

CHAMBERSBURG AREA SCHOOL DISTRICT
COURSE OF PLANNED INSTRUCTION

SCHOOL C.A.S.H.S. DEPARTMENT Math DATE 2-1-04
COURSE TITLE A.P. Statistics GRADE 12 COURSE LENGTH Full Year
LESSON FREQUENCY (PER WEEK) 5 TIME 47 min COURSE REVISED New
COURSE CREDIT 1.0 COURSE REQUIRED _____ ELECTED Yes

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I. MAJOR COURSE OBJECTIVES AND STUDENT PERFORMANCE INDICATORS

All Students Will:

- A. Interpret graphical displays of distributions and summarize univariate data 2.6.11.A, 2.6.11.B
1. Interpreting graphical displays of distributions of univariate data (dotplot, stemplot, histogram, cumulative frequency plot, boxplots, parallel boxplots, back-to-back stemplots)
 2. Calculate and describe relations between measures of center and measures of spread including using sigma-notation, (median, mean, range, interquartile range, standard deviation)
 3. Describe and calculate clusters, gaps, outliers and other unusual features of data
 4. Measure position quantities such as quartiles, percentiles, standardized scores (z-scores)
 5. Describe the effect of changing units on summary measures
- B. Explore bivariate and categorical data 2.6.11.A, 2.6.11.B
2.6.11.C, 2.6.11.D
1. Analyze patterns in scatterplots
 2. Calculate correlation coefficient and least-squares regression line
 3. Examine residual plots, outliers, and influential points
 4. Transform nonlinear data to achieve linearity: logarithmic and power transformations
 5. Explore frequency tables, marginal and joint frequencies for two-way tables, conditional relative frequencies
- C. Understand and apply methods of data collection 2.6.11.A, 2.6.11.E
2.6.11.G, 2.6.11.H
1. Differentiate between methods of data collection
 2. Plan and conduct surveys and experiments
 3. Differentiate between populations, samples, and random selection
 4. Generalize the results from observational studies, experimental studies, and surveys
 5. Understand and apply the techniques of random sampling
- D. Understand and apply the laws of probability 2.7.11.A, 2.7.11.C
2.7.11.D, 2.7.11.E
1. Understand and apply "Law of large numbers" concept
 2. Use the addition rule, multiplication rule, conditional probability, and independence
- E. Evaluate random variables, binomial distributions, and geometric distributions 2.6.11.D, 2.6.11.H
2.7.11.D
1. Simulate probability distributions, including binomial and geometric
 2. Calculate mean (expected value) and standard deviation of a random variable, and linear

transformation of a random variable

3. Understand the difference of independence versus dependence

4. Calculate mean and standard deviation for sums and differences of independent random variables

F. Model data using normal distribution 2.6.11.I

1. Apply properties of the normal distribution

2. Use tables for finding normal distributions

3. Standardize an observation using a z-score

G. Analyze sampling distributions and correlate this statistical inference 2.6.11.H, 2.6.11.I

1. Interpret a sampling distribution

2. Calculate the mean and standard deviation of a sampling distribution

3. Understand and apply the Central Limit Theorem

4. Simulate sampling distributions

H. Compute and interpret a confidence interval 2.6.11.H

1. State the meaning of a confidence interval

2. Calculate a confidence interval for both a mean and proportion

3. Determine the validity of a confidence interval based on the sample data

4. Apply tests of significance

5. Recognize special cases of normally distributed data

II. CONTENT OUTLINE AND TIME ALLOCATION

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| A. | Univariate data | 4.5 weeks |
| | 1. Dotplot, stemplot, histogram, cumulative frequency plot, back-to-back stemplots, parallel boxplots | |
| | 2. Clusters and gaps | |
| | 3. Outliers and other unusual features | |
| | 4. Shapes | |
| | 5. Measuring center: median, mean | |
| | 6. Measuring spread: range, interquartile range, standard deviation | |
| | 7. Measuring position: quartiles, percentiles, standardized scores (z-scores) | |
| | 8. Using boxplots | |
| | 9. The effect of changing units on summary measures | |
| | 10. Comparing center and spread: within group, between group variation | |
| B. | Bivariate and categorical data | 3.5 weeks |
| | 1. Analyzing patterns in scatterplots | |
| | 2. Correlation and linearity | |
| | 3. Least-squares regression line | |
| | 4. Residual plots, outliers, and influential points | |
| | 5. Transformations to achieve linearity: logarithmic and power transformations | |
| | 6. Marginal and joint frequencies for two-way tables | |
| | 7. Conditional relative frequencies and association | |
| C. | Overview of methods of data collection | 4 weeks |
| | 1. Census | |
| | 2. Sample survey | |
| | 3. Experiment | |
| | 4. Observational study | |
| | 5. Characteristics of a well-designed and well-conducted survey | |
| | 6. Populations, samples, and random selection | |
| | 7. Sources of bias in surveys | |
| | 8. Simple random sampling | |
| | 9. Stratified random sampling | |
| | 10. Characteristics of a well-designed and well-conducted experiment | |
| | 11. Treatments, control groups, experimental units, random assignments, and replication | |
| | 12. Sources of bias and confounding, including placebo effect and blinding | |
| | 13. Completely randomized design | |
| | 14. Randomized block design, including matched pairs design | |
| D. | Probability | 3.5 weeks |
| | 1. "Law of large numbers" concept | |
| | 2. Addition rule, multiplication rule, conditional probability, and independence | |
| E. | Random variables, binomial and geometric distributions | 5 weeks |
| | 1. Discrete random variables and their probability distributions, including binomial | |
| | 2. Simulation of probability distributions, including binomial and geometric | |
| | 3. Mean (expected value) and standard deviation of a random variable, and linear transformation of a random variable | |
| | 4. Combining independent random variables | |
| | 5. Notion of independence versus dependence | |
| | 6. Mean and standard deviation for sums and differences of independent random variables | |
| F. | Normal distribution | 3.5 weeks |
| | 1. Properties of the normal distribution | |
| | 2. Using tables of the normal distribution | |

	3. The normal distribution as a model for measurements	
	4. Z-scores	
G.	Sampling distributions	4 weeks
	1. Sampling distribution of a sample proportion	
	2. Sampling distribution of a sample mean	
	3. Central Limit Theorem	
	4. Sampling distribution of a difference between two independent sample proportions	
	5. Sampling distribution of a difference between two independent sample means	
	6. Simulation of sampling distributions	
H.	Confidence intervals	5 weeks
	1. The meaning of a confidence interval	
	2. Large sample confidence interval for a proportion, mean, and difference between two proportions	
	3. Large sample confidence interval for a difference between two means (unpaired and paired)	
	4. Tests of significance	
	6. Chi-square test for goodness of fit, homogeneity of proportions, and independence (one- and two-way tables)	
	7. T-distribution	
	8. Inference for the slope of least-squares regression line	
I.	Review for AP exam	1 week
J.	Related topics from other disciplines and student project presentations	2 weeks

III. TEXTS, MATERIALS, AND MAJOR RESOURCES

Text: The Practice of Statistics. Yates, Moore, and Starns: W. H. Freeman, 2003
Other resources published by W. H. Freeman:
Teacher's Edition
Teacher's Resource Binder
Instructor's CD resources
Prep for Exam Supplement

IV. PROCEDURES FOR ASSESSMENT OF PA ACADEMIC STANDARDS

Teacher designed quizzes and tests and/or standard text tests
Midterm and cumulative exams as designated by District policy
Teacher observation
Class participation, group discussions, and teacher conference
Teacher, peer, self-assessment of performance
Special reports and research
Student presentations
Opportunity for alternative assessment as deemed appropriate by the teacher

V. SPECIAL CONDITIONS OR PREREQUISITES

All students must have at least a B in Pre-Calculus

VI. COURSE EVALUATION PROCEDURE

All planned courses will be monitored by the department chair and building administrators and revised according to the District's revision cycle

VII. ACCOMMODATIONS

The needs of students in the learning support and gifted programs are met through a variety of adaptations, modifications or enrichments to the planned course. If a student has an IEP or a GIEP (Gifted individual Education Plan), specific strategies and accommodations for that student will be identified in his or her individualized educational plan under the section called specially designed instruction. The learning support and gifted teachers are available to provide classroom teachers with any kind of assistance in providing accommodations

AP STATISTICS
Chambersburg Area Senior High School

Teacher: Mr. Mitchell

E-mail: scott.mitchell@casdonline.org

School Year: 2014-2015

Website:

<http://www.chambersburg.k12.pa.us/education/staff/staff.php?sectionid=204&>

CLASSROOM PROCEDURES, REGULATIONS AND GRADING POLICY

Objectives:

This is a course in Advanced Placement Statistics and its applications. Students investigate topics in descriptive analysis of one and two variable data, linear and nonlinear regression, basic concepts of probability, probability distributions (including the binomial, geometric, and normal probability distributions), sampling distributions, the Central Limit Theorem, simple random sampling and statistical inference with confidence intervals and tests of significance for both means and proportions (such hypotheses testing as: z-tests, t-tests, chi-square tests, and ANOVAS).

Materials:

Each student should bring notebook, three ring binder, paper, pencil and pen, calculator, and textbook to class every day. Please take special care to keep your book in excellent condition. Do not write in your book under any circumstances. **The cost is \$100 to replace a lost or damaged book.**

We will be using technology extensively, in the computer lab and with TI-83s on a regular basis in this class. Responsible use of the computer is expected at all times. Vandalism will result in a disciplinary referral and the financial responsibility of the repair. It is highly recommended that students have access to a graphing calculator to complete homework and in class assignments.

Classroom Policy and Procedures:

Classroom instruction will consist of teacher lecture and presentations, student discussion and group work, graphing calculator exercises, and videos. Students are expected to maintain appropriate behavior at all times.

All rules outlined in the student handbook are observed. You are expected to behave in a manner, which helps create an environment that is conducive to learning for everyone. Disruptive behavior will not be tolerated. Tardiness is very disruptive, so be PROMPT. You are late if you are not seated when the bell rings.

Attendance and Make-up:

It is important to be in class every day. Good attendance is critical for good achievement. I am available most days before and after school. Please communicate with me and I can be available. All work must be made up within either a week or when that material has been tested of an excused absence, or the student will receive a grade of zero for those missing assignments. It is the responsibility of the student to schedule the make-up on the day of return from an excused absence. If a student misses a review day before the test that student is expected to take the test at the scheduled time. An unexcused absence will result in a zero for any particular work on the day of the class cut.

Grading:

All assignments will be graded by total points. Besides tests, quizzes there will be unit projects and required writing assignments. Homework will be checked daily and credit will be given for a complete paper or if the student has shown maximum effort (Remember to show all work!!). Point value of labs and quizzes will vary and tests will be 100 points. The marking period grade will be determined by dividing the total points earned by the total points possible. Each marking period grade will be averaged to determine the final grade. The standard Chambersburg Area School District grading scale will be used.

AP Handbook: Is online on my website

Additional Info: AP Exam is \$89. AP Exam is Wednesday May 13th in the afternoon.

AP Website:

<http://apcentral.collegeboard.com/apc/Controller.jspf>

I have read and understood the grading policy for AP Statistics.

Pd_____

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