

Course Outline
American River College
Los Rios Community College District

Section 1: Curriculum Cycle Information

Course:	STAT 305: Statway, Part II
Proposal Type:	New to District
Faculty Initiator:	Andrew Halseth
Outline Status:	DCCC
Last Full Review:	
Last Curriculum Action:	Oct 28, 2010
Official:	No

Section 2: Submission Information

Proposal:	<i>To add a course to the ARC catalog that is not currently offered by any Los Rios college.</i>
Explanation:	Statway is a year-long integrated course developed by The Carnegie Foundation in collaboration with 19 community colleges throughout the country. American River College has received a grant from The Carnegie Foundation to participate in this collaboration. The purpose of Statway is to provide an alternative for our basic skills, non-STEM (Science, Technology, Engineering, and Mathematics) students to achieve their goal of successfully completing a college-level statistics course.

Section 3: Basic Course Information

Identifier:	STAT 305
Title:	Statway, Part II
Units:	6.00
Prerequisite:	STAT 304 (<i>Statway, Part I</i>) with a grade of "C" or better
Advisory:	ENGRD 116 (<i>Proficient Reading</i>) or ESLR 320 (<i>Advanced-Low Reading</i>)
Hours:	108 hours lecture
Description:	This is the second semester of a two-semester course that introduces the concepts of probability and statistics with requisite arithmetic and algebraic topics integrated throughout. It is structured to serve students planning to transfer and continue studies in humanities or social sciences. Statistics topics emphasize data analysis and include basic concepts of probability; confidence intervals; hypothesis tests for means, proportions, and variance; chi-squared tests; and ANOVA (Analysis of Variance). Algebra topics include proportional relationships (including variation) with applications, expressions, linear equations and systems with applications, functions, quadratic and exponential equations, and linear and exponential/logarithmic models. Learning strategies for success with an emphasis on study

skills, resource acquisition, and maintaining a positive perspective towards learning are also discussed and applied. Both parts of Statway must be completed with a grade of "C" or better to receive credit for a transfer-level statistics course.

[Courses embedded in catalog description: None.]

Section 4: Learning Outcomes and Objectives

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

- demonstrate the use of appropriate statistical evidence to reason about population characteristics and experimental treatment effects.
- choose the appropriate statistical methods for a given situation based on the goal of the analysis and the data available.
- calculate and interpret probabilities.
- estimate probabilities (including conditional probabilities) empirically and using simulation.
- analyze both discrete and continuous probability distributions, including binomial probability and normal distribution, by examining and interpreting areas under the graph of a histogram or a normal curve.
- create and interpret confidence interval estimates for population parameters based on appropriate probability models.
- choose the appropriate hypothesis test, perform the necessary computations and comparisons for the test, and explain the conclusion of the test.
- apply the concept of numeracy to investigate and describe quantitative relationships and solve problems in a variety of contexts.
- make conjectures about the behavior of a function in a given context.
- investigate graphically and numerically the effect of changing a parameter within a model.
- apply learning strategies to achieve success in mathematics.

Section 5: Course Topics

The topics for this course are typically allocated as follows:

Lec Topic

- 10 Introduction to probability:
Fundamentals of probability
Laws of probability
Conditional probability
Probability through simulations
Counting methods
- 2 Developmental mathematics integration:
Using fractions, decimals, and percents
Rounding
Scientific notation
- 10 Formalizing probability and probability distributions:
Discrete and continuous probability distributions
Normal distributions
- 8 Developmental mathematics integration:
Application and analysis of functions

- 10 Linking probability to statistical inference:
 - Sampling distributions
 - Introduction to statistical inference
- 8 Inference for one proportion:
 - Large-sample confidence interval for a population proportion
 - One-sample Z-test for a population proportion
- 2 Developmental mathematics integration:
 - Comparing and ordering signed rational numbers
 - Interval notation
- 8 Inference for two proportions:
 - Confidence interval for the difference in two population proportions
 - Two-sample Z-test for the difference in two population proportions
- 2 Developmental mathematics integration:
 - Using and interpreting inequalities
- 8 Inference for one mean:
 - One-sample confidence interval for a population mean
 - One-sample T-test for a population mean
- 8 Inference for two means:
 - Two-sample confidence interval for the difference in two population means
 - Two-sample T-test for the difference in two population means
 - Paired T-test
- 8 Inference for variance and standard deviation:
 - Confidence interval for variance and standard deviation
 - One-sample chi-square test for variance and standard deviation
- 8 Chi-square tests:
 - Chi-square goodness-of-fit test
 - Chi-square tests for independence and for homogeneity of population proportions
- 6 ANOVA:
 - One-way analysis of variance test
- 8 Learning strategies for success:
 - Problem solving
 - Study habits
 - Time management
 - Relaxation techniques
 - Resource acquisition
- 2 Final exam

108 Total Hours

Section 6: Instructional Delivery Modalities

This course may be taught using the following instructional delivery modalities:

- In-Person

Section 7: Instruction Methods and In-class Activities

Lecture, class discussion, and class activities (collaborative or individual) with a focus on discovery and problem-solving.

Section 8: Typical Homework Assignments

Example #1:

You are a travel agent and wish to estimate, with 98% confidence, the proportion of vacationers who use an online service or the Internet to make travel reservations. Your estimate must be accurate within 4% of the population proportion.

- No preliminary estimate is available. Find the minimum sample size needed.
- Find the minimum sample size needed, using a prior study that found that 30% of the respondents said they used an online service or the Internet to make travel arrangements.
- Compare the results from parts (a) and (b).

Example #2:

A random sample of 85 eighth grade students has a mean score of 282 with a standard deviation of 35 on a national mathematics assessment test. This test result prompts a state school administrator to declare that the mean score for the state's eighth graders on the examination is more than 275. At a level of significance of 0.04, is there enough evidence to support the administrator's claim?

Section 9: Evaluation and Assessment Methods

Exams, quizzes, group activities, class discussion, homework, and a comprehensive final exam.

Section 10: Representative List of Textbooks

- The Carnegie Foundation (2010). *Open source materials*.
- Larson, R., and Farber, B. (2009). *Elementary Statistics: Picturing the World* (4th ed.). Upper Saddle River, NJ: Prentice Hall. [ISBN: 978-0-132-42433-2]
- Triola, M. (2010). *Elementary Statistics* (11th ed.). Boston, MA: Pearson/Addison Wesley. [ISBN: 978-0-321-564962]
- Martin-Gay, E. (2008). *Beginning & Intermediate Algebra* (4th ed.). Upper Saddle River, NJ: Prentice Hall. [ISBN: 978-0-136-007319]

Supplementary Requirements: A calculator with two-variable statistics capabilities is required.

Section 11: Additional Course Information

Faculty Discipline(s):	Mathematics
Short Title for Transcripts:	Statway, Part II
Type of Grading:	Letter Grade
Times Taken for Credit:	This course may be taken 1 time for credit.

Cross-listed Courses:	None.
Taxonomy of Programs (TOP) Code:	1701.00 (<i>Mathematics, General</i>)
Student Accountability Model (SAM) Code:	E (<i>Non-occupational</i>)

Section 12: Prerequisite Justification

Prerequisite: *STAT 304 with a grade of "C" or better*

Justification:

STAT 304: Statway, Part I

The following STAT 304 prerequisite skills are needed in order to be successful in the course:

- describe the data analysis process and the characteristics of a well-designed study.
 - develop and apply the concept of numeracy to investigate and describe quantitative relationships and solve problems in a variety of contexts.
 - solve problems that require the use of ratios, rates, proportions, and scaling.
 - express real-world and quantitative situations with equations, inequalities, expressions, tables, verbal descriptions, symbols, and graphs.
 - solve equations, systems of equations, and inequalities and explain how results relate to the original context.
 - apply functions as a way of modeling a correspondence between two variables in linear, quadratic, exponential, and logarithmic situations.
 - solve problems involving exponential growth and decay in formulas, graphs, tables, and applications.
 - apply learning strategies to achieve success in mathematics.
 - organize and display data using appropriate tables and graphs.
 - summarize a given data set using appropriate numerical summaries.
 - recognize different representations of the same data distribution (for example, dotplots, boxplots, and histograms) and describe how numerical summaries are related to characteristics of the data distribution.
 - make meaningful and appropriate comparisons of distributions of data collected from two or more different groups.
 - analyze bivariate data for linear trends using the least-squares regression model and the correlation coefficient.
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Section 13: Advisory Justification

Advisory: *ENGRD 116 or ESLR 320*

Justification:

ENGRD 116: Proficient Reading

The following ENGRD 116 advisory skills are recommended in order to be successful in the course:

- Analyze words contextually and structurally
- Infer authors' tone by identifying connotation, denotation, and figurative language
- Integrate words and their meanings into various readings
- Apply Survey, Question, Read, Recite, and Review (SQ3R) to textbook selections
- Apply appropriate annotations, notetaking, and mnemonic techniques

- Critically analyze an author's purpose, tone, bias, and point of view

ESLR 320: Advanced-Low Reading

The following ESLR 320 advisory skills are recommended in order to be successful in the course:

- examine long, complex reading passages.
- appraise and critique reading passages for bias.
- make inferences.
- recognize a wide variety of academic and idiomatic vocabulary.
- outline, paraphrase, and summarize passages from a range of texts.
- adapt reading speed and style to material.

Section 14: Relationship to College Programs

Need/Purpose for the Course: Statway is focused on statistics, data analysis and quantitative reasoning. These mathematics skills are essential for a growing number of occupations and professions, and are those needed for making decisions under conditions of uncertainty, an inescapable condition of modern life. This is the math that will help students understand the world around them and it is the math they can use right now. The year-long pathway experience will concentrate on statistical content with requisite arithmetic and algebraic concepts taught and applied in the context of statistics. Statway is structured especially to serve students planning to transfer and continue further studies in humanities or social sciences. Students who have unexpected success in quantitative courses, particularly when their experiences of mathematics has been difficult before, may become emboldened and may decide to take more mathematics.

Associate Degree Competency: Mathematics Competency (*Requested: Sep 18, 2010*)

Associate Degree GE Pattern: II(b). Languages and Rationality: Communication and Analytical Thinking (*Pending:*)

Degrees and Certificates: None.

Prerequisite To: None.

Corequisite To: None.

Advisory To: None.

Section 15: Relationship to Transfer Institutions

CSU Transfer: *Requested: Sep 18, 2010*

UC Transfer: *Pending: "will submit summer 2011"*

CSU General Education: Area B4: Mathematics/Quantitative Reasoning (*Pending:*)

IGETC:	Area 2: Mathematical Concepts and Quantitative Reasoning (<i>Requested: Sep 18, 2010</i>)
TCSU:	STAT 110 (<i>Requested: Sep 18, 2010</i>)

Section 16: Feasibility

Department Planning:	The Mathematics Department is committed to developing programs and courses to better serve our basic skills students. This course provides a new and challenging alternative for students to complete a transfer-level statistics course.
American River College Impact:	The course is being offered through a grant from The Carnegie Foundation. This grant will allow the course to be offered in Spring 2012. After that, this course will replace some sections of STAT 300, as well as some algebra courses.
Los Rios Impact:	Since this course will only be offered at American River College, there is no impact to other colleges in the district.
Staffing:	No additional support staff is needed to implement this course.
Facilities:	This course does not impact college facilities and/or classrooms.
Equipment and Supplies:	No new equipment or supplies are needed to implement this course.
Essential Library or Media Materials:	None.
Supplementary Library or Media Materials:	None.

Section 17: Digital Signatures

Faculty Initiator:	Andrew Halseth										
Department/Subject:	STAT										
Department Vote:	<table> <tr> <td><i>Yes:</i></td> <td>21</td> </tr> <tr> <td><i>No:</i></td> <td>3</td> </tr> <tr> <td><i>Abstain:</i></td> <td>0</td> </tr> <tr> <td colspan="2"><hr/></td> </tr> <tr> <td><i>Total:</i></td> <td>24</td> </tr> </table>	<i>Yes:</i>	21	<i>No:</i>	3	<i>Abstain:</i>	0	<hr/>		<i>Total:</i>	24
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<i>Total:</i>	24										
Department Chair/ Designated Contact:	"By paper ballot" --Anthony Barcellos (Signed: Oct 08, 2010)										
Librarian:	Kathy Champion (Signed: Oct 19, 2010)										
Division Dean:	"The completion of the second semester is essential in order to receive credit for the transfer level statistics as well as the completion of the algebra sequence." --Nancy Reitz (Signed: Oct 14, 2010)										
CRC Contact:	Michael Yarbrough (Unsigned) <i>Requested: Oct 04, 2010</i>										
FLC Contact:	Dean Pietromonaco (Signed: Oct 28, 2010)										

SCC Contact: Jesus Martinez (**Unsigned**) Requested: Oct 04, 2010