Advanced Placement Statistics 2020-2021

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Objective:

AP Statistics is a rigorous, college level, non-calculus based course intended to be the equivalent of a first year college level course. The course is guided by the AP syllabus and covers the following areas: organizing data, normal, binomial, geometric, and sample distributions, correlation, experimental designs, probability, and statistical inference and testing. Upon completion students will develop into competent interpreters and users of statistical data and information. Decision-making and justification of statistical hypotheses are emphasized. The AP Statistics course will prepare students for the College Board Advanced Placement Exam which is given in May. Students can earn college credit for this course by scoring from 3 to 5 on the exam. The amount of credit granted varies among colleges and universities.

Course Comments:

Since the potential exists to earn college credit, it is expected that you take the course seriously. Students must be active participants since the "best" learning occurs when students are actively involved in the learning process. To this end AP Statistics will be a "hands-on", practical applications oriented class. Computers and calculators are used extensively to allow students to investigate and explore statistical concepts. Effective communication skills will be developed through regular written analysis of real data.

Textbook:

Starnes, D. S., Tabor, J., Yates, D. S., & Moore, D. S. (2006). The practice of statistics:

TI-83/84/89 graphing calculator enhanced (5th ed.). New York: W. H. Freeman.
Online Support of Text: Online Quizzes, Simulation Applets, Data Sets
http://www.whfreeman.com/tps5e/ (You MUST register using your email address to use the online quizzes and certain site features.)

Supplemental Resources for Instruction:

- Against all Odds: Inside Statistics Video Series.
- Agresti, A., & Franklin, C. (2009). *Statistics: The art and science of learning from data (2nd Ed.)*. Upper Saddle River, New Jersey: Pearson Education, Inc.
- Chatterjee, Samprit, Marks S. Handcock, and Jeffery S. Simonoff (1995). A Casebook for a First Course in Statistics and Data Analysis. New York: Wiley.
- > Data Desk, Minitab, and/or Fathom will be used in the course for demonstration and exploration purposes.
- De Veaux, R. D., Velleman, P. F., Bock, D. E. (2005). Stats: Data and models. U.S.A.: Pearson-Addison Wesley.
- Erickson, T. (2001). *Data in depth: Exploring mathematics with fathom*. Emeryville, California: Key Curriculum Press.
- Freund, J. E., Walpole, R. E. (1987). Mathematical Statistics (2nd Ed.). Englewood Cliffs, New Jersey: Prentice-Hall, Inc.
- ➤ Graphing calculator, TI-83/83 Plus/84/84 Plus/nSpire and TI-89.
- > Hinders, Duane C. (2004). 5 steps to a 5: AP statistics. New York: McGraw-Hill.
- Mulekar, M. (2003). *Cracking the AP Statistics Exam.* New Jersey: Princeton Review.
- Rossman, Allan J., Beth L. Chance, and Robin H. Lock. J. (2001). Workshop Statistics: Discovery with Data and Fathom. Emeryville, Ca.: Key College Publishing.
- Scheaffer, R. L., Gnanadesikan, M., Watkins, A., and Witmer, J. A. (1996). Activity-based statistics. Rensselaer, NY: Hamilton Printing Co.
- Sternstein, M. (2004). Barron's how to prepare for the A P statistics: Advanced placement test in statistics. Hauppauge, New York: Barron's Educational Series, Inc.

A note about calculators:

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. It is imperative that all students have access to a calculator such as the TI-83/83+, TI-84/84+, TI-nspire, TI-nspire CX, Casio Classpad 300, FX-9750GPlus, or 9860G. The class will be taught using the TI-nspire calculator as well as software that goes with the TI-nspire. 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 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 a valid, justifiable conclusion including justifications.

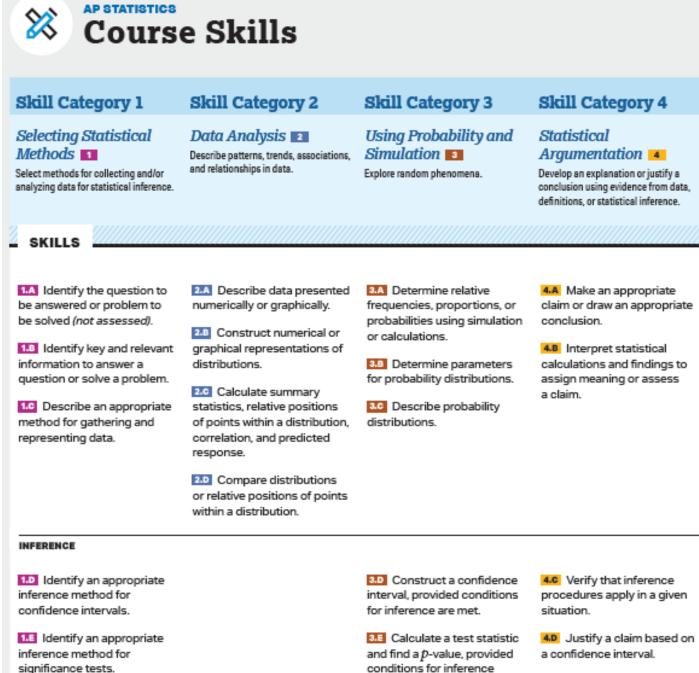
Cumulative Project:

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, 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.

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 with preparation for the AP Exam during April and early May. The second semester major project will be completed following the AP Exam including written and oral presentations of student selected area(s) of interest.

These are the course skills addressed by the course and AP Exam:



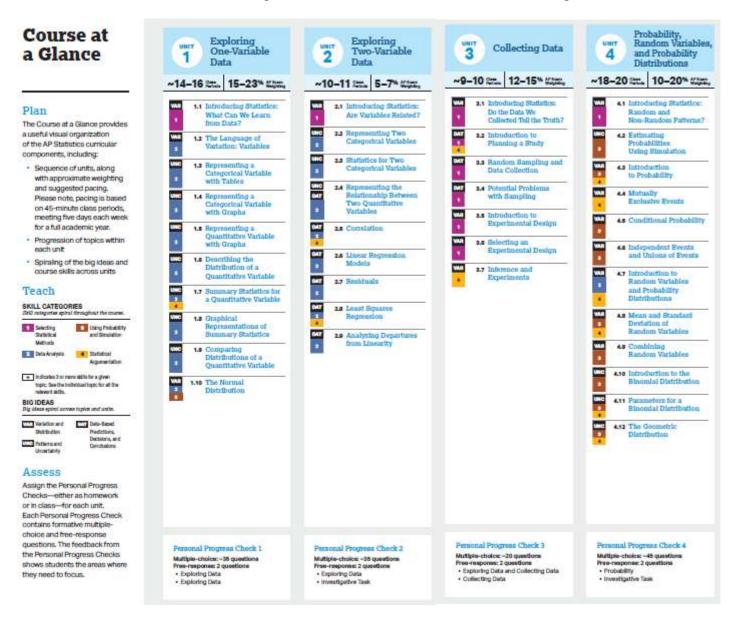
1.F Identify null and alternative hypotheses. conditions for inference are met

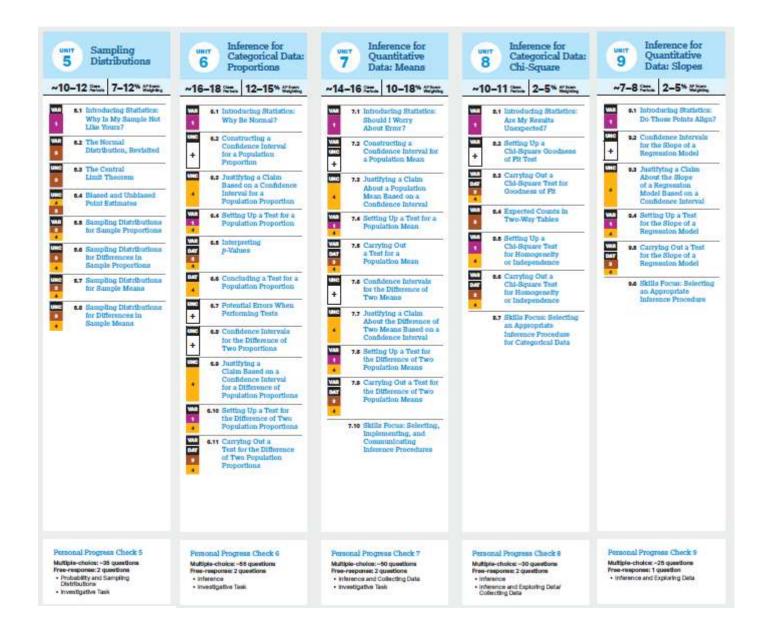
4.E Justify a claim using a decision based on significance tests.

Exam Weighting for the Multiple-Choice Sec	tion of the AP Exam

Units	Exam Weighting
Unit 1: Exploring One-Variable Data	15-23%
Unit 2: Exploring Two-Variable Data	5-7%
Unit 3: Collecting Data	12-15%
Unit 4: Probability, Random Variables, and Probability Distributions	10-20%
Jnit 5: Sampling Distributions	7-12%
Jnit 6: Inference for Categorical Data: Proportions	12-15%
Unit 7: Inference for Quantitative Data: Means	10-18%
Unit 8: Inference for Categorical Data: Chi-Square	2-5%
Jnit 9: Inference for Quantitative Data: Slopes	2-5%

First semester will cover Units 1 through 5. Second semester will cover Units 6 through 9.





Some links to visit for enhanced learning...

Online glossary of statistical terms: http://www.stats.gla.ac.uk/steps/glossary/hypothesis testing.html

Online texts that may be a good resource: HyperStat: <u>http://davidmlane.com/hyperstat/</u> http://www.psychstat.missouristate.edu/introbook/sbk00.htm

Careers in Statistics: http://www.amstat.org/careers/index.cfm?fuseaction=presentation http://www.amstat.org/careers/index.cfm?fuseaction=main

Which schools give college credit for AP studies?? http://www.collegeboard.com/ap/creditpolicy

AP Central: http://apcentral.collegeboard.com/

Data Resources: The New York Times: <u>http://www.nytimes.com/</u> Bureau of Labor Statistics: <u>http://www.bls.gov/</u> The gateway to statistics from over 100 U.S. Federal agencies: <u>http://www.fedstats.gov/</u> Rasmussen: <u>http://www.rasmussenreports.com</u> Zogby: <u>http://www.zogby.com</u> The National Center for Health Statistics: <u>http://cdc.gov/nchs</u> The National Center for Education Statistics: <u>http://nces.ed.gov/</u> Real Clear Politics: <u>http://www.realclearpolitics.com</u> Clinical Trials: <u>http://clinicaltrials.gov/</u>

Applets: http://www.ruf.rice.edu/~lane/stat_sim/index.html

Statistics Links: <u>http://math.about.com/od/statistics/</u> GapMinder: <u>http://www.gapminder.com</u> Khan Academy: <u>https://www.khanacademy.org/math/ap-statistics</u> Stats Monkey: <u>http://apstatsmonkey.com/StatsMonkey/Statsmonkey.html</u>