Advanced Placement Statistics

School Year: 2013 – 2014

**COURSE DESCRIPTION**

AP Statistics involves the study of four main areas: exploratory analysis; planning a study; probability; and statistical inference. According to the College Board, upon entering this course students are expected to have mathematical maturity and quantitative reasoning ability. Mathematical maturity could be defined as a complete working knowledge of the graphical and algebraic concepts through Math Analysis, including linear, quadratic, exponential, and logarithmic functions.

In contrast to many math classes, this course will require reading of the text. This AP Statistics course is taught as an activity-based course in which students actively construct their own understanding of the concepts and techniques of statistics.

Teaching materials for the course come from textbooks, classroom lectures, newspapers, journals, medical newsletters, videos, and the World Wide Web. At the start of the school year, students receive a list of formulas and tables from the course description book. These handouts are used throughout the year for homework and tests.

**COURSE OUTLINE**

AP Statistics is an activity-based course where students actively construct their own understanding of statistical concepts and techniques.  Broad topics include Exploring and Describing Data, Planning and Design of a Study to produce Data using Samples, Experiments , and Simulations, Probability and patterns in distributions, and Statistical Inference with confidence..  The teacher will facilitate and guide students’ explorations and formations of hypotheses.  Instruction on the use of technology's statistical data analysis tools will include the graphing calculator, and statistical software, including Fathom, Active Stats, and Data Desk.  First semester will cover Chapters 1 - 9.  Second semester will cover Chapters 10-14 prior to spring break, preparation for the AP Exam during April and early May. Second semester major project will be completed following the AP Exam. Written and oral presentations of student selected area of interest.

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| **Content Map Per Semester** |  | **Fall Semester** |
| **Organizing Data** | **Producing Data** | **Probability** |
| Weeks 1 - 3 | Weeks 4 - 6 | Weeks 7 - 9 | Weeks 10 - 12 | Weeks 13 – 14 | Weeks 15 - 17 |
| Exploring data and normal distributions.* Displaying distributions with graphs
* Describing distributions with numbers
* Chapter 1 test
* Assorted projects, special problems and quizzes.
* Density curves and the normal distributions
* Standard normal calculations
* Chapter 2 test
* Assorted projects, special problems and quizzes.
* Scatterplots
* Correlation
* Least-squares regression
* Chapter 3 test
* Assorted projects, special problems and quizzes.
 | Examining relationships and two-variable data.* Transforming relationships
* Cautions about correlation and regression
* Relations in categorical data
* Chapter 4 test
* Assorted projects, special problems and quizzes.
 | Designing samples, designing and simulating experiments.* Designing samples
* Designing experiments
* Simulating experiments
* Chapter 5 test
* Assorted projects, special problems and quizzes.
 | Probability models and rules.* The idea of probability
* Probability models
* General probability rules
* Chapter 6 test
* Assorted projects, special problems and quizzes.
 | Random variables.* Discrete and continuous random variables
* Means and variances of random variables
* Chapter 7 test
* Assorted projects, special
 | Binomial and geometric distributions. Sampling distributions, proportions and means.* The binomial distributions
* Geometric distributions
* Chapter 8 test
* Assorted projects, special problems and quizzes.
* Sampling distributions
* Sample proportions
* Sample means
* Chapter 9 test
* Assorted projects, special problems, and quizzes.
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| Week 18 is planned for review and the Final Exam. |
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| **Content Map Per Semester** |  | **Spring Semester** |
| **Inference** | **AP Test** | **Analysis of Variance** |
| Weeks 1 - 3 | Weeks 4 - 8 | Weeks 9 – 11 | Weeks 12 – 15 | Weeks 16 – 17 |
| Introduction to Inference.* Estimating with confidence
* Tests of significance
* Making sense of statistical significance
* Inference as decision
* Chapter 10 test
* Assorted projects, special problems and quizzes.
 | Inference for distributions and Proportions.* Inference for the mean of a population
* Comparing two means
* Chapter 11 test
* Inference for a population proportion
* Comparing two proportions
* Chapter 12 test
* Assorted projects, special problems and quizzes.
 | Inference for tables and regression.* Test for goodness of fit
* Inference for two-way tables
* Chapter 13 test
* Inference about the model
* Predictions and conditions
* Chapter 14 test
* Assorted projects, special problems and quizzes.
 | Preparation for and taking the AP test.It is recommended that students purchase a test preparation book for use outside the classroom. We will discuss this during class sometime in January. | Analysis of variance.* Inference for population spread
* One-way analysis of variance
* Chapter 15 test
* Cumulative project
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| Week 18 is planned for review and the Final Exam. |

**CALCULATOR:** Graphing calculators are allowed on the AP Statistics exam and will be used extensively in this class. In fact, the Texas Instruments TI-83+ was specifically designed to facilitate statistical and financial data analysis and is the tool the AP exam authors considered while designing questions. If you show up to the AP Statistics test without an approved calculator please be aware that your chances of passing are extremely low. Because of the memory retaining qualities and programmability of these calculators, students will not be allowed to share calculators. It is imperative that all students have access to a calculator listed above.  Therefore, it is suggested that you obtain your own calculator, however school owned calculators may be issued to students unable to secure their own.

**COURSE PROJECTS**

Course projects are in the form of extended formal writing assignments. Form and technical adequacy are enforced on multiple assignments throughout the year. Students will gain experience in developing statistical studies and forming valid justifiable including justifications.

**Cumulative Project:** There will be a cumulative project for this course. It will cover the four conceptual themes of statistics: exploratory analysis, planning a study, probability, and statistical inference. Task: Develop a question, research the question and use statistical analysis to determine an answer. Specifically, decide on a question to investigate – be ingenious). Design an experiment to run, then go through the steps OR design a study, recruit subjects or whatever, place subjects into groups (randomly, of course), impose the treatments, etc. OR perform a simulation on the calculator.   Collect data, plot the data, and finally perform inference.  Demonstrate the use of the 4 inference steps.  Then analyze the data and draw a conclusion.  Write up a report and orally report your study findings to the class.

**STUDENT EVALUATION:**

Term grades are computed using homework, quizzes, exams, and projects to accumulate a total grade. Homework is periodically collected to check for understanding and to make sure it is being done. In addition, students will be assessed with a number of other types of evaluation. For example: homework assignments, daily quizzes, pop test, midterm exam, final exam, AP free-response questions, AP multiple-choice questions, and cooperative learning projects. Students will take a full-length practice exam prior to sitting for the AP Statistics Exam. A high level of expectation is maintained at all times. Frequent daily assessments keep students ever mindful of keeping up with their work and staying current in their studies. On all work, solutions alone will not be given credit. Answers must be accompanied by the appropriate work. Scrambled versions of tests are administered in order to maintain honor and integrity in the classroom. Test questions may include any material that the instructor has taught from the first day of school. Likewise, students are also held accountable for math concepts taught in previous grade levels. The tests are structured this way to mimic the AP test. Students are also graded on a “Test Prep Assignment” for each chapter.

No extra credit work will be extended to students.

**TEACHER RESOURCES**

PRIMARY TEXTBOOK:

 Daniel S. Yates, et al., *The Practice of Statistics*, Second Edition (New York:W.H. Freeman, 2003).

OTHER RESOURCES:

 •Rossman, Allan J., Beth L. Chance, and Robin H. Lock. J.  *Workshop Statistics – Discovery with   Data and  Fathom.* Emeryville, Ca.: Key College Publishing (2001)
 •Hinders, Duane C.  *5 steps to a 5: AP statistics*.  New York: McGraw-Hill (2004)
 •Chatterjee, Samprit, Marks S. Handcock, and Jeffery S. Simonoff. *A Casebook for a First  Course in Statistics and Data Analysis.* New York: Wiley, 1995•Mulekar, M.   *Cracking the AP Statistics Exam.* New Jersey:Princeton Review (2003)• *Against all Odds: Inside Statistics -* Video Series
• 3-ring, 2 inch binder (class notes/assignments) and 3 prong soft folder (for response log) •Graphing calculator, TI-83/ 83 Plus/ 84/ 84 Plus and TI 89