

**MT. DIABLO UNIFIED SCHOOL DISTRICT
COURSE OF STUDY**

COURSE TITLE:	Statistics
COURSE NUMBER:	1520
CBEDS NUMBER:	2410
DEPARTMENT:	Mathematics
NCLB TEACHER CREDENTIAL REQUIREMENT:	Math Credential with Subject Matter Proficiency
LENGTH OF COURSE:	One year
CREDITS PER SEMESTER:	5
GRADE LEVEL(S):	11-12
REQUIRED OR ELECTIVE:	This course fulfills one year of the high school mathematics requirement, and UC/CSU “c” requirement (pending).
PREREQUISITES:	C or better in Algebra II or Algebra II/Trig

BOARD OF EDUCATION ADOPTION:

COURSE DESCRIPTION:

The purpose of the Statistics course is to encourage student awareness of the importance of mathematics in the real world. This course is an introduction to fundamental statistical problem-solving and interpretation of data. Students will gather, analyze and interpret data. Students will apply appropriate statistical models to draw conclusions and learn to use technology in solving statistical problems. The course will cover basic statistical concepts that will prepare the student to take a college-level statistics course in the future.

COURSE OUTLINE:

1. MAJOR GOALS

- 1.1 Students will be able to organize data effectively and use statistical measures to interpret and draw conclusions from the data set.
- 1.2 Students will be able to organize probability data sets and calculate probabilities using appropriate probability rules and methods.
- 1.3 Students will be able to use one or two samples to make valid inferences about the population of interest (small and large samples).
- 1.4 Students will be able to display and interpret bivariate data, make inferences, and draw reasonable conclusions from various statistical calculations.

2. PERFORMANCE OBJECTIVES:

- 2.1 Identify different data types and think critically about the data source
- 2.2 Create a survey and identify bias

- 2.3 Represent data using appropriate models including bar charts, pie charts, bar graphs, etc.
- 2.4 Calculate statistical measures including measures of center, variability, and relative standing using appropriate tools
- 2.5 Determine the shape, center, spread, outliers and characteristics
- 2.6 Compare two data sets using various representations
- 2.7 Use probability rules including Addition and Multiplication Rules
- 2.8 Identify sample spaces, independent events, mutually exclusive events, and complements
- 2.9 Use Fundamental Counting Principle to calculate probabilities
- 2.10 Represent information with a tree diagram, Venn diagram, and table
- 2.11 Use Conditional Probabilities and Bayes' Theorem
- 2.12 Introduce Bernoulli's trial and find binomial and geometric probability distributions and calculate statistical measures using appropriate tools
- 2.13 Define both discrete and continuous random variables and use transformations
- 2.14 Be able to calculate expected value and standard deviation from probability tables
- 2.15 Be able to create and interpret Normal probability distribution graphs
- 2.16 Use the central measures of tendency on Normal distributions
- 2.17 Understand how sampling distributions are used for inferences and apply the Central Limit Theorem
- 2.18 Be able to use the normal model as an approximation to a binomial distribution
- 2.19 Calculate a point estimate and a margin of error
- 2.20 Construct and interpret confidence intervals for the population proportion and mean
- 2.21 Understand what hypothesis testing is within the context of statistics and state the null and alternative hypotheses
- 2.22 Perform hypothesis test for the population proportion and population mean
- 2.23 Identify and understand the consequences of a type I or type II error
- 2.24 Determine when to use the z-distribution and the t-distribution
- 2.25 Determine if two sample sets are dependent or independent and compare using the appropriate hypothesis test
- 2.26 Represent bivariate data using appropriate models with scatterplots
- 2.27 Determine the direction, form, and strength of the scatterplot
- 2.28 Determine the correlation coefficient and the equation of the regression line
- 2.29 Determine and interpret the slope and the y-intercept in context
- 2.30 Calculate and interpret residuals for data points
- 2.31 Make predictions using a regression line or multiple regression lines and estimate accuracy
- 2.32 Find and interpret the coefficient of determination, r^2
- 2.33 Make inference based on the sample of the slope of the regression line
- 2.34 Use technology to perform and interpret regression analysis
- 2.35 Calculate expected frequencies using contingency tables
- 2.36 Perform inferences of counts using chi-square distribution

3. CONTENT OUTLINE:

3.1 Data Analysis – Univariate

3.1.1 Statistical and Critical Thinking

3.1.2 Types of Data

3.1.3 Collecting Sample Data

3.1.4 Frequency Distributions

3.1.5 Histograms

3.1.6 Graphs: Scatterplots, Time-Series Graphs, Dotplots, Stemplots, Bar Graphs, Paerto Charts, Pie Charts, Frequency Polygons, Ogives, Pictographs

3.1.7 Measures of Center, Variation and Relative Standing and Boxplots

3.2 Probability

3.2.1 Basic Concepts – Events, sample space, ‘Law of Large Numbers’ concept

3.2.2 Addition rule, multiplication rule, conditional probability

3.2.3 Simulations and probability distributions

3.2.4 Discrete probability distributions

3.2.5 Binomial distributions

3.2.6 Normal probability distributions – applications and sampling

3.2.7 Assessing normality and approximation to binomial

3.3 Statistical Inferences

3.3.1 Estimating population proportion and mean

3.3.2 Estimating population standard deviation or variance

3.3.3 Basics of hypothesis testing

3.3.4 Testing a claim about a proportion and a mean

3.3.5 Testing a claim about a standard deviation or variance

3.3.6 Independent and dependent samples

3.3.7 Two variances or standard deviations

3.4 Data Analysis – Bivariate

3.4.1 Correlations

3.4.2 Regressions, multiple regressions, nonlinear regressions

3.4.3 Prediction intervals and variation

3.4.4 ‘Goodness-of-Fit’ concept

3.4.5 Contingency tables

4. TIME ESTIMATES: Instructional sequences vary in length from a few days to several weeks.

5. INSTRUCTIONAL MATERIALS:

5.1 District adopted textbooks

5.2 Supplementary and teacher-created materials that include a career focus

5.3 Technology materials and on-line resources

6. EVALUATION OF STUDENT PROGRESS

7.1 Formative assessments such as warm-ups, check for understanding strategies, exit tickets, quizzes and oral participation.

7.2 Summative assessments such as quizzes, chapter tests, unit tests, labs and final exams

7.3 Written assignments

7.4 Teacher observations

7.5 Unit projects

7.6 Presentations

Committee Members:

Concord HS

Mt. Diablo HS

Northgate HS

Student Achievement & School Support

Student Achievement & School Support

Oegie Briones

Shellee Harris

Peter Ceresa

Cherisse Payne

Hellena Postrik

Teacher

Teacher

Teacher

Secondary Math Coach

School Support Administrator

(Mathematics)