

## Crafton Hills College Course Outline

**1. Discipline:** Mathematics

**2. Department:** Mathematics

**3. Course Title:** Pre-statistics

**4. Course I.D.:** MATH 085

**5. Prerequisite(s):** None

**Corequisite(s):** None

**Departmental Recommendation(s):** None

**6. Semester Units:** 4 – 6

**7. Minimum Semester Hours:**

| Method          | In-Class Min | In-Class Max | Out-of-Class Min | Out-of-Class Max |
|-----------------|--------------|--------------|------------------|------------------|
| Lecture         | 64.00        | 96.00        | 128.00           | 192.00           |
| Lab             |              |              |                  |                  |
| Activity        |              |              |                  |                  |
| Clinical        |              |              |                  |                  |
| Field           |              |              |                  |                  |
| Work Experience |              |              |                  |                  |
| Independent     |              |              |                  |                  |
| <b>Total</b>    | <b>64.00</b> | <b>96.00</b> | <b>128.00</b>    | <b>192.00</b>    |

**8. Need for the Course:**

Statewide data regarding throughput rates to transfer level courses indicate system wide failure in traditional pathways. California Community Colleges developed alternative pathways in response to this problem. Data consistently demonstrates increases in success and throughput rates for the non-STEM students. The CSU and UC systems currently accept these pathways as meeting prerequisites for transfer level statistics courses.

**9. Goals for the Course:**

This course is designed to give non-STEM majors the mathematical background needed to be successful in a transfer level statistics course. Students completing the course will have met the prerequisite for MATH 110. Shortening the number of courses needed to meet the prerequisite for math 110 has been shown by statewide data to significantly increase the percent of students completing transfer level mathematics, and to lessen the equity gap for students. Successful implementation of this course will help Crafton Hills College to achieve higher rates of students

completing transfer level mathematics courses and lessen the equity gap.

**10. Catalog Description:**

This an intensive course which introduces core concepts from arithmetic, prealgebra, elementary and intermediate algebra, and descriptive statistics that prepares students for transfer-level statistics. Topics include numerical information, evaluating expressions relating to statistical formulas, graphical and numerical descriptive statistics for quantitative and categorical data, including two-way tables and linear regression, and an introduction to the normal distribution.

**11. Schedule Description:**

An intensive course which introduces core concepts from arithmetic, prealgebra, elementary and intermediate algebra, and descriptive statistics that prepares students for transfer-level statistics.

**12. Entrance Skills:**

**A. Requisite Skills:** None

**B. Recommended Skills:**  
None

**13. Student Learning Outcomes:**

**Upon satisfactory completion of the course, students will be able to:**

1. Construct, mathematical models to represent relationships in quantitative data at the prestatistics level
2. Evaluate, mathematical models to represent relationships in quantitative data at the level appropriate prestatistics
3. Analyze mathematical models to represent relationships in quantitative data appropriate to the prestatistics level
4. Use the properties of algebra to simplify expressions, solve equations, and answer questions in context.
5. Formulate questions that can be addressed with data, then organize, display, and analyze relevant data to answer these questions and communicate results at the prestatistics level.
6. Demonstrate numerical, algebraic, or geometric reasoning skills to support statistical analysis at the prestatistics level as appropriate to the question being investigated.

**14. Course Objectives:**

**Upon satisfactory completion of the course, students will be able to:**

1. Evaluate, apply, and simplify algebraic expressions.
2. Use linear expressions, equations, and inequalities in application problems.
3. Use ratios and proportions to solve applied problems.
4. Produce data through random sampling and analyze the data collected.
5. Analyze real data sets by finding measures of central tendency, position, and spread, including standard deviation, and by constructing various charts and graphs at the prestatistics level.
6. Use data to calculate and analyze the slope, y-intercept, and equation of a line in two variables and construct a graph of the linear equation and regression line.
7. Apply linear, quadratic, exponential, logarithmic, and other functions for regression analysis to solve application problems.
8. Solve and analyze basic probability problems using ratios, proportions, two-way tables, and percentages.

**15. Representative Texts and Instructional Materials:**

Lehmann, J. (2015). *A Pathway to Introductory Statistics (1/e)*. Upper Saddle River, NJ: Pearson.

Bluman, A. (2013). *Elementary Statistics: A Step by Step Approach (6/e/e)*. New York, NY: McGraw Hill.

Sullivan, Michael (2013). *Statistics: Informed Decisions Using Data (4/e/e)*. Boston, MA: Pearson.

## 16. Course Content:

- A. Formulas and algebraic expressions
  - 1. Evaluating formulas using real numbers and the order of operations
  - 2. Using formulas in applied problems
  - 3. Simplifying algebraic expressions
- B. Linear equations and inequalities in one variable
  - 1. Addition and multiplication properties of equality with application problems
  - 2. Solving general linear equations with applications
  - 3. Using formulas to solve application problems
  - 4. Solving problems and applications involving ratios and proportions
- C. Analyzing and producing data
  - 1. Comparing samples and producing data
  - 2. Distinguishing between observations and experiments
  - 3. Using principles of responsible survey and experimental design
  - 4. Comparing and analyzing the purpose of randomization and random sampling
  - 5. Comparing, contrasting, and using random samples and other sampling designs
  - 6. Lurking (confounding) variables and cautions about sample surveys, experimentation, and population claims
  - 7. Comparing and determining correlation vs. causation
- D. Sample statistics and graphs
  - 1. Finding and interpreting measures of center: mean and median
  - 2. Finding and interpreting measures of position: quartiles, percentages, and box plots
  - 3. Finding and interpreting measures of spread: range, interquartile, and standard deviation
  - 4. Determining appropriate use of sample statistics
  - 5. Constructing and reading bar graphs
  - 6. Analyzing real data using the above statistics
- E. Linear equations and inequalities in two variables
  - 1. Using the rectangular coordinate system
  - 2. Plotting ordered pairs
  - 3. Graphing linear equations
  - 4. Determining slopes of linear equations and average rate-of-change
  - 5. Finding the equation of a line
  - 6. Constructing and analyzing scatterplots
  - 7. Finding linear correlation and interpreting its meaning
  - 8. Finding a regression line
- F. Working with functions
  - 1. Defining relations, functions, and function notation
  - 2. Working with linear and quadratic functions and their applications
  - 3. Graphing various functions
  - 4. Defining and working with composite and inverse functions
  - 5. Defining and working with exponents, scientific notation, and exponential functions with applications
  - 6. Finding and working with logarithms and logarithmic functions with applications
  - 7. Solving exponential and logarithmic equations in applications
  - 8. Working with direct and indirect variation
- G. Introducing probability
  - 1. Constructing and interpreting two-way tables
  - 2. Determining basic probability (marginal, conditional, and joint probabilities) with applications

## 17. Methods of Instruction:

- A. Lecture
- B. Lab
- C. Demonstration
- D. Audio Visual Presentations

- E. Collaborative Group Work
- F. Computer-aided Instruction
- G. Feedback and Critique
- H. Class Activities
- I. Class Discussions
- J. Other: Active learning approaches are encouraged when engaging students in this course, such as interactive, student-centered, and cooperative and experiential learning.

### **18. Assignments and Methods of Evaluation:**

Students will be required to do homework assignments of two hours homework per hour of lecture. Students will be directed to show their work and write using proper mathematical and statistical notation and vocabulary. Homework will consist of problems chosen from the required materials, textbook, or computer software. Students may also be asked to complete computer assignments, software enhanced assignments, quizzes or projects, participate in in-class demonstrations, or other classroom activities. At least three examinations in addition to a comprehensive in class final exam must be given. Not all exams may be assigned as take home examinations.

1. Comprehensive final exam 25%-40%
2. Tests and quizzes 30%-70%
3. Homework 0%-15%
4. Projects and other activities 5%-15%

### **19. Course Enrollment: 35**

3164