
Syllabus Development Guide: AP[®] Statistics

The guide contains the following sections and information:

Curricular Requirements	The curricular requirements are the core elements of the course. Your syllabus must provide clear evidence that each requirement is fully addressed in your course.
Scoring Components	Some curricular requirements consist of complex, multi-part statements. These particular requirements are broken down into their component parts and restated as “scoring components.” Reviewers will look for evidence that each scoring component is included in your course.
Evaluation Guideline(s)	These are the guidelines used by reviewers to evaluate the evidence in your syllabus. Use these guidelines to determine the level of detail reviewers require to demonstrate how the curricular requirements are met in your course.
Key Term(s)	To ensure the clarity of certain terms or expressions that may have multiple meanings, each of these terms is clearly defined.
Samples of Evidence	For each scoring component, three separate samples of evidence are provided. These statements provide clear descriptions of what acceptable evidence should look like.

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Curricular Requirement	<p>The course provides instruction in each of the following four broad conceptual themes outlined in the course description with appropriate emphasis on each:</p> <ul style="list-style-type: none"> • Exploring data • Sampling and experimentation • Anticipating patterns • Statistical inference
Scoring Component 1	<p>The course provides instruction in exploring data.</p>
Evaluation Guideline(s)	<p>The syllabus must provide evidence of both graphical and statistical methods of exploring data. Covering only one of the two approaches is not sufficient.</p> <p>There must be evidence that students are calculating and interpreting statistical results in context.</p>
Key Term(s)	<p>Exploring data: includes calculations of numerical summary statistics, interpreting those summary statistics in context, and creating graphical representations of data and interpreting those graphical representations in context.</p>
<p>Samples of Evidence</p> <ol style="list-style-type: none"> 1. Students calculate and interpret numerical descriptive statistics and create and interpret graphical statistical displays of data. 2. When mentioning exploring data, the syllabus states, “Students become familiar with graphical portrayal of data, for example, using box and whisker plots, stem plots, and histograms.” The syllabus states, “Students become familiar with descriptive statistics such as the five-number summary, median, mean, variance, and standard deviation.” 3. When mentioning exploring data, the syllabus states, “Samples of graphics and numerical statistics from <i>USA Today</i> are reviewed on a regular basis, with students critiquing the presentations. The class makes extensive use of data sets with students entering data, calculating the summary statistics, and presenting their results graphically.” 	

Curricular Requirement	<p>The course provides instruction in each of the following four broad conceptual themes outlined in the course description with appropriate emphasis on each:</p> <ul style="list-style-type: none"> • Exploring data • Sampling and experimentation • Anticipating patterns • Statistical inference
Scoring Component 2	The course provides instruction in sampling.
Evaluation Guideline(s)	None at this time.
Key Term(s)	None at this time.
<p>Samples of Evidence</p> <ol style="list-style-type: none"> 1. The syllabus states, “The methods of simple random, stratified random, and systematic sampling are discussed and their appropriateness for different situations evaluated.” 2. In the sampling unit, the syllabus states, “Students plan and justify a sampling procedure for given real-life sampling problems. These scenarios span the sampling procedures, and include situations where different possible strategies are arguably reasonable. In student planning, specific issues of potential bias must be addressed. It is not necessary to actually solve completely any issues of bias, but limitations must be noted.” 3. The syllabus provides examples of assignments that provide sufficient detail that students are involved in planning sampling procedures (to include simple random sampling, stratified sampling, and cluster sampling) for a variety of situations. The assignments require that students consider potential bias. 	

Curricular Requirement	<p>The course provides instruction in each of the following four broad conceptual themes outlined in the course description with appropriate emphasis on each:</p> <ul style="list-style-type: none"> • Exploring data • Sampling and experimentation • Anticipating patterns • Statistical inference
Scoring Component 3	The course provides instruction in experimentation.
Evaluation Guideline(s)	None at this time.
Key Term(s)	None at this time.
<p>Samples of Evidence</p> <ol style="list-style-type: none"> 1. In the experimentation unit, the syllabus states, “Students are presented with problems of experimental design gleaned from newspapers and/or newsmagazine reports. Students must (a) explain the design issues as presented in the report, and (b) flesh out the details as they would improve on the experiment.” 2. Examples of assignments provide sufficient detail on experimental design and stress random assignment and blocking. 3. Details on chapter coverage include sufficient information on experimental design including the execution of an experiment. 	

Curricular Requirement	<p>The course provides instruction in each of the following four broad conceptual themes outlined in the course description with appropriate emphasis on each:</p> <ul style="list-style-type: none"> • Exploring data • Sampling and experimentation • Anticipating patterns • Statistical inference
Scoring Component 4	<p>The course provides instruction in anticipating patterns.</p>
Evaluation Guideline(s)	<p>The syllabus must include coverage of probability, combining independent random variables, the normal distribution, and sampling distributions.</p>
Key Term(s)	<p>Anticipating patterns: exploring random phenomena using probability and simulation, including distributions of both discrete and continuous random variables. Probability is a tool for anticipating what the distribution of data should look like under a given model.</p>
<p>Samples of Evidence</p> <ol style="list-style-type: none"> 1. A combination of assignments and chapter citations provides students with instruction in using probability and simulation to model random behavior in real contexts. 2. The chapter details provided in the syllabus include instruction on probability, combining independent random variables, the normal distribution, and sampling distributions. 3. The syllabus includes a variety of assignments related to the graphic and numeric interpretation of chance behavior. In one assignment students study patterned outcomes of chance events by constructing relative frequency histograms of simulated experiments with discrete random variables, and in another students compute probabilities using the normal distribution and other sampling distributions of statistics. 	

Curricular Requirement	<p>The course provides instruction in each of the following four broad conceptual themes outlined in the course description with appropriate emphasis on each:</p> <ul style="list-style-type: none"> • Exploring data • Sampling and experimentation • Anticipating patterns • Statistical inference
Scoring Component 5	The course provides instruction in statistical inference.
Evaluation Guideline(s)	None at this time.
Key Term(s)	<p>Statistical inference: the use of sample statistics to make conclusions about the broader population from which the sample was drawn. For the statistics student, statistical inference involves computing and interpreting in context the confidence intervals and hypothesis tests enumerated in the Course Description.</p>
<p>Samples of Evidence</p> <ol style="list-style-type: none"> 1. The syllabus includes detailed coverage of chapters on confidence intervals for a proportion, the difference between two proportions, the mean, the difference between two means, and the slope of the regression line. The syllabus also provides coverage on hypothesis testing for a proportion, the difference between two proportions, the mean, the difference between two means, goodness of fit, homogeneity of proportions, independence, and the slope of the regression line. 2. The syllabus includes detailed information on assignments covering confidence intervals for a proportion, the difference between two proportions, the mean, the difference between two means, and the slope of the regression line. The syllabus also includes information on assignments on hypothesis testing for a proportion, the difference between two proportions, the mean, the difference between two means, goodness of fit, homogeneity of proportions, independence, and the slope of the regression line. 3. The syllabus includes a combination of assignments and chapters addressing confidence intervals for a proportion, the difference between two proportions, the mean, the difference between two means, and the slope of the regression line. The syllabus also includes a combination of assignments and chapters covering hypothesis testing for a proportion, the difference between two proportions, the mean, the difference between two means, goodness of fit, homogeneity of proportions, independence, and the slope of the regression line. 	

Curricular Requirement	The course draws connections between all aspects of the statistical process including design, analysis, and conclusions.
Scoring Component 6	The course draws connections between all aspects of the statistical process including design, analysis, and conclusions.
Evaluation Guideline(s)	The syllabus must include a description of projects or activities demonstrating that students bring together all aspects of the statistical process including design, analysis and conclusions.
Key Term(s)	Draws connections: assignments or activities that require the students to draw connections among all aspects of the statistical process (exploring data, sampling and experimentation, anticipating patterns, and statistical inference) in a manner that demonstrates an understanding of the overall process of quantitative research. With equivalent emphasis on drawing connections within the four conceptual themes, students should be taught to connect various parts of the statistical process through either a single project or activity or a sequence of project activities. Assignments that demonstrate specific aspects of the course without explicit indication of linking of the conceptual themes are not sufficient.
Samples of Evidence	
<ol style="list-style-type: none"> 1. Students (either individually or in pairs) conduct a substantial project using the statistical techniques learned during the course. The project may involve the collection of data or the use of available data and must require that students engage in all stages of the research process. 2. The syllabus includes an assignment where students complete a written report of their project involving the design and administration of a survey from which they collect and analyze data using descriptive and inferential statistics, drawing conclusions from their analysis. 3. In the introduction, the syllabus states, “Student projects are assigned as a major and formal assignment in the second semester. Students must, in stages: (a) plan the sampling procedure, (b) clearly define their measurement strategy, (c) anticipate confounding variables in the case of experiments and issues of bias in an observational study (d) suggest their statistical analysis at the planning stage, (e) conduct their analysis, (f) interpret their results in context, and (g) present their results. Both a written report and a short question-and-answer in front of the class are required.” 	

Curricular Requirement	The course teaches students how to communicate methods, results and interpretations using the vocabulary of statistics.
Scoring Component 7	The course teaches students how to communicate methods, results and interpretations using the vocabulary of statistics.
Evaluation Guideline(s)	The syllabus must include at least one assignment to demonstrate that students communicate methods, results and interpretations using the vocabulary of statistics.
Key Term(s)	Communicate: formal written and/or oral presentation of data collection methods, analysis via descriptive and/or inferential statistics, and interpretation of the results of analysis in the context of the problem being studied using statistical language. Informal class discussion or answering free response items, for example, do not meet this definition.
Samples of Evidence	
<ol style="list-style-type: none"> 1. The syllabus states that students write formal assignments (e.g. essays, projects, or formal classroom presentations) that require students to use the language and vocabulary of statistics to describe methods, results, and interpretations in order to complete the assignment. 2. The syllabus includes a final project that requires a formal written and/or oral presentation that includes statistical methods, vocabulary and interpretations. 3. The syllabus illustrates an assignment that requires students to provide formal written and/or oral presentations of research reported in newspapers, news magazines, or academic journals. The assignment requires students to describe the statistical methods, vocabulary, and interpretations of their findings. 	

Curricular Requirement	The course teaches students how to use graphing calculators and demonstrates the use of computers and/or computer output to enhance the development of statistical understanding through exploring and analyzing data, assessing models, and performing simulations.
Scoring Component 8	The course teaches students how to use graphing calculators to enhance the development of statistical understanding through exploring data, assessing models, and/or analyzing data.
Evaluation Guideline(s)	The calculator must be tied to specific assignments and specific uses.
Key Term(s)	Enhance the development: use of technology to enhance development of statistical understanding includes the process of using calculators, computers, or examples of computer output to facilitate student learning of statistical content.
Samples of Evidence	
<ol style="list-style-type: none"> 1. In the graphing calculators section, the syllabus states, “In the data exploration chapters students are taught to calculate the relevant statistics and use the List features of their calculators.” 2. Calculator usage is detailed in the chapter coverage throughout the course. 3. The syllabus may state, “Technology is incorporated throughout the text, including the use of graphing calculators. Each chapter in the text has a section on calculator use to give the students instruction and practice with the statistical capabilities of the calculator.” 	

Curricular Requirement	The course teaches students how to use graphing calculators and demonstrates the use of computers and/or computer output to enhance the development of statistical understanding through exploring and analyzing data, assessing models, and performing simulations.
Scoring Component 9	The course teaches students how to use graphing calculators, tables, or computer software to enhance the development of statistical understanding through performing simulations.
Evaluation Guideline(s)	The syllabus must provide evidence of one assignment or activity where students use graphing calculators, tables, or computer software to enhance the development of statistical understanding through performing simulations.
Key Term(s)	None at this time.
Samples of Evidence	
<ol style="list-style-type: none"> 1. The syllabus states that, "Simulation of sampling distributions is performed and results of different estimators are analyzed using the German Tank problem." 2. The textbook procedure for performing simulations is used by the students to simulate probabilistic events. 3. Students use statistical software to design and execute simulations of chance behavior. 	

Curricular Requirement	The course teaches students how to use graphing calculators and demonstrates the use of computers and/or computer output to enhance the development of statistical understanding through exploring and analyzing data, assessing models, and performing simulations.
Scoring Component 10	The course demonstrates the use of computers and/or computer output to enhance the development of statistical understanding through exploring data, analyzing data, and/or assessing models.
Evaluation Guideline(s)	The syllabus must provide evidence of one assignment or activity where students use computers to enhance the development of statistical understanding through exploring data, analyzing data, and/or assessing models. Explicit mention of the use of computer output in the primary text or supplemental materials only is not sufficient.
Key Term(s)	Computers and/or computer output: includes the use of statistical computer programs and/or output to facilitate data analysis and simulations.
<p>Samples of Evidence</p> <ol style="list-style-type: none"> 1. Students use computer software and/or computer output to display transformed data. 2. The students use statistical software in the completion of assignments or semester projects. 3. The syllabus states that Minitab, SPSS, or other statistical output are available in the text and used throughout the course to complete assignments. 	