the Least-Squares Line**

Given paired data, do a hypothesis test for the slope of the regression line using your graphing calculator. Read MINITAB output for regression and use this for a hypothesis test for the slope of the regression line.

*Duration: 1 hr; Scoring: 25 points*

## **LESSON 4: UNIT WRAP-UP**

### **10.4.1 Discuss: What Is Interesting? What Is Confusing?**

Discuss concepts you find interesting or confusing in an informal setting.

*Duration: 30 mins; Scoring: 10 points*

### **10.4.2 Review: Inference for One- and Two-Way Tables and for Least-Squares Lines**

Review your studies of inference for one- and two-way tables and for least square lines.

*Duration: 3 hrs 30 mins*

### **10.4.3 Test (CS): Inference for Tables and Least-Squares**

Take a 20-minute test covering one-way tables, two way tables, and inference for the least-squares line.

*Duration: 20 mins; Scoring: 48 points*

## **UNIT 11: FINAL PREPARATION FOR THE AP STATISTICS EXAM**

### **LESSON 1: GENERAL PREPARATION STRATEGIES**

#### **11.1.1 Study: How to Prepare for the AP Statistics Exam**

Study how to assess where you are in your preparations for the Exam, and plan how to best prepare based on your self-assessment.

*Duration: 50 mins*

#### **11.1.2 Practice: Action Plan**

Write an action plan for preparing for the AP Statistics Exam.

*Duration: 1 hr; Scoring: 25 points*

#### **11.1.3 Discuss: Statistics as a Cohesive Whole**

Create a map that ties together the concepts covered in the statistics course. Discuss an example of how statistics is used, and list the most important concepts from the statistics course used in your example.

*Duration: 1 hr; Scoring: 10 points*

#### **11.1.4 Quiz: Interpreting MINITAB Output**

Review how MINITAB or other software packages may be used on the AP Exam.

*Duration: 2 hrs; Scoring: 10 points*

### **LESSON 2: STRATEGIES AND PRACTICE FOR MULTIPLE-CHOICE AND FREE-RESPONSE QUESTIONS**

#### **11.2.1 Quiz: AP-Style Multiple-Choice Questions, Part 1**

Practice answering AP-style multiple-choice questions.

*Duration: 2 hrs 30 mins; Scoring: 20 points*

#### **11.2.2 Practice: AP-Style Free-Response Practice, Part 1**

Practice with AP-style free-response questions and study how they are scored.

*Duration: 2 hrs 30 mins*

#### **11.2.3 Quiz: AP-Style Multiple-Choice Questions, Part 2**

Practice Answering AP-style multiple-choice questions.

*Duration: 2 hrs 30 mins; Scoring: 20 points*

#### **11.2.4 Practice: AP-Style Free-Response Practice, Part 2**

More practice with AP-style free-response questions.

*Duration: 2 hrs 30 mins*

### **LESSON 3: PUTTING IT TOGETHER: PRACTICE EXAM AND MIXED PRACTICE**

#### **11.3.1 Practice: Full-Length Practice Exam**

Take a full-length practice exam and study how AP Exams are scored by scoring yourself.

*Duration: 5 hrs; Scoring: 25 points*

#### **11.3.2 Practice: Mixed Practice with Multiple-Choice and Free-Response Questions**

Answer items similar to the practice exam (the format is different and you don't need to do it in one sitting).

*Duration: 5 hrs*

#### **11.3.3 Study: Final Wrap-Up for AP Exam**

Take note of some things to think about on the Exam. Apply some final preparation suggestions.

*Duration: 50 mins*

### **LESSON 4: FINAL EXAM**

#### **11.4.1 Exam: Final Exam**

Take the Final Exam. Good luck!

*Duration: 1 hr 30 mins; Scoring: 80 points*

#### **11.4.2 Final Exam: Final Exam**

Take the Final Exam. Good Luck!

*Duration: 1 hr 30 mins; Scoring: 112 points*

## **Course Credit**

The course grade will be calculated as follows:

- 50% coursework average;
- 50% summative assessment average, including the final exam;
- A passing course grade is 70 or higher.

Students must attempt all assignments in the course. The final exam will not be available until all assignments have been accepted and graded by the teacher.

Students who score below 70% on the final exam will be eligible for one re-exam opportunity.

## Summative Assessments

Summative assessments are those that allow you to demonstrate mastery of the course objectives. For summative assessments, you will NOT be allowed to use the learning materials. These are opportunities for you to show what you have learned by that point in the course. The summative assessments for this course are as follows:

- Unit Tests **(20% of Course Grade)**
- Final Exam **(30% of Course Grade)**

## Course Completion

- Students may not complete the course in less than 30 days.
- All courses expire six months after the enrollment date.

## Academic Integrity

It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and high standard of integrity. The attempt of students to present as their own any work not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offenders liable to serious consequences, possibly suspension.

“Scholastic dishonesty” includes, but is not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student (such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor) or the attempt to commit such an act.

## Student Expectations

You will be expected to log into the Blackboard course regularly to be aware of possible announcements/reminders and to pace your progress in the course.

Students are expected to maintain an online environment conducive to learning, which includes “netiquette” (Internet etiquette). Please review the basic rules for [Online Discussion Netiquette](#). Ensure that your email messages, discussion board postings, and other electronic communications are thoughtful and respectful. Diverse opinions are welcome in this course, and you are expected to demonstrate an open mind and courtesy when responding to the thoughts and ideas of others.

The following are prohibited:

- making offensive remarks in email or the discussion board;
- using inappropriate language or discussing inappropriate topics online;
- spamming;
- hacking;
- using TTU or Blackboard email or discussion boards for commercial purposes;
- using all caps (considered shouting in online communications); and
- cyber-bullying or online harassment of any type.

Inappropriate behavior shall result in consequences ranging from a request to correct the problem, to removal from the course or even the university, depending on the severity of the behavior. Disciplinary actions will be taken according to the TTU K-12 Student Handbook.

## Communication

- You can expect a reply from your instructor within 2 business days.
- Use the Blackboard Course Messages tool for sending messages to your instructor.
- Apex Messages will be used for submitting assignments that your instructor must grade.

## Technical Difficulties

### ***Getting Help***

For student assistance with Blackboard, visit [TTU K-12 Support](#).

### ***Computer Problems***

A working computer is necessary for online coursework. Computer problems will not be accepted as a valid reason for failure to complete course activities within the allotted time frame. Identify a second computer, before the course begins, that you can use if you experience computer problems.

### ***Server Problems***

When the Blackboard server needs to be taken down for maintenance, the Blackboard administrator will post an announcement in your course informing you of the time and date. If the server experiences unforeseen problems, your course instructor will notify you.

### ***Lost or Corrupted Files***

You must keep/save a copy of every project/assignment on an external disk or personal computer. In the event of any kind of technology failure (e.g., Blackboard server crash or virus infection, students' own computer problems, loss of files in cyberspace, etc.) or any disputes, the instructor may request or require you to resubmit the files. In some

instances, the instructor may need to open another attempt within Blackboard, so communication with your instructor is critical in these circumstances.