# Advanced Placement Statistics Course Syllabus Mrs. Cope 2022-2023

#### **Contact Information**

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#### **Course Description**

Students in AP Statistics are exposed to four broad conceptual themes: Exploring Data, Sampling and Experimentation, Anticipating Patterns, and Statistical Inference. Students will make use of data both in graphical and numerical forms to observe patterns and departures from patterns. Included under planning a study, students will develop a plan by deciding what and how to measure in order to collect valid information. Probability theory will allow students anticipate patterns and produce output under given models. Finally in statistical inferences, students will develop conclusions through hypotheses testing. In contrast to many math courses, this course will require reading the text and writing both in daily instruction and assessments. AP Statistics is an activity-based course in which students will construct their own understanding of concepts through hands-on projects.

#### **Course Materials**

Primary Text: Starnes, Yates, & Moore. *The Practice of Statistics*. 6<sup>th</sup> ed., W. H. Freeman & Co., 2020.In addition to the primary text, teaching materials will include newspapers, videos, magazines, and Internet sources.

Students will be provided with a copy of the formula sheets provided with the AP Exam to use throughout the year on class assignments and homework.

A graphing calculator of the TI-83 or TI-84 family is highly recommended and will be used both in class and for homework. Students will have access to a classroom set of such calculators during the school day. If a student is unable to purchase a graphing calculator for use outside the classroom, arrangements can be made with the teacher.

#### **COLLEGE CREDIT**

You can obtain college credit for this course either though the AP Exam or the CHS program through Seton Hill. Guidance oversees the registration for both. More specific information is to come.

# **Classroom Expectations**

My classroom expectations are defined by our school-wide BRAVE expectations:

<u>Be</u> Safe: Listen to staff, Maintain personal space

<u>*Respect Others*</u>: Be on time, Be polite, Use appropriate language and tone <u>*Accountable*</u>: Be prepared, Be honest, Do your own work,

*<u>V</u>ictorious*: Do your best work, Celebrate academic success

*Enthusiastic*: Have a positive attitude, Take ownership of learning

Special consideration needs to be given to the importance of Academic Integrity. I expect all my students to hold their work and learning in the highest regard. The following are the Academic Integrity expectations for this course:

- Do your own work
- Take pride in your work
- Show your work
- Ask for help if you are confused
- Help you peers to understand their work
- Do no copy or take pictures of someone's work
- Do no discuss test questions or answers
- Do no just give answers or air drop
- Do not give up
- Do not give your completed work to someone

Any violations of BRAVE expectations or Academic Integrity expectations will be handled as defined by the EFHS student handbook.

**Grades**: Grades are determined by a combination of tests, quizzes, class work/homework, and projects. Each category is weighted. 60% of your marking period grade will be tests and quizzes, 40% will be class assignments, projects and participation.

# What you can expect

- Students will be expected to read the coordinating section in the textbook and complete practice assignments outside of the classroom.
- In class, we will use a variety of action-based strategies to practice the concepts. We will utilize group and individual work under my guidance and assistance.
- All assignments/classwork will be turned in via Canvas. You will be expected to keep all hard copies in an organized notebook. On occasion, you will be requested to produce the hard copy of your work.

### **Course Structure**

Canvas modules will be published weekly. In these modules, you will find a playlist. This playlist will outline what we will be completing during the week. It will list both in class tasks and assignments for outside of class. It is very important that you review the playlist at the beginning of every week and use it to keep on track. Tasks and Assignments for the week will be due on the Sunday following that week at 11:59pm. Late work will receive -1 point for every calendar day late.

### Assignments

Assignments and practice are graded on effort. These assignments and practice are given to hone your skill and understanding. I will gladly go over questions from assignments on request either individually or as a class. If you do not understand a question from a practice, ASK!

# **Tests and Quizzes**

Tests will be given at the end of every unit. The tests will be a combination of both multiple choice and open-ended questions. Content on a test will be cumulative and therefore will assess a student's knowledge on both material from the current unit and from any previous unit taught. I will make every attempt to utilize the assigned Math department test days of Tuesday and Friday for the timing of all tests and quizzes.

#### THERE WILL BE A COMPREHENSIVE FINAL EXAM.

Quizzes will be both announced and unannounced. Content for the quizzes will mainly focus on the content being covered in class and on homework at that time.

When you are absent on the day of a test or quiz or on the day prior to the test when the class completed the review, you will be expected to make arrangements with me to make-up the test or quiz on your own time. Because of the pace of this course, you would miss valuable new information if you were to take the make-up during class time. The deadline for completing all make-up tests and quizzes is 10 school days after the test has been given to the class.

Due to the high percent allotted to test/quizzes in the grading, you are permitted to re-take ONE TEST/QUIZ each marking period. The re-test grade will replace the original test, for better or for worse. You have 10 school days after the grades are posted into PowerSchool to take the re-test. There will be no re-tests permitted the last week of any marking period.

# Help Available

If you are ever feeling like you do not understand or are struggling in this course, let me know as soon as possible. We will make arrangements to get you the additional help you need. The longer you wait to get help, the harder it will be to get you up to speed. The material in this course is very cumulative, for example the material we learn in Chapter 2 we will use throughout the remaining course.

# **Course Outline**

(organized by chapters in primary textbook)

Chapter	Section	АР Торіс
1: Exploring	1.1 Analyzing	a) Frequency tables and bar charts
One-Variable	Categorical	b) Comparing distributions using bar charts
Data	Data	
	1.2 Displaying	a) Constructing and comparing center and spread
	Quantitative	b) Constructing and comparing clusters and gaps
	Data with	c) Constructing and comparing outliers and unusual
	Graphs	features
		d) Constructing and comparing shape
	1.3 Describing	a) Measuring center: median and mean
	Quantitative	b) Measuring spread: range, inter-quartile range,
	Data with	standard deviation
	Numbers	c) Measuring position: quartiles, percentiles
		d) Using box-plots
		e) Comparing centers and spread
		f) Comparing clusters and gaps
		g) Comparing Outliers and unusual features
		h) Comparing shape
		i) Explore the effect of outliers and influential
		points.
2: Modeling	2.1 Describing	a) Summarizing distributions of univariate data
Distributions	Location in a	b) Measuring position with z-scores
of	Distribution	c) The effect of changing units on summary
Quantitative		measures
Data		
	2.2 Normal	a) Properties of the Normal distribution
	Distributions	b) Using tables of the Normal distribution
		c) The Normal distribution as a model for
		measurements
3: Exploring	3.1	a) Analyzing patterns in scatterplots
Two-Variable	Scatterplots	b) Correlation and linearity
Data	and	
	Correlation	
	3.2 Least-	a) Least-squares regression line
	Squares	b) Residual plots, outliers, and influential points
	Regression	
	-0	

	3.3	a) Transformations using powers, roots, or
	Transforming	logarithms
	to Achieve	
	Linearity	
4: Collecting	4.1 Sampling	a) Census
Data	and Surveys	b) Sample survey
		c) Characteristics of a well designed and well
		conducted experiment
		d) Populations samples and random selection
		e) Sources of bias in sampling and surveys
		f) Sampling methods, including simple random
		sampling stratified random sampling and cluster
		sampling
	4.2	a) Experiment
	Experiments	b) Observational study
	•	c) Characteristics of a well designed and well
		conducted experiment
		d) Treatments, control groups, experimental units,
		random assignments, and replication
		e) Completely randomized designed
		f) Randomized block design, including matched
		pairs design
	4.3 Using	a) Results and types of conclusions that can be
	Studies	drawn from observational studies, experiments and
	Wisely	surveys
5: Probability	5.1	a) Interpreting probability, including long-run
	Randomness,	relative frequency interpretation
	Probability,	b) Law of Large Numbers' concept
	anu	c) Simulation of random behavior and probability
	Simulation	distributions
	5.2	a) Marginal and joint frequencies for two-way tables
	Probability	b) Addition Rule
	Rules	b) multion mult
	itules	
	5.3	a) Conditional relative frequencies and association
	Conditional	b) Multiplication Rule, Conditional Probability, and
	Probability	Independence
	and	
	Independence	

6. Random	61 Discrete	a) Discrete random variables
Variables	and	b) Mean and standard deviation
and	Continuous	
allu Drobability	Pandom	
Distributions	Variables	
Distributions	variables	
	62	a) Linear transformation
	Transforming	b) Notion of independence versus dependence
	and	c) Moan and standard doviation for sums and
	Combining	differences of independent random variables
	Random	anterences of independent random variables
	Variables	
	variables	
	6.3 Binomial	a) Binomial and geometric
	and	
	Geometric	
	Random	
	Variables	
7: Sampling	7.1 What is a	a) Simulation of distributions
Distributions	Sampling	
	Distribution?	
	7.2 Sample	a) Sampling distribution of a sample proportion
	Proportions	
	7.3 Sample	a) Sampling distribution of a sample mean
	Means	b) Central limit theorem
0.5.1	0.1	
8: Estimating	8.1 Confidence	a) Estimating population parameters and margins of
Proportions		error
With	Intervals: The	b) Properties of point estimators, including
Confidence	Basics	unblasedness and variability
		c) Logic of confidence intervals and properties of
	0.2	confidence intervals
	8.2 Estimating a	a) Large-sample confidence interval for a proportion
	Estimating a	
	Population	
	FICHOLUCII	
	8.3	a) Sampling distribution of a difference between two
	Estimating a	independent sample proportions
	Difference in	b) Large-sample confidence interval for a difference
	Proportions	between two proportions

9: Testing a Claim about Proportions	9.1 Significance Tests: The	<ul> <li>a) t distribution</li> <li>b) Confidence interval for a mean</li> <li>c) Confidence interval for a difference between two means (paired)</li> <li>a) Significance testing, null and alternative</li> <li>hypotheses; p-value; one- and two-sided tests;</li> <li>concepts of Type I and Type II errors; concept of</li> </ul>
Toportions	Basics	power
	9.2 Tests about a Population Proportion	a) Large-sample test for a proportion
	9.3 Tests about a Difference in Proportions	a) Test for a difference between two proportions
10: Estimating Means with Confidence	10.1 Estimating a Population Mean	a) t distribution b) Confidence interval for a mean
	10.2 Estimating a Difference in Means	<ul> <li>a) Sampling distribution of a difference between two independent sample means</li> <li>a) Confidence interval for a difference between two means (paired)</li> </ul>
11: Testing Claims About Means	11.1 Tests about Population Mean	a) t distribution b) Test for population mean
	11.2 Tests About a Difference in Means	<ul><li>a) Test for a difference between two means (paired)</li><li>b) Test for a difference between two means (unpaired)</li></ul>
12: Inference for Distributions and Relationships	12.1 Chi- square Goodness-of- Fit Tests	<ul> <li>a) Chi-square distribution</li> <li>b) Chi-square test for goodness of fit, homogeneity of proportions and independence (one- and two-way tables)</li> </ul>

12.2 Inference for Two-way tables	a) Chi-square test for goodness of fit, homogeneity of proportions and independence (one- and two- way tables)
12.3 Inference for Slope	<ul> <li>a) Confidence interval for the slope of a least-squares regression line</li> <li>b) Test for the slope of a least-squares regression line</li> <li>c) Students use calculators and computers to write equations of the curves that best fit the model their data.</li> <li>d) Interpret the results of computer output for regression.</li> </ul>