San Bernardino Valley College
Curriculum Approved: SP01

I. **CATALOG DESCRIPTION:**

A. Division: Science an Math
Department: Mathematics
Course ID: MATH 108
Course Title: Introduction to Probability and Statistics
Units: 4
Lecture: 4 hours
Prerequisite: MATH 095 or eligibility for MATH 102 as determined through the SBVC assessment process.

B. Course Description:
An introductory course to probability, descriptive and inferential statistics, with applications to the natural sciences, business, economics, and the behavioral sciences.

Schedule Description:
An introductory course to probability, descriptive and inferential statistics, with applications to the natural sciences, business, economics, and the behavioral sciences.

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: One

III. EXPECTED OUTCOMES FOR STUDENTS

Upon successful completion of the course, the student should be able to:

A. Recognize the proper use and statistics and distinguish it from the abuse
B. Describe and summarize data of samples and populations
C. Apply proper rules of probability
D. Compare and contrast different kinds of probability distributions, including the binomial, the uniform and the normal, and select the correct distribution in applications.
E. Run various tests of hypotheses on various types of sample statistics
F. Apply techniques of linear correlation and regression to sample sets
G. Be familiar with applications from business, psychology, sociology and other disciplines.

IV. CONTENT:

A. Introduction to Statistics
    1. Uses and abuses
    2. Nature of data
    3. Samples vs. populations
B. Descriptive Statistics
    1. Summarizing, graphing and presenting data
    2. Evaluating various measures on data sets including means, variances, measures of placement, etc.
C. Probability
    1. Fundamentals
    2. Addition and multiplication rules
    3. Counting techniques
D. Probability distributions
    1. Random variables
    2. Mean, standard deviation and expected value of random variables
    3. Binomial, uniform and other probability distributions
E. Normal probability distribution
    1. Standard Normal Distribution
    2. Central limit theorem
    3. Normal as approximation to the binomial

F. Testing hypotheses
   1. Testing a hypotheses
   2. Determining confidence intervals
   3. Running various specific hypothesis tests of the mean, variance and standard deviation on normal, binomial, and other distributions

G. Other topics
   1. Linear correlation
   2. Linear regression
   3. Contingency tables
   4. ANOVA

V. **METHODS OF INSTRUCTION**:

A. Lecture
B. Discussion
C. Collaborative Methods
D. Multimedia-aided Instruction

VI. **TYPICAL ASSIGNMENTS**:

A. Daily reading and/or problem assignments will reinforce and extend classroom presentations
B. Written assignments will include solutions of various problems illustrative of the appropriate mathematical concepts and processes
C. Term project to require usage of statistical techniques

VII. **EVALUATIONS:**

A. Three to six regularly scheduled examinations
   1. Typical exam problems:
      a. Two cards are selected, without replacement, from a standard deck. Find the probability of selecting a king and then selection a queen.
      b. Use the following information to construct a 95% confidence interval for the population mean:
         A random sample of 32 gas grills has a mean price of $280.90 and a standard deviation of $123.70.

B. Quizzes, textbook and/or supplementary assignments
   1. Typical homework or quiz problems:
      a. Find the mean, median and mode for the following data entries:
         8 10 12 6 8 4 9 7 8 11 10 14 8 9
      b. Find the z-score that corresponds to the third quartile.

C. Term Project
   1. Typical term projects:
      a. Conduct a survey. Use descriptive and inferential statistical techniques to evaluate and interpret the data.
      b. Evaluate a scientific paper that uses statistics. Verify the calculations and methods that were used.

D. Comprehensive final examination
   1. Typical final exam problems:
      a. Use the following information to conduct a hypothesis test, using P-values:
         Claim: $\mu = 40$; $\alpha = 0.05$
         Sample statistics: $\bar{x} = 39.2, \quad s = 3.23, \quad n = 75$
      b. Test the significance of the correlation coefficient r using a two-tailed test, when
         $r = 0.5, \quad \alpha = 0.05, \quad n = 7$

VIII. **TYPICAL TEXTS**:

1. Larson and Farber, Elementary Statistics, Prentice Hall, 2000.
2. Triola, Elementary Statistics, 7th ed., Addison Wesley, 1998
3. Robert Johnson, Elementary Statistics, 6th ed., Duxbury Press, 1992.

IX. **OTHER SUPPLIES REQUIRED OF STUDENTS:** Statistics Calculator