

**EL DORADO UNION HIGH SCHOOL DISTRICT
EDUCATIONAL SERVICES
Course of Study Information Page**

COURSE TITLE Probability and Statistics			
DISTRICT COURSE NUMBER #0234		4-DIGIT STATE COURSE CODE (COMPLETED BY SILT) 2410	
Rationale:	This course is designed to meet the needs of students who want an additional year of mathematics, especially those who would like experience with the skill and concepts of statistics.		
Course Description that will be in the Course Directory:	This course is designed to give students experience with exploring data, determining probabilities, making inferences and calculating and interpreting linear models.		
How Does this Course align with or meet State and District content standards?			
NCLB Core Subjects:	<i>Select up to two that apply:</i> <input type="checkbox"/> Arts <input type="checkbox"/> Civics and Government <input type="checkbox"/> Not Core Subject <input type="checkbox"/> Economics <input type="checkbox"/> History <input type="checkbox"/> English <input checked="" type="checkbox"/> Mathematics <input type="checkbox"/> Foreign Language <input type="checkbox"/> Reading / Language Arts <input type="checkbox"/> Geography <input type="checkbox"/> Science		
CDE CALPADS Course Descriptors: (See Page 2 for Definitions)	CTE TECH PREP COURSE INDICATORS <input type="checkbox"/> Tech Prep (32) <input type="checkbox"/> Tech Prep & ROP (33) <input type="checkbox"/> ROP <input checked="" type="checkbox"/> N/A	CTE COURSE CONTENT CODE <input type="checkbox"/> CTE Introductory (01) <input type="checkbox"/> CTE Concentrator (02) <input type="checkbox"/> CTE Completer (03)	INSTRUCTIONAL LEVEL CODE <input type="checkbox"/> Remedial (35) <input checked="" type="checkbox"/> Honors UC-Certified (39) <input type="checkbox"/> Honors Non UC-Certified (34) <input type="checkbox"/> College (40) <input type="checkbox"/> N/A
Length of Course:	<input checked="" type="checkbox"/> Year <input type="checkbox"/> Semester		
Grade Level(s):	<input type="checkbox"/> 9 <input type="checkbox"/> 10 <input checked="" type="checkbox"/> 11 <input checked="" type="checkbox"/> 12		
Credit:	<input checked="" type="checkbox"/> Number of units: 10 <input checked="" type="checkbox"/> Meets graduation requirements <input checked="" type="checkbox"/> Request for UC "a-g" requirements		<input checked="" type="checkbox"/> College Prep <input checked="" type="checkbox"/> Elective <input type="checkbox"/> Career Technical
Prerequisites:	Grade C or better in Algebra 2 or Advanced Algebra 2.		
Department(s):	Mathematics		
District Sites:	EDHS, ORHS, PHS, UMHS		
Board of Trustees COS Adoption Date:	May 17, 2011		
Textbooks / Instructional Materials:	Elementary Statistics Using the TI-83/84 Plus Calculator, Addison Wesley Publishing, Mario F. Triola, 2011 – 3 rd Edition, ISBN: 0-321-64148-5		
Funding Source:			
Board of Trustees Textbook Adoption Date:	June 21, 2011		

Definitions

CALPADS	California Longitudinal Pupil Achievement Data System
CTE Technical Prep	A course within a CTE technical career pathway or program that has been articulated with a postsecondary education or through an apprenticeship program of at least 2 years following secondary instruction.
Instructional Level Code	Represents a nonstandard instructional level at which the content of a specific course is either above or below a 'standard' course instructional level. These levels may be identified by the actual level of instruction or identified by equating the course content and level of instruction with a state or nationally recognized advanced course of study, such as IB or AP.
Instructional Level Honors, UC Certified	Includes all AP courses.
Instructional Level Honors, non UC Certified	Requires Board approval.
Instructional Level College	Includes ACE courses. Equivalent to college course and content, but not an AP course. Not related to section, but to course.

EDUCATIONAL SERVICES**Course Title: Probability and Statistics (#0234)****TABLE OF CONTENTS**

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EL DORADO UNION HIGH SCHOOL DISTRICT

EDUCATIONAL SERVICES

Department: Mathematics

Course Title: Probability & Statistics (#0234)

UNIT/STANDARD #: Unit #1 - Exploring Data

LEARNING OUTCOME: Students learn to summarize and graph data and use statistics to describe, explore and compare data.

LEARNING OUTCOME	INSTRUCTIONAL STRATEGIES	ASSESSMENTS	INTERVENTIONS
<p>1. What students will learn, know, and be able to do? (Must be aligned to state content standards.)</p> <p>Students will be able to analyze sample data and comment on context, source and sampling method. They will be able to describe the difference between statistical significance and practical significance. [Common Core State Standards: Statistics - IC 1]</p> <p>Students will learn to construct a boxplot from a given set of sample data. Students will also learn to construct a dotplot, stemplot and scatterplot. [Common Core State Standards: Statistics - ID 1]</p> <p>Students will be able to construct similar graphs to compare data sets. Students will conclude there are many different and varied statistical graphs that are effective in allowing us to identify important characteristics of data and will be able to select the graph that does the best job of revealing the true nature of the data set being considered. [Common Core State Standards: Statistics - ID 2]</p>	<p>2. Instructional strategies that will be used to engage students.</p> <p>Probability & Statistics students will learn to examine data, calculate statistics, understand results and be able to interpret results in a meaningful way. Real data will be used in examples, quizzes and tests. When appropriate, students will collect their own data for statistical analysis.</p> <p>Teachers will use direct instruction to stress conceptual understanding rather than mere knowledge of procedures. During direct instruction, pre-printed note packets will be used.</p> <p>Teachers will model use of technology (TI calculator) through the TI simulator to display appropriate steps for calculating various statistics and displaying graphs.</p> <p>Response device questions will be used throughout instruction to determine student's level of understanding.</p> <p>Students will have access to online tools,</p>	<p>3. How will we know that students have learned? Include both Formative (for learning) and Summative (of learning) assessment examples.</p> <p>Frequent checks for understanding will be used. These may take the form of a warm-up, homework activity, quiz or performance assessment (formative), or chapter/unit test (summative).</p> <p>Examples:</p> <ol style="list-style-type: none"> 1. Suppose that ABC News conducts a survey by asking viewers to call a toll-free number to respond to this question: "Do you favor a new federal tax on movie ticket costs?" <ol style="list-style-type: none"> a) Who is likely to respond to the question? b) Is the sample of respondents likely to be representative of the general population? Why or Why not? c) Should the responses be used to form conclusions about the general population? 2. Here are measured reaction times (in seconds) in a test of driving skills: 2.4, 2.5, 2.8, 2.0, 2.4, 2.9, 3.2, 3.5, 2.7, 2.7, 2.8, 2.6, 5.6. Find the mean and five-number summary and construct a boxplot to 	<p>4. What will we do if students don't learn?</p> <p>Group activities will allow peer-tutoring within the learning activities for solving probability rules.</p> <p>Warm-ups and/or quizzes will be used to give students and their teacher the opportunity to be sure each student understands each skill before moving to the next.</p> <p>If more than a handful of students fail the warm-up/ quiz, re-teaching will occur with more cooperative learning group activities to ensure that each student is accountable and has been provided assistance.</p> <p>Students can utilize online resources for additional help. These may include online tutoring with guided practice, along with assessments that can provide immediate feedback.</p> <p>5. What will we do if students already know it?</p> <p>Provide a minimum of independent practice</p>

<p>Students will learn to measure the center of data by finding the mean, median, and mode. They will be able to compute a z score and use the result to determine whether a given value x is unusual. They will be able to determine whether an outlier has a substantial effect on the mean, median and mode. [Common Core State Standards: Statistics - ID 3]</p> <p>Students will learn to measure variation in a set of sample data by finding values of the range, variance and standard deviation. [Common Core State Standards: Statistics - ID 4]</p>	<p>such as video lectures, animations, free-response tutorial exercises and assessments to improve their understanding and performance. Students will work in groups on cooperative group activities to involve them with active learning.</p> <p>Daily warm-ups and/or quizzes will be used to check for understanding and provide accountability for each student independent of their support group.</p> <p>Both formative and summative assessments will be written to check for student's ability to not only calculate various statistics, but more importantly to understand and interpret the calculated results. For example, when teaching the formula for standard deviation, it is more important for students to understand what standard deviation measures, not just to be able to reproduce the formula for standard deviation.</p>	<p>represent the sample data. Remove the outlier, recalculate the mean and five-number summary and comment on how the results have changed.</p> <p>3. In class, each student should record his or her pulse rate. Construct a frequency distribution and histogram for the pulse rates of males and construct another frequency distribution and histogram for the pulse rates of females. Compare the results. Is there an obvious difference?</p> <p>4. A statistics teacher finds that the times (in seconds) required to complete a quiz have a mean of 180 sec and a standard deviation of 30 sec. Is a time of 90 sec unusual? Why or why not?</p>	<p>problems, then move to the next topic.</p>
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Content Area Standards (Please identify the source)

<p>The students will demonstrate mastery of the following content standards:</p> <p>Common Core State Standards: Statistics - IC 1</p> <p>Common Core State Standards: Statistics - ID 1</p> <p>Common Core State Standards: Statistics - ID 2</p> <p>Common Core State Standards: Statistics - ID 3</p> <p>Common Core State Standards: Statistics - ID 4</p>
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EL DORADO UNION HIGH SCHOOL DISTRICT

EDUCATIONAL SERVICES

Department: Mathematics

Course Title: Probability & Statistics (#0234)

UNIT/STANDARD #: Unit #2 - Probability

LEARNING OUTCOME: Students will develop a sound understanding of probability values, because those values constitute the underlying foundation on which the methods of influential statistics are built.

LEARNING OUTCOME	INSTRUCTIONAL STRATEGIES	ASSESSMENTS	INTERVENTIONS
<p>1. What students will learn, know, and be able to do? (Must be aligned to state content standards.) Students will develop and understand probability values and the basic skills necessary to determine probability values. [Common Core State Standards: Statistics - CP 1]</p> <p>Students will develop an understanding of the addition rule of event A or event B occurring; or both. [Common Core State Standards: Statistics - CP 7]</p> <p>Students will use probability to evaluate outcomes of decisions. [Common Core State Standards: Statistics - MD 5]</p> <p>Students will describe events as subsets of a sample space using characteristics or the outcomes, or as unions, intersections, or complements. [Common Core State Standards: Statistics - CP 1]</p>	<p>2. Instructional strategies that will be used to engage students. Teachers will use direct instruction to model summarizing and interpreting independence and conditional probability, computing probabilities of compound events, and making decisions on expected values.</p> <p>Real-life applications will be used as examples to add meaning to student's everyday life.</p> <p>Teachers will use technology (TI Calculator) to model concepts so students can follow along.</p> <p>Cooperative learning groups will be used to provide students with guided practice opportunities, and to check for understanding. Within each group, the "experts" will share the responsibility with the teacher to ensure that each student in the group is building their skills appropriately.</p>	<p>3. How will we know that students have learned? Include both Formative (for learning) and Summative (of learning) assessment examples. Frequent checks for understanding will be used. These may take the form of a warm-up, homework activity, quiz, or performance assessment (formative), or chapter/unit test (summative). Examples: 1. A sample of applicants for a management position yields the following numbers with regard to age and experience. What is the probability that an applicant is less than 50 years old? Has more than 10 years experience? Is more than 50 years old and has five or fewer year's experience? 2. What must the probability of an accident being the cause of death be in order for this to be a legitimate probability? 3. What is the probability that a randomly chosen cause of death was not due to cardiovascular disease? 4. A single trial of some procedure is conducted and the resulting events are</p>	<p>4. What will we do if students don't learn? Group activities will allow peer-tutoring within the learning activities for solving probability rules.</p> <p>Warm-ups and/or quizzes will be used to give students and their teacher the opportunity to be sure each student understands each skill before moving to the next.</p> <p>If more than a handful of students fail the warm-up/ quiz, re-teaching will occur with more cooperative learning group activities to ensure that each student is accountable and has been provided assistance.</p> <p>Students can utilize online resources for additional help. These may include online tutoring with guided practice, along with assessments that can provide immediate feedback.</p> <p>5. What will we do if students already know it?</p>

<p>Students use fundamental counting principles to compute combinations and permutations. [Common Core State Standards: Statistics - CP 9]</p> <p>Students will demonstrate that they know the probability rules and be able to apply them to determine probabilities of defined events. [Common Core State Standards: Statistics - CP 6-7]</p> <p>Students will use the multiplication rule to find the joint probability of two events and use the definition of conditional probability to find these probability events. [Common Core State Standards: Statistics - CP 8]</p>	<p>Warm-ups and/or quizzes will be used to check for understanding and provide accountability for each student independent of their support group.</p> <p>System Response Questions will be used to help with quick review and quick check for understanding.</p> <p>Access to online materials such as videos, lectures, power points, worksheets, and examples will help with understanding.</p>	<p>analyzed. Describe what it means for two events in a single trial to be disjoint.</p>	<p>Provide a minimum of independent practice problems, then move to the next topic.</p>
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Content Area Standards (Please identify the source)

<p>The students will demonstrate mastery of the following content standards:</p> <p>Common Core State Standards: Statistics - CP 1</p> <p>Common Core State Standards: Statistics - CP 6</p> <p>Common Core State Standards: Statistics - CP 7</p> <p>Common Core State Standards: Statistics - CP 8</p> <p>Common Core State Standards: Statistics - CP 9</p> <p>Common Core State Standards: Statistics - MD 5</p>
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EL DORADO UNION HIGH SCHOOL DISTRICT

EDUCATIONAL SERVICES

Department: Mathematics

Course Title: Probability & Statistics (#0234)

UNIT/STANDARD #: Unit #3 - Inference

LEARNING OUTCOME: Students will develop an understanding of inferential statistics. Students will be able to use sample data to estimate values of population parameters and to test a hypothesis or claim made about the population parameter.

LEARNING OUTCOME	INSTRUCTIONAL STRATEGIES	ASSESSMENTS	INTERVENTIONS
<p>1. What students will learn, know, and be able to do? (Must be aligned to state content standards.)</p> <p>Students will be able to find the margin of error of a statistic and create confidence intervals for various confidence levels. [Common Core State Standards: Statistics - IC 1, IC 4]</p> <p>Students will understand the concept of margin of error and statistical significance to draw conclusions from data. [Common Core State Standards: Statistics - IC 6, IC4]</p> <p>Students will conduct and analyze tests of significance. Students will identify the null and alternative hypothesis of an experiment, determine if a test is one-sided or two sided, check if conditions are met, calculate the appropriate test statistic and use this information to conduct one sample mean and proportion significance tests. [Common Core State Standards: Statistics - IC 4, IC 6]</p>	<p>2. Instructional strategies that will be used to engage students.</p> <p>Real-life applications will be used as examples to add meaning to student's everyday life.</p> <p>Teachers will use technology (TI Calculator) to model concepts so students can follow along.</p> <p>Cooperative learning groups will be used to provide students with guided practice opportunities, and to check for understanding. Within each group, the "experts" will share the responsibility with the teacher to ensure that each student in the group is building their skills appropriately.</p> <p>Warm-ups and/or quizzes will be used to check for understanding and provide accountability for each student independent of their support group.</p> <p>System Response Questions will be used</p>	<p>3. How will we know that students have learned? Include both Formative (for learning) and Summative (of learning) assessment examples.</p> <p>Frequent checks for understanding will be used. These may take the form of a warmup, homework activity, quiz, or performance assessment (formative), or chapter/unit test (summative).</p> <p>Examples:</p> <ol style="list-style-type: none"> 1. A study of career paths of hotel general managers sent questionnaires to an SRS of 160 hotels belonging to major U.S. hotel chains. There were 114 responses. The average time they had spent with a company was 11.78 years with a standard deviation of 3.2 years. <ol style="list-style-type: none"> a. Give a 90% confidence interval. b. Give a 95% confidence interval c. Give a 99% confidence interval d. How do the margins of error change as the confidence level increases? 2. You are thinking about opening a restaurant and are searching for a good location. From research you have done, 	<p>4. What will we do if students don't learn?</p> <p>Group activities will allow peer-tutoring within the learning activities for solving probability rules.</p> <p>Warm-ups and/or quizzes will be used to give students and their teacher the opportunity to be sure each student understands each skill before moving to the next.</p> <p>If more than a handful of students fail the warm-up/ quiz, re-teaching will occur with more cooperative learning group activities to ensure that each student is accountable and has been provided assistance.</p> <p>Students can utilize online resources for additional help. These may include online tutoring with guided practice, along with assessments that can provide immediate feedback.</p> <p>5. What will we do if students already know it?</p>

	<p>to help with quick review and quick check for understanding.</p> <p>Access to online materials such as videos, lectures, power points, worksheets, and examples will help with understanding.</p>	<p>you know that the mean income of those living near the restaurant must be over \$45,000 to support the type of upscale restaurant you wish to open. You decide to take a simple random sample of 50 people living near one potential location. Based on the mean income of this sample, you will decide whether to open a restaurant here. A number of similar studies have shown that the standard deviation is \$5000.</p> <p>a. Describe the two types of errors that you might make. Identify which is a Type I error and which is a Type II error.</p> <p>b. Which of the two types of error is more serious? Explain.</p> <p>c. State the null and alternative hypotheses.</p> <p>d. If you had to choose one of the standard significance levels for your significance test, would you choose 0.01, 0.05, or 0.10? Justify your choice.</p> <p>e. Based on your choice in part (d), how high will the sample mean need to be before you decide to open a restaurant in that area?</p> <p>3. The one-sample t statistic for testing $H_0 : \mu = 0$ $H_a : \mu > 0$ from a sample of $n = 15$ observations has the value $t = 1.82$.</p> <p>a. What are the degrees of freedom for this statistic?</p> <p>b. Give the two critical values t^* from the t table that bracket t. What are the right-tail probabilities for these two entries?</p> <p>c. Between what two values does the P-value of the test fall?</p> <p>d. Is the value $t = 1.82$ significant at the 5% level? At the 1% level?</p>	<p>Provide a minimum of independent practice problems, then move to the next topic.</p>
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Content Area Standards (Please identify the source)

The students will demonstrate mastery of the following content standards:

Common Core State Standards: Statistics - IC 1

Common Core State Standards: Statistics - IC 4

Common Core State Standards: Statistics - IC 6

EL DORADO UNION HIGH SCHOOL DISTRICT

EDUCATIONAL SERVICES

Department: Mathematics

Course Title: Probability and Statistics #234

UNIT/STANDARD #: Unit #4 - Correlation and Regression

LEARNING OUTCOME: Students will be able to graph two variables that are related linearly. They will be able to calculate the line of best fit and interpret its meaning.

LEARNING OUTCOME	INSTRUCTIONAL STRATEGIES	ASSESSMENTS	INTERVENTIONS												
<p>1. What students will learn, know, and be able to do? (Must be aligned to state content standards.)</p> <p>Students will be able to graph two quantitative variables on a scatterplot and determine if a relationship exists. [Common Core State Standards: Statistics - ID 6]</p> <p>Students will be able to calculate a least squares regression line using technology and determine its appropriateness by examining a residual plot. [Common Core State Standards: Statistics - ID 6]</p> <p>Students will be able to use the least squares regression line to solve problems. [Common Core State Standards: Statistics - ID 6]</p> <p>Students will be able to interpret the slope, y-intercept and correlation coefficient in the context of the data for a regression setting. [Common Core State Standards: Statistics - ID 7, ID 8]</p>	<p>2. Instructional strategies that will be used to engage students.</p> <p>Teacher-led instruction on the construction of scatterplots.</p> <p>Teacher-led discussion on the relationship that may exist between two quantitative variables. Through the use of different examples, students discuss if the two given variables are positively associated, negatively associated or not associated.</p> <p>Students will collect their own data or examine real data sets that have meaningful linear relationships.</p> <p>Teachers will model the use of technology through the TI simulator to display the appropriate steps in calculating the least squares regression line.</p> <p>Students will practice their skills through the use of various resources such as problem sets from the textbook, as well as online tools that provide additional tutoring and assessments.</p> <p>Students will work in cooperative learning groups on a culminating activity that demonstrates their understanding of correlation and regression.</p>	<p>3. How will we know that students have learned? Include both Formative (for learning) and Summative (of learning) assessment examples.</p> <p>Frequent checks for understanding will be used. These may take the form of a warmup, homework activity, quiz, or performance assessment (formative), or chapter/unit test (summative).</p> <p>Examples:</p> <p>1. The values below list the body temperatures (in Fahrenheit) of subjects measured at 8:00 a.m. and later at midnight.</p> <table border="0"> <tr> <td>8:00 am</td> <td>98.2</td> <td>97.7</td> <td>97.3</td> <td>97.5</td> <td>97.1</td> </tr> <tr> <td>Midnight</td> <td>97.4</td> <td>99.4</td> <td>98.4</td> <td>98.6</td> <td>98.4</td> </tr> </table> <p>a. Construct a scatterplot. What does the scatterplot suggest about a linear correlation between these two variables?</p> <p>b. Find the value of the linear correlation coefficient and interpret its value.</p> <p>c. Calculate the regression equation.</p> <p>d. Interpret the value of the slope and y-intercept within the given context.</p> <p>e. Based on the given data, what is the</p>	8:00 am	98.2	97.7	97.3	97.5	97.1	Midnight	97.4	99.4	98.4	98.6	98.4	<p>4. What will we do if students don't learn?</p> <p>Group activities will allow peer-tutoring within the learning activities for solving probability rules.</p> <p>Warm-ups and/or quizzes will be used to give students and their teacher the opportunity to be sure each student understands each skill before moving to the next.</p> <p>If more than a handful of students fail the warm-up/ quiz, re-teaching will occur with more cooperative learning group activities to ensure that each student is accountable and has been provided assistance.</p> <p>Students can utilize online resources for additional help. These may include online tutoring with guided practice, along with assessments that can provide immediate feedback.</p> <p>5. What will we do if students already know it?</p>
8:00 am	98.2	97.7	97.3	97.5	97.1										
Midnight	97.4	99.4	98.4	98.6	98.4										

	Students will be given assessments such as a daily quiz or a warm-up to check for understanding.	best predicted midnight body temperature of someone with a body temperature of 98.3 measured at 8:00 am?	Provide a minimum of independent practice problems, then move to the next topic.
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Content Area Standards (Please identify the source)

The students will demonstrate mastery of the following content standards:

Common Core State Standards: Statistics - ID 6

Common Core State Standards: Statistics - ID 7

Common Core State Standards: Statistics - ID 8