

## 2024 UTC AP Statistics

### Short description

The AP Statistics Course and Exam Description (CED) offers a sound framework and resources for constructing quality instruction. The course is packaged into nine “Units”, each containing a wealth of specificity and detail about what your students will be expected to know and do. At the 30,000-foot level we will review the big ideas of AP Statistics; at the 300-foot level we will engage participants in classroom-ready materials that focus on specific thinking and writing skills necessary for success in the course and on the AP Statistics exam. Statistics is an active endeavor, and our activities this week will engage your students and get them “out of their seats.” The use of technology -- graphing calculators, and statistical software -- will be stressed throughout the week. Communication – the presentation of an effective argument about interpreting data -- is an essential part of doing and teaching statistics; our time together will be spent mostly in discussion and interpretation, not me pontificating! The sequence of statistical topics, and approximate allocation of time follows below. Generally, we will focus more on content and pedagogy early in the week, with increasing concern about the exam and exam issues as we march through the week.

### The basic outline of the schedule

#### Day 1:

Our first day will be a plunge into the CED. The CED does not only define the course, it contains strategies for teaching and suggestions for timing as you move through the year.

- **Introduction to the Course:** we will become familiar with the course framework structure (Big Ideas, Topics, Learning Objectives. The Calculator and Computer software as basic tools – statistical software (freeware!) will be provided for your use during the week and your future classroom use.
- **Online resources.** In addition to the extensive materials provided by College Board’s “AP Classroom,” we will begin to explore some excellent resources available at the click of a mouse.
- **Unit 1:** We will analyze univariate data sets designed to highlight the numeric and graphical tools used AP Statistics. Topics include amphibians, circadian rhythms in humans, old pottery, characteristics of coins in Roman times, and that age-old question: are snakes left-handed? The data sets are diverse and are classroom ready.

## Day 2:

On our second day we will continue analyzing data and the introduction of College Board and other online resources. The course content on the second day will feature bivariate data analysis, the choice of sampling techniques, and the planning and execution of experiments. The basic decisions involved in choosing a sampling strategy and an experimental design strategy will be addressed and the nature of stratification, blocking, and confounding variables will be considered in detail.

- **Unit 2:** Exploring Two-Variable Data. Categorical data (Two-way tables) and Correlation and Regression (including outliers, high-leverage points, and influence). Gazelles, Alice in Wonderland, Therapods (e.g. T. Rex), the Beatles, and Lizzie Borden.

- **Unit 3:** Collecting data – sampling and the design of experiments

- **Strategies for random sampling:** Simple Random Sample, Stratified, Cluster, and Systematic Sampling. Saving apartment dwellers from noise, pedestrians from New York City traffic, and Creatures in Long Island Sound will occupy our attention.

- **Strategies for planning experiments:** The Completely Randomized Design, the Randomized Block Design. The logic in planning an experiment: Random selection, random assignment, and confounding. Clam dancing, Bambi vs. the World, Fly Fishing and Slot Machines.

### **Day 3:**

On our third day we will begin our discussion of the exam, with primary focus the Free Response section. What should the students write? What does it mean to be clear, cogent, and correct? What do the rubrics look for in student writing? We will begin by reviewing the general logic about hypothesis testing and estimation (confidence intervals) and then get into the nitty gritty.

- **Unit 4:** Probability, Random Variables, and Probability Distributions. We will consider coins, dice, the Spoon Law of Large Numbers, the likeability of coyotes, the Titanic, and Athenian democracy.
- **Unit 5:** Sampling distributions: Means, proportions, etc. What is the theory, and how can we teach it via both formulas and simulation?
- **Unit 6:** Inference for Categorical Data: Proportions
- **Unit 7:** Inference for Quantitative Data: Means

### **Day 4:**

Graduation day! -- will be something of a smorgasbord. We will review the week so far and resolve any remaining teacher questions and content questions. The statistical content will complete the inference topics in AP Statistics; the exam topic will be the Investigative Task.

- **Unit 8:** Inference for Categorical Data – Chi square
- **Unit 9:** Inference for Quantitative Data – Slope of a regression line