

East Penn School District
Secondary Curriculum

A Planned Course Statement
for

Statistics AP

Course # 364

Grade(s) 10—12

Department: Math

Length of Period (mins.) 41 Total Clock Hours: 126

Periods per Cycle: 6 Length of Course (yrs.) 1

Type of Offering: required elective

Credit: 1

Adopted: 6/28/10

Developed by:

Cynthia Brashear

Description of Course

This course is designed for those students who want a solid background in statistics prior to attending college. Many college majors require a course in statistics; especially engineering, business, and social sciences. Four main components of the course will be: exploring data to discover patterns or departures from patterns, planning a study and deciding what and how to measure, anticipating patterns and producing models using probability theory and simulation, and drawing statistical inferences in order to select and confirm appropriate models. The course will include almost daily use of technology and it is strongly recommended that students have their own graphing calculator and have a basic knowledge of Excel. Students who satisfactorily complete this course will be eligible to take the Advanced Placement Statistics exam for possible college credit.

Course Title: AP Statistics

Description:

Goals:

- To introduce students to material which will allow them to describe, analyze and make predictions from data.
- To prepare students to take the AP Statistics exam

Requirements:

- Algebra III/Trigonometry CP (84% or better) OR Algebra III/Trigonometry Honors (84% or better)

Text: The Practice of Statistics for AP, Starnes, Yates, Moore, 2012 WH Freeman and Company
4th Edition

Key to Levels of Achievement (Listed with each learning objective)

| | |
|--------------------|--|
| Awareness (A): | Students are introduced to concepts, forms, and patterns. |
| Learning (L): | Students are involved in a sequence of steps and practice activities which involved further development and allow evaluation of process. |
| Understanding (U): | Students demonstrate ability to apply acquired concepts and skills to individual assignments and projects on an independent level. |
| Reinforcement (R): | Students maintain and broaden understanding of concepts and skills to accomplish tasks at a greater level of sophistication. |

| Unit | Num | Objective | Level | Content | Evaluation | Standard |
|------------------------------|-----|--|-------|---|--|------------|
| I. Exploring Univariate Data | 1 | Students will calculate measures of central tendency of a set of data (mean, median, and mode). | R | <ul style="list-style-type: none"> ● Material and exercises from Chapter 3.1 ● Calculator exercises | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (A) |
| | 2 | Students will identify the measures of dispersion of a set of data (range, interquartile range, and standard deviation). | U | <ul style="list-style-type: none"> ● Material and exercises from Chapter 3.2 ● Calculator exercises | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (A) |
| | 3 | Students will find standardized scores and percentiles. | U | <ul style="list-style-type: none"> ● Material and exercises from Chapters 3.4 and 6.2 | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (B) |
| | 4 | Students will identify any clusters and gaps in sets of data. | U | <ul style="list-style-type: none"> ● Examples and worksheets | Homework assignments Discussion Class activities Quizzes Tests | |
| | 5 | Students will determine whether a set of data has outliers. | U | <ul style="list-style-type: none"> ● Material and exercises from Chapter 3.4 | Homework assignments Discussion Class activities Quizzes Tests | |
| | 6 | Students will describe the shape of a distribution. | U | <ul style="list-style-type: none"> ● Material and exercises from Chapter 2.3 | Homework assignments Discussion Class activities Quizzes Tests | |
| | 7 | Students will create a dotplot from a set of data. | R | <ul style="list-style-type: none"> ● Material and exercises from Chapter 2.2 ● Worksheets | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (A) |

| Unit | Num | Objective | Level | Content | Evaluation | Standard |
|------|-----|--|-------|--|--|------------|
| | 8 | Students will create a stem and leaf plot from a set of data. | R | <ul style="list-style-type: none"> Material and exercises from Chapter 2.4 | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (A) |
| | 9 | Students will create a histogram from a set of data. | U | <ul style="list-style-type: none"> Material and exercises from Chapter 2.3 | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (A) |
| | 10 | Students will create a cumulative frequency plot from a set of data. | U | <ul style="list-style-type: none"> Material and exercises from Chapter 2.3 | Homework assignments Discussion Class activities Quizzes Tests | |
| | 11 | Students will create a boxplot from a set of data. | R | <ul style="list-style-type: none"> Material and exercises from Chapter 3.4 | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (A) |
| | 12 | Students will compare center and spread of multiple sets of data. | U | <ul style="list-style-type: none"> Worksheets Calculator exploration | Homework assignments Discussion Class activities Quizzes Tests | |
| | 13 | Students will compare clusters and gaps of multiple sets of data. | U | <ul style="list-style-type: none"> Worksheets Calculator exploration | Homework assignments Discussion Class activities Quizzes Tests | |
| | 14 | Students will compare outliers of multiple sets of data. | U | <ul style="list-style-type: none"> Worksheets Calculator exploration | Homework assignments Discussion Class activities Quizzes Tests | |

| Unit | Num | Objective | Level | Content | Evaluation | Standard |
|------------------------------|-----|---|-------|--|--|--|
| | 15 | Students will compare shapes of multiple distributions. | U | <ul style="list-style-type: none"> Worksheets Calculator exploration | Homework assignments Discussion Class activities Quizzes Tests | |
| II. Exploring Bivariate Data | 16 | Students will analyze patterns in scatterplots. | U | <ul style="list-style-type: none"> Material and exercises from Chapter 10.1 | Homework assignments Discussion Class activities Quizzes Tests | |
| | 17 | Students will find the coefficient of correlation and describe the linearity of a distribution. | U | <ul style="list-style-type: none"> Material and exercises from Chapters 10.2 and 10.3 Calculator exercises | Homework assignments Discussion Class activities Quizzes Tests | 2.2.11 (C) |
| | 18 | Students will find the equation of the least-squares regression line. | U | <ul style="list-style-type: none"> Material and exercises from Chapters 10.2 and 10.3 Calculator exercises | Homework assignments Discussion Class activities Quizzes Tests | 2.2.11 (C) 2.6.11 (C,D) |
| | 19 | Students will discuss residual plots, outliers, and influential points in a set of data. | U | <ul style="list-style-type: none"> Material and exercises from Chapters 10.2 and 10.3 | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (C) |
| | 20 | Students will use appropriate transformations to achieve linearity (logarithmic and power transformations). | L | <ul style="list-style-type: none"> Worksheets Calculator exploration | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (D) 2.1.11 (A) 2.2.11 (F) |
| III. Planning a Study | 21 | Students will describe different methods of data collection, and decide when each is appropriate to use. | U | <ul style="list-style-type: none"> Material and exercises from Chapter 2.1 | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (B,E) |

| Unit | Num | Objective | Level | Content | Evaluation | Standard |
|--------------------------------|-----|---|-------|---|--|--------------|
| | 22 | Students will list the characteristics of a well designed and well-conducted surveys and experiments. | U | <ul style="list-style-type: none"> ● Material and exercises from Chapter 2.1 ● Worksheets | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (B,E) |
| | 23 | Students will list the population and sample used in a particular study or experiment. | U | <ul style="list-style-type: none"> ● Material and exercises from Chapter 1.1 | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (B) |
| | 24 | Students will describe types of random sampling. | U | <ul style="list-style-type: none"> ● Material and exercises from Chapter 2.1 | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (A) |
| | 25 | Students will identify potential sources of bias in surveys and experiments. | U | <ul style="list-style-type: none"> ● Material and exercises from Chapter 1.1 ● Worksheets ● Examples | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (E) |
| | 26 | Students will define various terms (placebo effect, treatment group, control groups, etc.) in terms of a particular experiment. | U | <ul style="list-style-type: none"> ● Material and exercises from Chapter 2.1 ● Worksheets ● Examples | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (G) |
| | 27 | Students will discuss the appropriateness of the generalization of results from observational studies, experimental studies, and surveys. | U | <ul style="list-style-type: none"> ● Material and exercises from Chapter 2.1 ● Worksheets ● Examples | Homework assignments Discussion Class activities Quizzes Tests | 2.2.11 (D) |
| IV. Patterns and Probabilities | 28 | Students will describe the Law of Large Numbers. | U | <ul style="list-style-type: none"> ● Material and exercises from Chapter 4.1 | Homework assignments Discussion Class activities Quizzes Tests | |

| Unit | Num | Objective | Level | Content | Evaluation | Standard |
|------|-----|---|-------|--|--|------------------|
| | 29 | Students will find the probability in given situations using the addition rule, the multiplication rule, conditional probability, and independence where appropriate. | U | <ul style="list-style-type: none"> Material and exercises from Chapters 4.1, 4.2, and 4.3 | Homework assignments Discussion Class activities Quizzes Tests | 2.7.11 (A,B,D,E) |
| | 30 | Students will use the binomial, geometric, and poisson distributions where appropriate to determine probabilities. | U | <ul style="list-style-type: none"> Material and exercises from Chapters 5.2, 5.3, and 5.4 | Homework assignments Discussion Class activities Quizzes Tests | 2.7.11 (D) |
| | 31 | Students will find the mean (expected value) and standard deviation of a probability distribution. | U | <ul style="list-style-type: none"> Material and exercises from Chapters 5.1 and 5.3 | Homework assignments Discussion Class activities Quizzes Tests | |
| | 32 | Students will identify random variables as independent or dependent. | U | <ul style="list-style-type: none"> Material and exercises from Chapter 5.1 | Homework assignments Discussion Class activities Quizzes Tests | |
| | 33 | Students will identify the properties of the normal distribution. | U | <ul style="list-style-type: none"> Material and exercises from Chapter 6.1 | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (I) |
| | 34 | Students will find probabilities using the normal distribution, both by tables and by calculator. | U | <ul style="list-style-type: none"> Material and exercises from Chapters 6.1, 6.2, and 6.3 | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (I) |
| | 35 | Students will find probabilities of sampling distributions. | U | <ul style="list-style-type: none"> Material and exercises from Chapters 7.1 and 7.2 | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (H) |

| Unit | Num | Objective | Level | Content | Evaluation | Standard |
|--------------------------|-----|--|-------|--|--|--------------------------------|
| V. Statistical Inference | 36 | Students will describe the meaning of confidence intervals with respect to data. | U | <ul style="list-style-type: none"> Material and exercises from Chapter 8.1 | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (H) 2.7.11 (C) |
| | 37 | Students will find confidence intervals for a proportion, a mean, a difference between proportions, and a difference between two means. | U | <ul style="list-style-type: none"> Material and exercises from Chapters 8.1, 8.2, 8.3, and 8.5 | Homework assignments Discussion Class activities Quizzes Tests | 2.6.11 (H) |
| | 38 | Students will define terms associated with tests of significance (p-values, null and alternate hypotheses, one- and two-tailed tests, types of errors, . . .). | U | <ul style="list-style-type: none"> Material and exercises from Chapters 9.1 and 9.3 Worksheets Examples | Homework assignments Discussion Class activities Quizzes Tests | |
| | 39 | Students will perform a hypothesis test involving the mean for large and small samples. | U | <ul style="list-style-type: none"> Material and exercises from Chapters 9.2 and 9.4 | Homework assignments Discussion Class activities Quizzes Tests | 2.5.11 (A,B,C,D) 2.7.11 (C) |
| | 40 | Students will perform a hypothesis test involving a proportion. | U | <ul style="list-style-type: none"> Material and exercises from Chapter 9.5 | Homework assignments Discussion Class activities Quizzes Tests | 2.5.11 (A,B,C,D) 2.7.11 (C) |
| | 41 | Students will perform a hypothesis test for paired differences (dependent samples). | U | <ul style="list-style-type: none"> Material and exercises from Chapter 9.6 | Homework assignments Discussion Class activities Quizzes Tests | 2.5.11 (A,B,C,D) 2.7.11 (C) |
| | 42 | Students will perform a hypothesis test for the difference of two means or two proportions (independent samples). | U | <ul style="list-style-type: none"> Material and exercises from Chapter 9.7 | Homework assignments Discussion Class activities Quizzes Tests | 2.5.11 (A,B,C,D) 2.7.11 (C) |

| Unit | Num | Objective | Level | Content | Evaluation | Standard |
|------|-----|---|-------|--|--|---|
| | 43 | Students will perform a chi-square test for goodness of fit. | U | <ul style="list-style-type: none"> Material and exercises from Chapter 11.2 | Homework assignments Discussion Class activities Quizzes Tests | 2.5.11 (A,B,C,D) 2.7.11 (C) |
| | 44 | Students will perform a chi-square test for homogeneity of proportions. | U | <ul style="list-style-type: none"> Material and exercises from Chapter 11.2 | Homework assignments Discussion Class activities Quizzes Tests | 2.5.11 (A,B,C,D) 2.7.11 (C) |
| | 45 | Students will perform a chi-square test for independence. | U | <ul style="list-style-type: none"> Material and exercises from Chapter 11.1 | Homework assignments Discussion Class activities Quizzes Tests | 2.5.11 (A,B,C,D) 2.6.11 (F) 2.7.11 (C) |