Course Outline
American River College
Los Rios Community College District

Section 1: Curriculum Cycle Information

Course:	STAT 304: Statway, Part I
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: *To add a course to the ARC catalog that is **not** currently offered by any Los Rios college.*

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 304

Title: Statway, Part I

Units: 6.00

Prerequisite: MATH 32 (*Pre-Algebra*) or 39 (*Pre-Algebra - Part II*) with a grade of "C" or better; and placement through a required assessment process.

Advisory: ENGRD 116 (*Proficient Reading*) or ESLR 320 (*Advanced-Low Reading*)

Hours: 108 hours lecture

Description: This is the first 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 methods for collecting data, graphical and numerical descriptive statistics, correlation, and simple linear regression. 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:

- describe the data analysis process and the characteristics of a well-designed study.
- 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.
- 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.

Section 5: Course Topics

The topics for this course are typically allocated as follows:

Lec	Topic
10	Statistical studies and overview of data analysis: Data analysis process Types of statistical studies Sampling techniques Experimental design
6	Developmental mathematics integration: Basic operations and properties of real numbers Comparing and ordering fractions, decimals, and percents
10	Summarizing data graphically and numerically: Graphical displays - bar charts, dotplots, histograms, and boxplots Numerical measures of center and variability Comparing distributions graphically and numerically
6	Developmental mathematics integration: Estimating and rounding

Using absolute and relative difference
Comparing and ordering signed rational numbers
Interpreting units and using units to compare

8 Developmental mathematics integration:
Simplifying expressions
Solving equations and inequalities
Formulas, ratios, and proportions

10 Reasoning about bivariate data:
Scatterplots
Correlation
Simple linear regression

8 Developmental mathematics integration:
Linear equations and functions
Interpreting slope and intercepts
Using and interpreting inequalities

8 Developmental mathematics integration:
Modeling with linear functions
Finding equations of linear models
Function notation and making predictions
Rate of change

10 Exponential growth and decay:
Modeling with exponential functions
Logarithmic functions

8 Developmental mathematics integration:
Properties of exponents
Scientific notation

8 Developmental mathematics integration:
Modeling with quadratic functions
Solving quadratic equations

6 Reasoning about bivariate categorical data:
Two-way tables; joint and marginal relative frequencies

8 Learning strategies for success:
Problem solving
Study habits
Time management
Relaxation techniques
Resource acquisition

2 Final exam

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108 Total Hours

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ection 6: Instructional Delivery Modalities

his 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 developing a new cereal for children. You want your cereal to rate above average on the Consumer Rating scale so that the cereal appeals to parents, but you also want the cereal to taste good to children. The average rating for the 77 cereals on the attached scatterplot handout is about 43. From marketing research we know that in blind taste tests, the children prefer cereals that are not good for them. They like cereals high in sugar, low in protein and fiber, with lots of salt.
(1) Which two ingredients do you think are most influential in determining the Consumer Report ratings? Which two ingredients do not seem to be influential? Use the data to support your choices. Write a short explanation of how you used the data.
(2) For the two ingredients that you chose as most important, how much of each will you use in your cereal recipe? Describe how you thought through the decision.

Example #2:
The number of unruly passengers per year has decreased approximately linearly from 279 passengers in 2003 to 141 passengers in 2007. Let n be the number of unruly passengers in the year that is t years since 2000. Find a linear function that models the data.

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.

ection 11: Additional Course Information

Faculty Discipline(s):	Mathematics
Short Title for Transcripts:	Statway, Part I

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 *(Mathematics, General)*
Student Accountability Model (SAM) Code:	E *(Non-occupational)*

Section 12: Prerequisite Justification

Prerequisite: *MATH 32 or 39 with a grade of "C" or better; and placement through a required assessment process.*

Justification:

MATH 32: Pre-Algebra

The following MATH 32 prerequisite skills are needed in order to be successful in the course:

- evaluate expressions that contain addition, subtraction, multiplication, and division of whole numbers, fractions,
- decimals, signed numbers, and variables.
- simplify expressions that contain variables.
- evaluate expressions using order of operation laws.
- solve equations.
- simplify and evaluate exponential and square root expressions.
- demonstrate problem-solving techniques of applications using ratio and proportions.
- solve elementary word problems using algebraic techniques.
- calculate area, perimeter, and volume of geometric figures.

MATH 39: Pre-Algebra - Part II

The following MATH 39 prerequisite skills are needed in order to be successful in the course:

- solve numerical and applied percent problems.
- solve first-degree equations, including those with signed numbers, fractions, and/or decimals.
- solve elementary word problems using algebraic techniques, including the use of proportional reasoning.
- add, subtract, and multiply polynomials.
- graph points and lines on a coordinate plane.
- calculate perimeter, area, and volume of geometric figures.

"and placement through a required assessment process."

Other Justification:

The Carnegie Foundation would like to see a common placement tool used among all participating colleges.

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 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: STAT 305

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 *(Requested: Sep 18, 2010)*
TCSU:	STAT 110 *(Requested: Sep 18, 2010)*

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:	This course is being offered through a grant from The Carnegie Foundation. This grant will allow the course to be offered in Fall 2011. 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:

Yes:	21
No:	3
Abstain:	0

Total: 24

Department Chair/ Designated Contact:	"By paper ballot" --Anthony Barcellos (**Signed:** Oct 08, 2010)
Librarian:	Kathy Champion (**Signed:** Oct 19, 2010)
Division Dean:	"The principle behind this 2 semester course sequence is to help students to see the relevance of algebra by integrating its use with the principles of statistics. The pedagogical approach is very interactive with an emphasis on thinking skills rather than repetitive problem solving. " --Nancy Reitz (**Signed:** Oct 14, 2010)
CRC Contact:	Michael Yarbrough (**Unsigned**) *Requested: Oct 04, 2010*
FLC Contact:	Dean Pietromonaco (**Signed:** Oct 28, 2010)
SCC Contact:	Jesus Martinez (**Unsigned**) *Requested: Oct 04, 2010*