



Course Title: AP Statistics		
<p>Description: The purpose of the AP course in statistics is to introduce students to the major concepts and tools for collecting, analyzing and drawing conclusions from data. Students are exposed to four broad conceptual themes:</p> <ul style="list-style-type: none"> · 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 hypothesis <p>Students who successfully complete the course and exam may receive credit, advanced placement or both for a one-semester introductory college statistics course. AP Statistics corresponds to MAT157 in the DMACC guide.</p>		
<u>Reporting Topic</u>	<u>course Level Standards</u>	<u>Competency Statement</u>
<u>Exploring One-Variable Data</u>	<ul style="list-style-type: none"> ● VAR-1.C Classify types of variables (Skill 2.A) <ul style="list-style-type: none"> ○ VAR-1.A Identify questions to be answered based on variation in one-variable data. (Skill 1.A) ○ VAR-1.B Identify variables in a set of data (Skill 2.A) ○ UNC-1.F Classify types of quantitative variables (Skill 2.A) ● UNC-1.E Compare multiple sets of categorical data (Skill 2.D) <ul style="list-style-type: none"> ○ UNC-1.A Represent categorical data using frequency or relative frequency tables (Skill 2.B) ○ UNC-1.B Describe categorical data represented in frequency or relative tables (Skill 2.A) ○ UNC-1.C Represent categorical data graphically (Skill 2.B) ○ UNC-1.D Describe categorical data represented graphically (Skill 2.A) ● UNC-1.O Compare summary statistics for multiple sets of quantitative data (Skill 2.D) <ul style="list-style-type: none"> ○ UNC-1.I Calculate measures of center and position for quantitative data (Skill 2.C) ○ UNC-1.J Calculate measures of variability for quantitative data. (Skill 2.C) ○ UNC-1.K Explain the selection of a particular measure of center and/or variability for describing a set of quantitative data. (Skill 4.B) ● UNC-1.N Compare graphical representations for multiple sets of quantitative data (Skill 2.D) <ul style="list-style-type: none"> ○ UNC-1.G Represent quantitative data graphically (Skill 2.B) ○ UNC-1.H Describe characteristics of quantitative data distributions (Skill 2.A) ○ UNC-1.L Represent summary statistics for quantitative data graphically (Skill 2.B) ○ UNC-1.M Describe summary statistics of quantitative data represented graphically (Skill 2.A) ● VAR-2.C Compare measures of relative position in data sets. (Skill 2.D) 	



	<ul style="list-style-type: none"> ○ VAR-2.A Compare a data distribution to the normal distribution model. (Skill 2.D) ○ VAR-2.B Determine proportions and percentiles from a normal distribution (Skill 3.A) 	
<u>Exploring Two-Variable Data</u>	<ul style="list-style-type: none"> ● UNC-1.P Compare numerical and graphical representations for two categorical variables. (Skill 2.D) <ul style="list-style-type: none"> ○ VAR-1.D Identify questions to be answered about possible relationships in data (Skill 1.A) ○ UNC-1.Q Calculate statistics for two categorical variables (Skill 2.C) ○ UNC-1.R Compare statistics for two categorical variables (Skill 2.D) ● DAT-1.C Interpret the correlation for a linear relationship (Skill 4.B) <ul style="list-style-type: none"> ○ UNC-1.S Represent bivariate quantitative data using scatterplots. (Skill 2.B) ○ DAT-1.A Describe the characteristics of a scatter plot (Skills 2.A) ○ DAT-1.B Determine the correlation for a linear relationship (Skill 2.C) ● DAT-1.F Describe the form of association of bivariate data using residual plots (Skill 2.A) <ul style="list-style-type: none"> ○ DAT-1.D Calculate a predicted response value using a linear regression model (Skill 2.C) ○ DAT-1.E Represent differences between measured and predicted responses using residual plots. (Skill 2.B) ● DAT-1.I Identify influential points in regression (Skill 2.A) <ul style="list-style-type: none"> ○ DAT-1.G Estimate parameters for the least-squares regression line model (Skill 2.C) ○ DAT-1.H Interpret coefficients for the least-squares regression line model (Skill 4.B) 	
<u>Collecting Data</u>	<ul style="list-style-type: none"> ● DAT-2.D Explain what a particular sampling method is or is not appropriate for a given situation (Skill 1.C) <ul style="list-style-type: none"> ○ DAT-2.C Identify a sampling method given a description of a study. (Skill 1.C) ○ DAT-2.E Identify potential sources of bias in sampling methods. (Skill 1.C) ● VAR-3.E Interpret the results of a well-designed experiment (Skill 4.B) <ul style="list-style-type: none"> ○ VAR-3.A Identify the components of an experiment (Skill 1.C) ○ VAR-3.B Describe elements of a well-designed experiment (Skill 1.B) ○ VAR-3.C Compare experimental designs and methods (Skill 1.C) ○ VAR-3.D Explain why a particular experimental design is appropriate (Skill 1.C) ● DAT-2.A Identify the type of a study. (Skill 1.C) <ul style="list-style-type: none"> ○ VAR-1.E Identify questions to be answered about data collection methods (Skill 1.A) ○ DAT-2.B Identify appropriate generalizations and determinations based on observational studies. (Skill 4.A) 	



<p><u>Probability, Random Variables, and Probability Distributions</u></p>	<ul style="list-style-type: none"> • VAR-4.B Interpret probabilities for events (Skill 4.B) <ul style="list-style-type: none"> ○ VAR-1.F Identify questions suggested by patterns in data. (Skill 1.A) ○ UNC-2.A Estimate probabilities using simulation. (Skill 3.A) ○ VAR-4.A Calculate probabilities for events and their complements. (Skill 3.A) ○ VAR-4.C Explain why two events are (or are not) mutually exclusive (Skill 4.B) ○ VAR-4.D Calculate conditional probabilities. (Skill 3.A) ○ VAR-4.E Calculate probabilities for independent events and for the union of two events (Skill 3.A) • VAR-5.B Interpret a probability distribution (Skill 4.B) <ul style="list-style-type: none"> ○ VAR-5.A Represent the probability distribution for a discrete random variable (Skill 2.B) • VAR-5.E Calculate parameters for linear combinations of random variables (Skill 3.B) <ul style="list-style-type: none"> ○ VAR-5.C Calculate parameters for a discrete random variable (Skill 3.B) ○ VAR-5.D Interpret parameters for a discrete random variable (Skill 4.B) ○ VAR-5.F Describe the effects of linear transformations of parameters of random variables (Skill 3.C) • VAR-5.E Calculate parameters for linear combinations of random variables (Skill 3.B) <ul style="list-style-type: none"> ○ VAR-5.C Calculate parameters for a discrete random variable (Skill 3.B) ○ VAR-5.D Interpret parameters for a discrete random variable (Skill 4.B) ○ VAR-5.F Describe the effects of linear transformations of parameters of random variables (Skill 3.C) • UNC-3.D Interpret probabilities and parameters for a binomial distribution. (Skill 4.B) <ul style="list-style-type: none"> ○ UNC-3.A Estimate probabilities of binomial random variables using data from a simulation. (Skill 3.A) ○ UNC-3.B Calculate probabilities for a binomial distribution (Skill 3.A) ○ UNC-3.C Calculate parameters for a binomial distribution. (Skill 3.B) ○ UNC-3.D Interpret probabilities and parameters for a binomial distribution. (Skill 4.B) • UNC-3.G Interpret probabilities and parameters for a geometric distribution (Skill 4.B) <ul style="list-style-type: none"> ○ UNC-3.E Calculate probabilities for geometric random variables. (Skill 3.A) ○ UNC-3.F Calculate parameters of a geometric distribution (Skill 3.B) 	
<p><u>Sampling</u></p>	<ul style="list-style-type: none"> • VAR-6.A Calculate the probability that a particular value lies in a given interval of a normal distribution (Skill 3.A) <ul style="list-style-type: none"> ○ VAR-1.G Identify questions suggested by variation in statistics for samples collected from the same population (Skill 1.A) ○ VAR-6.B Determine the interval associated with a given area in a normal distribution (Skill 3.A) 	



<p><u>Distributions</u></p>	<ul style="list-style-type: none"> ○ VAR-6.C Determine the appropriateness of using the normal distribution to approximate probabilities for unknown distributions. (Skill 3.C) ○ VAR-1.G Identify questions suggested by variation in statistics for samples collected from the same population (Skill 1.A) ○ VAR-6.A Calculate the probability that a particular value lies in a given interval of a normal distribution (Skill 3.A) ● UNC-3.M Interpret probabilities and parameters for a sampling distribution for a sample population (Skill 4.B) <ul style="list-style-type: none"> ○ UNC-3.H Estimate sampling distributions using simulation (Skill 3.C) ○ UNC-3.I Explain what an estimator is or is not biased (Skill 4.B) ○ UNC-3.J Calculate estimates for a population parameter (Skill 3.B) ○ UNC-3.K Determine parameters of a sampling distribution for sample proportions (Skill 3.B) ○ UNC-3.L Determine whether a sampling distribution for a sample proportion can be described as approximately normal (Skill 3.C) ● UNC-3.P Interpret probabilities and parameters for a sampling distribution for a difference in proportions (Skill 4.B) <ul style="list-style-type: none"> ○ UNC-3.N Determine parameters for a sampling distribution for a difference in sample proportions (Skill 3.B) ○ UNC-3.O Determine whether a sampling distribution for a difference of sample proportions can be described as approximately normal (Skill 3.C) ● UNC-3.S Interpret probabilities and parameters for a sampling distribution for a sample mean (Skill 4.B) <ul style="list-style-type: none"> ○ UNC-3.Q Determine parameters for a sampling distribution for sample means. (Skill 3.B) ○ UNC-3.R Determine whether a sampling distribution of a sample mean can be described as approximately normal (Skill 3.C) ● UNC-3.V Interpret probabilities and parameters for a sampling distribution for a difference in sample means (Skill 4.B) <ul style="list-style-type: none"> ○ UNC-3.T Determine parameters of a sampling distribution for a difference in sample means (Skill 3.B) ○ UNC-3.U Determine whether a sampling distribution of a difference in sample means can be described as approximately normal (Skill 3.C) 	
<p><u>Inference for Categorical</u></p>	<ul style="list-style-type: none"> ● UNC-4.D Calculate an appropriate confidence interval for a population proportion (Skill 3.D) <ul style="list-style-type: none"> ○ VAR-1.H Identify questions suggested by variation in the shapes of distributions of 	



<p><u>Data:</u> <u>Proportions</u></p>	<p>samples taken from the same population (Skill 1.A)</p> <ul style="list-style-type: none"> ○ UNC-4.A Identify an appropriate confidence interval procedure for a population proportion (Skill 1.D) ○ UNC-4.B Verify the conditions for calculating confidence intervals for a population proportion (Skill 4.C) ○ UNC-4.C Determine the margin of error for a given sample size and an estimate for the sample size that will result in a given margin of error for a population proportion (Skill 3.D) ● UNC-4.G Justify a claim based on a confidence interval for a population proportion (Skill 4.D) <ul style="list-style-type: none"> ○ UNC-4.E Calculate an interval estimate based on a confidence interval for a population proportion (Skill 3.D) ○ UNC-4.F Interpret a confidence interval for a population proportion (Skill 4.B) ○ UNC-4.H Identify the relationships between the sample size, width of confidence interval, confidence level. And margin of error for a population proportion (Skill 4.A) ● VAR-4.D Identify the null and alternative hypothesis for a population proportion. (Skill 1.F) <ul style="list-style-type: none"> ○ VAR-6.E Identify an appropriate testing method for a population proportion (Skill 1.E) ○ VAR-6.F Verify the conditions for making statistical inferences when testing a population proportion (Skill 4.C) ● DAT-3.B Justify a claim about the population based on the results of a significance test for a population proportion (Skill 4.E) <ul style="list-style-type: none"> ○ VAR-6.G Calculate an appropriate test statistic and p-value for a population proportion (Skill 3.E) ○ DAT-3.A Interpret the p-value of a significance test for a population proportion (Skill 4.B) ● UNC-5.D Interpret Type I and Type II errors (Skill 4.B) <ul style="list-style-type: none"> ○ UNC-5.A Identify Type I and Type II errors (Skill 1.B) ○ UNC-5.B Calculate the probability of a Type I and Type II errors (Skill 3.A) ○ UNC-5.C Identify factors that affect the probability of errors in significance testing (Skill 4.A) ● UNC-4.N Justify a claim based on a confidence interval for a difference of proportions (Skill 4.D) <ul style="list-style-type: none"> ○ UNC-4.J Identify an appropriate confidence interval procedure for a comparison of population proportions (Skill 1.D) ○ UNC-4.J Verify the conditions for calculating confidence intervals for a difference between population proportions (Skill 4.C) 	
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	<ul style="list-style-type: none"> ○ UNC-4.K Calculate an appropriate confidence interval for a comparison of population proportions (Skill 3.D) ○ UNC-4.L Calculate an interval estimate based on a confidence interval for a difference of proportions (Skill 3.D) ○ UNC-4.M Interpret a confidence interval for a difference of proportions (Skill 4.B) ● DAT-3.D Justify a claim about the population based on the results of a significance test for a difference of population proportions (Skill 4.E) <ul style="list-style-type: none"> ○ VAR-6.H Identify the null and alternative hypothesis for a difference of two population proportions (Skill 1.F) ○ VAR-6.I Identify an appropriate testing method for the difference of two population proportions (Skill 1.E) ○ VAR-6.J Verify the conditions for making statistical inferences when testing a difference of two population proportions (Skill 4.C) ○ VAR-6.K Calculate an appropriate test statistic for the difference of two population proportions (Skill 3.E) ○ DAT-3.C Interpret the p-value of a significance test for a difference of population proportions (Skill 4.B) 	
<u>Inference for Quantitative Data: Means</u>	<ul style="list-style-type: none"> ● UNC-4.T Justify a claim based on a confidence interval for a population mean, including the mean difference between values in matched pairs. (Skill 4.D) <ul style="list-style-type: none"> ○ VAR-1.I Identify questions suggested by probabilities of errors in statistical inference (Skill 1.A) ○ VAR-7.A Describe t-distributions (Skill 3.C) ○ UNC-4.O Identify an appropriate confidence interval procedure for a population mean, including the mean difference between values in matched pairs (Skill 1.D) ○ UNC-4.P Verify the condition for calculating confidence intervals for a population mean, including the mean difference between values in matched pairs (Skill 4.C) ○ UNC-4.Q Determine the margin of error for a given sample size for a one-sample t-interval (Skill 3.D) ○ UNC-4.R Calculate an appropriate confidence interval for a population mean, including the mean difference between values in matched pairs (Skill 3.D) ○ UNC-4.S Interpret a confidence interval for a population mean, including the mean difference between values in matched pairs (Skill 4.B) ○ UNC-4.U Identify the relationships between sample size, width of a confidence interval, confidence level, and margin of error for a population mean (Skill 4.A) ● DAT-3.F Justify a claim about the population based on the results of a significance test for a population mean. (Skill 4.E) 	



	<ul style="list-style-type: none"> ○ VAR-7.B Identify an appropriate testing method for a population mean with unknown σ, including between values in matched pairs. (Skill 1.E) ○ VAR-7.C Identify the null and alternative hypotheses for a population mean with unknown σ, including the mean difference between values in matched pairs. (Skill 1.F) ○ VAR-7.D Verify the conditions for the test for a population mean, including the mean difference between values in matched pairs. (Skill 4.C) ○ VAR-7.E Calculate an appropriate test statistic for a population mean, including the mean difference between values in matched pairs (Skill 3.E) ○ DAT-3.E Interpret the p-value of a significance test for a population mean, including the mean difference between values in matched pairs. (Skill 4.B) ● UNC-4.AA Justify a claim based on a confidence interval for a difference of population means (Skill 4.D) <ul style="list-style-type: none"> ○ Identify an appropriate confidence interval procedure for a difference of two population means (Skill 1.D) ○ UNC-4.W Verify the conditions to calculate confidence intervals for the difference of two population means (Skill 4.C) ○ UNC-4.X Determine the margin of error for the difference of two population means (Skill 3.D) ○ UNC-4.Y Calculate an appropriate confidence interval for a difference of two population means (Skill 3.D) ○ UNC-4.Z Interpret a confidence interval for a difference of population means (Skill 4.B) ○ UNC-4.AB Identify the effects of sample size on the width of a confidence interval for the difference of two means (Skill 4.A) ● DAT-3.H Justify a claim about the population based on the results of a significance test for a difference of two population means in context (Skill 4.E) <ul style="list-style-type: none"> ○ VAR-7.F Identify an appropriate selection of a testing method for a difference of two population means (Skill 1.E) ○ VAR-7.G Identify the null and alternative hypotheses for a difference of two population means (Skill 1.F) ○ VAR-7.H Verify the conditions for the significance test for the difference of two population means. (Skill 4.C) ○ VAR-7.I Calculate an appropriate test statistic for a difference of two means (Skill 3.E) ○ DAT-3.G Interpret the p-value of a significance test for a difference of population means (Skill 4.B) 	
<u>Inference for Categorical</u>	<ul style="list-style-type: none"> ● DAT-3.J Justify a claim about the population based on the results of a chi-square test for goodness of fit (Skill 4.E) 	



<p><u>Data:</u> <u>Chi-Square</u></p>	<ul style="list-style-type: none"> ○ VAR-1.J Identify questions suggested by variation between observed and expected counts in categorical data (Skill 1.A) ○ VAR-8.A Describe chi-square distributions (Skill 3.C) ○ VAR-8.B Identify the null and alternative hypotheses in a test for a distribution of populations in a set of categorical data (Skill 1.F) ○ VAR-8.C Identify an appropriate testing method for a distribution of proportions in a set of categorical data (Skill 1.E) ○ VAR-8.D Calculate expected counts for the chi-square test for goodness of fit (Skill 3.A) ○ VAR-8.E Verify the conditions for making statistical inferences when testing goodness of fit for a chi-square distribution (Skill 4.C) ○ VAR-8.F Calculate the appropriate statistic for the chi-square test for goodness of fit (Skill 3.E) ○ VAR-8.G Determine the p-value for chi-square test for goodness of fit significance test (Skill 3.E) ○ DAT-3.I Interpret the p-value for the chi-square test for goodness of fit (Skill 4.B) ● DAT-3.L Justify a claim about the population based on the results of a chi-square test for homogeneity or independence (Skill 4.E) <ul style="list-style-type: none"> ○ VAR-8.H Calculate expected counts of two way tables of categorical data (Skill 3.A) ○ VAR-8.I Identify the null and alternative hypotheses for a chi-square test for homogeneity or independence (Skill 1.F) ○ VAR-8.J Identify an appropriate testing method for comparing distributions in two way tables of categorical data (Skill 1.E) ○ VAR-8.K Verify the conditions for making statistical inferences when testing a chi-square distribution for independence or homogeneity (Skill 4.C) ○ VAR-8.L Calculate the appropriate statistic for a chi-square test for homogeneity or independence (Skill 3.E) ○ VAR-8.M Determine the p-value for a chi-square significance test for independence or homogeneity (Skill 3.E) ○ DAT-3.K Interpret the p-value for the chi-square test for homogeneity or independence (Skill 4.B) 	
<p><u>Inference for Qualitative Data: Slope</u></p>	<ul style="list-style-type: none"> ● UNC-4.AH Justify a claim based on a confidence interval for the slope of a regression model (Skill 4.D) <ul style="list-style-type: none"> ○ VAR-1.K Identify questions suggested by variation in scatter plots (Skill 1.A) ○ VAR-4.AC Identify an appropriate confidence interval procedure for a slope of a regression model (Skill 1.D) 	



	<ul style="list-style-type: none">○ VAR-4.AD Verify the conditions to calculate confidence intervals for the slope of a regression model (Skill 4.C)○ UNC-4.AE Determine the given margin of error for the slope of a regression model (Skill 3.D)○ UNC-4.AF Calculate an appropriate confidence interval for the slope of a regression model (Skill 3.D)○ UNC-4.AG Interpret a confidence interval for the slope of a regression model (Skill 4.B)○ UNC-4.AI Identify the effects of sample size on the width of a confidence interval for the slope of a regression model (Skill 4.A)● DAT-3.N Justify a claim about the population based on the results of a significance test for the slope of a regression model (Skill 4.E)<ul style="list-style-type: none">○ VAR-7.J Identify the appropriate selection of a testing method for a slope of a regression model. (Skill 1.E)○ VAR-K Identify appropriate null and alternative hypotheses for a slope of a regression model. (Skill 1.F)○ VAR-7.L Verify the conditions for the significance test for the slope of a regression model (Skill 4.C)○ VAR-7.M Calculate an appropriate test statistic for the slope of a regression model (Skill 3.E)○ DAT-3.M Interpret the p-value of a significance test for the slope of a regression model (Skill 4.B)	
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