**Patrick Simmons
Miami Beach Senior High**

**Room: 558 Ph: 305-532-4515 x2558**

**2019-2020 AP ® Statistics Syllabus**

**COURSE OVERVIEW**

The intent of this course is to cover all assigned Statistics topics as outlined in the AP Statistics Course Description**.** The material will be completed in time to allow several weeks of review in preparation for the AP exam in May. Following the exam, students will complete a final, culminating project.

AP Statistics is the high school equivalent of a one semester (almost 2 semesters!), introductory college statistics course.

In this course, students develop strategies for collecting, organizing, analyzing, and

Interpreting conclusions from data. Students design, administer, and tabulate results from surveys and experiments. Probability and simulations aid students in constructing models for chance phenomena. Sampling distributions provide the logical structure for confidence intervals and hypothesis tests. Students use a **TI-83/84 graphing calculator**, Microsoft Excel, and Web-based java applets to investigate statistical concepts. To develop effective statistical communication skills, students are required to prepare frequent written and oral analyses of real data.

AP Statistics introduces students to the major concepts and tools for collecting,

organizing, analyzing, and drawing conclusions from data. Students are exposed to four broad conceptual themes, with appropriate emphasis given to each:

**Exploring Data**: Describing patterns and departures from patterns

**Sampling and Experimentation**: Planning and conducting a study

**Anticipating Patterns**: Exploring random phenomena using probability

and simulation

**Statistical Inference**: Estimating population parameters and testing Hypotheses.

Throughout the course, these themes will be integrated and linked so that students understand the connection between each of the ideas. By the end of the year, they will view these themes as being related, as opposed to independent ideas.

**COURSE GOALS**

In AP Statistics, students are expected to learn –

**Skills**

• To produce convincing oral and written statistical arguments, using appropriate

terminology, in a variety of applied settings.

• When and how to use technology to aid them in solving statistical problems

**Knowledge**

• Essential techniques for producing data (surveys, experiments, observational studies,

simulations), analyzing data (graphical & numerical summaries), modeling data (probability, random variables, sampling distributions), and drawing conclusions from data (inference procedures – confidence intervals and significance tests)

**Habits of mind**

• To become critical consumers of published statistical results by heightening their

Awareness of ways in which statistics can be improperly used to mislead, confuse, or distort the truth. Additionally, students will be able to describe, understand, and apply the four major Conceptual themes of statistics: Describing Data, Producing Data, Anticipating Patterns, and Statistical Inference.

**PRIMARY TEXT**

Wilcox, Starnes and Tabor*. The Practice of Statistics*. 6th ed. New York: W.H. Freeman, 2018.

The above will also be supplemented by additional textbooks, as well as media applications, practice AP questions, and student activities throughout the year.

**COURSE OUTLINE**

Graphical displays include, but are not limited to using box plots, dot plots, stem plots,

back-to-back stem plots, histograms, frequency plots, parallel box plots, and bar charts.

Each Class Period lasts 90 minutes.

**Topic Outline Sequence**

What is Statistics?

• Activity 1: M&M Activity

• Data Production: Where do you get good data?

• Data Analysis: Making Sense of Data

• Probability: What are the Chances?

Statistical Thinking: Drawing Conclusions from Data

**Chapter 1: Data Analysis**

1.1 Analyzing Categorical Data

1.2 Displaying Quantitative Data with Graphs

1.3 Describing Quantitative Data with Numbers

**Chapter 2: Modeling Distributions of Data**

2.1 Describing Location in a Distribution

2.2 Density Curves and Normal Distributions

**Chapter 3: Describing Relationships**

3.1 Scatter-plots and Correlation

3.2 Least-squares Regression

**Chapter 4: Collecting Data**

4.1 Sampling and surveys

4.2 Experiments

4.3 Using Studies Wisely

**Chapter 5: Probability – What are the Chances?**

5.1 Randomness, Probability and Simulation

5.2 Probability Rules

5.3 Conditional Probability and Independence

**Chapter 6: Random Variables**

6.1 Discrete and Continuous Random Variables

6.2 Transforming and Combining Random Variables

6.3 Binomial and Geometric Random Variables

**Chapter 7: Sampling Distributions**

7.1 What is a Sampling Distribution?

7.2 Sample Proportions

7.3 Sample Means

**Chapter 8: Estimating with Confidence**

8.1 Basics of Confidence Intervals

8.2 Estimating a Population Proportion

8.3 Estimating a Population Mean

**Chapter 9: Testing a Claim**

9.1 Basics of Hypothesis Testing

9.2 Tests about a Population Proportion

9.3 Tests about a Population Mean

**Chapter 10: Comparing Two Populations or Groups**

10.1 Comparing Two Proportions

10.2 Comparing Two Means

10.3 Comparing Two Means: Paired Data

**Chapter 11: Inference for Distributions of Categorical Data**

11.1 Chi-square Goodness of Fit Tests

11.2 Inference for Relationships

**Chapter 12: More About Regression**

12.1 Inference for Linear Regression

**Review for AP Exam**

• Released Multiple Choice Exams (2006 - 2018)

• Remaining previous AP questions

• Remaining multiple-choice questions from textbook study guide

**AP Exam: May, 2015 (exact date TBA)**

**Post AP Exam**

• Second semester project – Games of Chance/Famous Mathematicians

**TEACHING STRATEGIES**

Learning in the class is largely student-centered. Concepts and sample problems will be

introduced on the board to begin work on new material. Students then work

collaboratively in groups, do presentations, and participate in class discussions of concepts as we proceed through each new chapter. Homework review is jointly done by the teacher and students, allowing them to offer their solutions and explanations, in addition to teacher instruction. Review of practice AP problems throughout the year is also an essential element of their learning. The overall emphasis is on diverse means of explanation and understanding, in addition to teacher lecture. This includes students’ explanations, computer applications, activities, and other formats. Students regularly present problems on the board. They must be able to explain concepts mathematically, as well as demonstrate understanding of fundamental concepts of statistics.

**TECHNOLOGY**

At the start of the year, we begin using the graphing calculator to develop and reinforce

concepts. **All students MUST have some version of either the TI-83 or TI-84.** Students will work with the calculators on all assignments, homework, and tests/quizzes in order to become familiar with its functions and applications. We examine how to use the calculator to solve problems graphically, numerically, and analytically. There are frequent opportunities to use it as a tool to explore, discover, and reinforce material covered in class. Students will be using these calculators daily as an essential tool.

In addition, students are taught to use Microsoft Excel and its applicable functions for

Analyzing data, and demonstrate basic statistical skills. During the year, students will utilize computers to work on projects related to topics from the course material.

Java Applets will also be demonstrated in class throughout the year to help explain

concepts such as confidence intervals, visualizing correlation in scatterplots, and linear

regression decomposition.

**STUDENT ACTIVITIES**

Throughout the year, various activities will be integrated into the curriculum in order to

Provide different and unique ways of accessing and presenting information and topics. In many cases, the graphing calculator is used to help clarify various points and concepts. It will be heavily involved in most activities.

In addition to several small projects during the year, students will complete a final project on a topic of their choice. The purpose of the project is for students to demonstrate an integrated understanding of all aspects of the statistical process (design, analysis, and conclusions) and the major conceptual themes of AP statistics: Exploring Data, Sampling and Experimentation, Anticipating Patterns, and Statistical Inference. Students are expected to communicate their methods, results, and interpretations using proper statistical vocabulary. This project will require both a written product and an oral presentation.

**Assessment**

**- Tests (10 grades)**

We will take a test every chapter. These involve

multiple-choice, as well as, free response questions and are designed to

model AP exam questions that cover the material that has been taught in that and previous chapters. \*\*ALL Exams are cumulative!\*\*

**- Notebook (1 grade)**

Notes should be taken during each reading assignment with an emphasis on applications, examples and calculator button sequences. Each section should be front and back, **FULL pages**.

**-Assignments (1 grade)**

Assignments are given on a daily basis to reinforce the concepts which were covered in the book and during lecture. A grade will be given for each Chapters’ Assignment pack. YOU are responsible for doing the work, checking your answers, and asking for clarity on anything you did not understand!

**- Labs (2 grade)**

Each nine weeks projects are assigned that are designed to allow the students to take the basic concepts that they have learned and see them put into real-life practice. We want students to be able to not only collect, organize, and analyze data, but also

to COMMUNICATE their understanding to others. These projects have

the effect of reinforcing those concepts, while generating interest in

statistics as a field of study.

Student -

 Print:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Sign:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date:\_\_\_\_

Parent/Guardian -

 Print:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Sign:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date:\_\_\_\_