Topic Outline for AP® Statistics From the College Board's AP® Statistics Course Description	**Introduction to Statistical Investigations: AP® edition** Chapter and Section References
I . Exploring Data: Describing patterns and departures from patterns (20%–30%)	
A . Constructing and interpreting graphical displays of distributions of univariate data (dotplot, stemplot, histogram, cumulative frequency plot	Dotplot P.2, 6.1; stemplot 6.1 Part 2; histogram 2.1; cumulative frequency plot 6.1 Part 2
1 . Center and spread	P.2, 6.1, 6.1 Part 2
2 . Clusters and gaps	P.2, 6.1, 6.1 Part 2
3 . Outliers and other unusual features	P.2, 6.1, 6.1 Part 2
4 . Shape	P.2, 6.1, 6.1 Part 2
B . Summarizing distributions of univariate data	
1 . Measuring center: median, mean	2.2, 6.1, 6.1 Part 2
2 . Measuring spread: range, interquartile range, standard deviation	6.1, 6.1 Part 2
3 . Measuring position: quartiles, percentiles, standardized scores (z-scores)	1.3, 11.7
4 . Using boxplots	6.1, 6.1 Part 2
5 . The effect of changing units on summary measures	11.5
C . Comparing distributions of univariate data (dotplots, back-to-back stemplots, parallel boxplots)	
1 . Comparing center and spread: within group, between group variation	6.1, 6.1 Part 2, 7.2
2 . Comparing clusters and gaps	6.1, 6.1 Part 2, 7.2
3 . Comparing outliers and other unusual features	6.1, 6.1 Part 2, 7.2
4 . Comparing shapes	6.1, 6.1 Part 2, 7.2
D . Exploring bivariate data	
1 . Analyzing patterns in scatterplots	10.1, 10.2
2 . Correlation and linearity	10.1, 10.2
3 . Least-squares regression line	10.3, 10.3 Part 2
4 . Residual plots, outliers and influential points	10.3, 10.3 Part 2
5 . Transformations to achieve linearity: logarithmic and power transformations	10.3 Part 3
E . Exploring categorical data	
1 . Frequency tables and bar charts	1.1, 5.1, 5.2, 5.3
2 . Marginal and joint frequencies for two-way tables	5.1, 5.2, 5.3, 8.1, 8.2, 8.3
3 . Conditional relative frequencies and association	8.1, 8.2, 8.3
4 . Comparing distributions using bar charts	5.1, 5.2, 5.3, 8.1, 8.2, 8.3
II . Sampling and Experimentation: Planning and conducting a study (10%–15%)	
A . Overview of methods of data collection	

1 . Census	2.1
2 . Sample survey	2.1
3 . Experiment	4.3, 4.3
4 . Observational study	4.2
B . Planning and conducting surveys	
1 . Characteristics of a well-designed and well-conducted survey	2.1
2 . Populations, samples and random selection	2.1
3 . Sources of bias in sampling and surveys	2.1, 2.1 Part 2
4 . Sampling methods, including simple random sampling, stratified random sampling and cluster sampling	2.1, 2.1 Part 2, 2.1 Part 3
C . Planning and conducting experiments	
1 . Characteristics of a well-designed and well-conducted experiment	4.1, 4.2, 4.3
2 . Treatments, control groups, experimental units, random assignments and replication	4.1, 4.2, 4.3
3 . Sources of bias and confounding, including placebo effect and blinding	4.1, 4.2, 4.3
4 . Completely randomized design	4.1, 4.2, 4.3
5 . Randomized block design, including matched pairs design	4.4
D . Generalizability of results and types of conclusions that can be drawn from observational studies, experiments and surveys	4.2
III . Anticipating Patterns: Exploring random phenomena using probability and simulation (20%–30%)	
A . Probability	
1 . Interpreting probability, including long-run relative frequency interpretation	P.3, 11.1
2 . “Law of Large Numbers” concept	11.1
3 . Addition rule, multiplication rule, conditional probability and independence	11.2, 11.3
4 . Discrete random variables and their probability distributions, including binomial and geometric	11.4, 11.6
5 . Simulation of random behavior and probability distributions	11.1
6 . Mean (expected value) and standard deviation of a random variable, and linear transformation of a random variable	11.5
B . Combining independent random variables	
1 . Notion of independence versus dependence	11.5
2 . Mean and standard deviation for sums and differences of independent random variables	11.5
C . The normal distribution	
1 . Properties of the normal distribution	11.7, 11.8
2 . Using tables of the normal distribution	11.7, 11.8
3 . The normal distribution as a model for measurements	11.7, 11.8
D . Sampling distributions	
1 . Sampling distribution of a sample proportion	1.5, 1.6, 11.8
2 . Sampling distribution of a sample mean	2.2, 2.2 Part 2, 11.8
3 . Central Limit Theorem	1.5, 2.2, 2.2 Part 2 5.2, 5.3

4 . Sampling distribution of a difference between two independent sample proportions	6.2, 6.3
5 . Sampling distribution of a difference between two independent sample means	Ch 1, 2, 3, 5-8, 10
6 . Simulation of sampling distributions	2.2, 2.2 Part 2
7 . t-distribution	8.1, 8.2, 8.3, 8.4
8 . Chi-square distribution	
IV . Statistical Inference: Estimating population parameters and testing hypotheses (30%–40%)	
A . Estimation (point estimators and confidence intervals)	
1 . Estimating population parameters and margins of error	3.1, 3.2, 3.2 Part 2, 3.3, 3.3 Part 2, 3.4, 3.5
2 . Properties of point estimators, including unbiasedness and variability	3.1, 3.2, 3.4, 3.5
3 . Logic of confidence intervals, meaning of confidence level and confidence intervals, and properties of confidence intervals	3.1, 3.2, 3.2 Part 2, 3.4, 3.5
4 . Large sample confidence interval for a proportion	3.2, 3.2 Part 2
5 . Large sample confidence interval for a difference between two proportions	5.3, 5.4
6 . Confidence interval for a mean	3.3, 3.3 Part 2
7 . Confidence interval for a difference between two means (unpaired and paired)	6.3, 6.4, 7.3, 7.4
8 . Confidence interval for the slope of a least-squares regression line	10.5, 10.6
B . Tests of significance	
1 . Logic of significance testing, null and alternative hypotheses; p-values; one- and two-sided tests; concepts of Type I and Type II errors; concept of power	1.1 1.4 2.3
2 . Large sample test for a proportion	1.5, 1.7
3 . Large sample test for a difference between two proportions	5.3, 5.5
4 . Test for a mean	2.2, 2.2 Part 3
5 . Test for a difference between two means (unpaired and paired)	6.3, 6.4, 7.3, 7.4
6 . Chi-square test for goodness of fit, homogeneity of proportions, and independence (one- and two-way tables)	8.2, 8.3, 8.4
7 . Test for the slope of a least-squares regression line	10.4, 10.5, 10.6