

Manual High School - AP Statistics Course Syllabus –x501

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Prerequisite: Algebra II or equivalent

Textbook: Peck, Olsen, Devore: An introduction to Statistics and Data Analysis 2nd Edition.

Reference Material: Winer, B., 1971. Statistical principles in experimental design. McGraw-Hill, New York: Yates, Moore, Starnes: The Practice of Statistics 3rd Edition: Statistics Course Description. The College Board, May 2003: AP Statistics, 2005-2006 Professional Development Workshop Materials, The College Board, 2005: Texas Instruments TI-84 Graphing Calculator Manual: Kreith & Chakerian, Teaching Mathematics Using Technology – Graphing Calculator & Spreadsheet Activities, McDougal Littell, 2002.

Technology

- It is strongly recommended that all students have the equivalent of a TI-83, TI-83+ or TI-84 graphing calculator for use in class, at home, and on the AP Exam.
- Students will use their graphing calculator extensively throughout the course. Most assignments, numerous in class activities and test will require the use of a graphing calculator.
- Students that do not have access to a graphing calculator will have great difficulty with the class.
- The TI calculators are recommended. TI calculators are NOT required and neither the instructor, nor the school has any financial relationship with TI. However, the examples in class will be given using a TI-84 (which is very similar to the TI 83) and the instructor does not know how to instruct students in the use of calculators other than the TI 83/84. Please note that the key strokes on the TI 86 & 89 are completely different than the TI 83/84.
- Students will also occasionally go to the computer lab and utilize statistics software, MS Excel as well as some Internet applets.
- Students are not required to have access to any statistical computer software. However, numerous examples of MINITAB printouts will be reviewed in class and some homework and test problems will require understanding of MINITAB output to answer the questions.

Course Description: Curriculum for this course follows the AP Statistics curriculum set by the College Board and is designed to prepare students for the AP Statistics exam in May. This syllabus is adapted from the course description given by the College Board. The full course description should be downloaded from www.Collegeboard.com and read completely. 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. This course draws connections between all aspects of the statistical process, including design, analysis, and conclusions. Additionally, using the vocabulary of statistics this course will teach students how to communicate statistical methods, results and interpretations. Students will learn how to use graphing calculators and read computer output in an effort to enhance the development of statistical understanding.

Performance Standards: During this course, the student will be exposed to four broad conceptual themes and will be expected to demonstrate proficiency in:

- 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 hypotheses.

Instructional Materials: The following materials are needed for this class:

- Text Book, each student provided individual copy by JCPS. Needed daily in class.
- Daily access to a graphing calculator of some type is strongly suggested (see technology section above and students are encouraged to visit the College Board website for a list of graphing calculators that are approved for the AP exam)
- Access to a computer with a spreadsheet program is highly recommended. The computer lab at school will be used occasionally during class, however, home access can accentuate the learning process.
- 3 ring binder with loose leaf paper
- writing utensil

To help in studying for the AP exam, all class notes, assignments, exams and quizzes should be kept in a neatly organized binder. Your notebook/binder for class should be organized into the following clearly labeled sections:

- Notes
- Homework/effortwork
- Exams/Quizzes
- Miscellaneous assignments
- AP prep materials

Class Room Standards: Students are to follow all JCPS, MHS rules & standards. One point will be deducted for each day homework/effortwork assignments are late beyond due date defined by the Red Book. The deducted points guidelines for late projects will be specified when instructions for projects are given. All students are to follow the Class Expectations that are given out with this syllabus and can be found on the class web site. Class Expectations will be gone over in class the first week of class.

Academic Dishonesty: Cheating of any kind will not be tolerated. All involved parties will earn zeros on the assignment or assessment and a disciplinary referral will be sent to the office. The following are examples of cheating; however, this list is not all inclusive:

- Representing the work of others as your own (copying homework, letting someone copy your work etc.)
- Looking at another student's paper during an exam or quiz.
- Using prohibited materials (notes, etc.) on exams or quizzes.
- Sharing calculators during exams or quizzes
- Discussing exams or quizzes with students in other sections of the class who have not yet taken them.

Forms of Assessment & Grading Scale: Exams, quizzes, class participation, homework/effortwork, class work, calculator assignments, group assignments, projects & content writing are used to assess the students' performance. The JCPS grading scale will be used in this class.

GRADING SCALE

A 90%-100%
B 80% - 89%
C 70% - 79%
D 60% - 69%
U 0% - 59%

GRADING STANDARDS

40% Tests
20% Quizzes
20% Projects/Writing/ Group work
20% Homework/Effortwork

The instructor reserves the right to change the Grading Standards percentages as long as they stay within JCPS or duPont Manual guidelines & they are changed at the beginning of the school year.

Project: Each student will have an individual and/or group project each semester. As an example, previously students have designed a simple survey and collected data on school athletic ticket sales to obtain specific information needed by the schools athletic department, been assigned specific pairs of physical attributes to measure on individuals to create a scatter plot and assess the strength & type (linear, quadratic, log, etc) of the relationship, required to individually develop questions & answers of which their groups develop a Jeopardy style game to be used in class for AP test review, etc. The instructor will give project assignments each semester & reserves the right to change projects to fit the needs of the school and the class.

Makeup Work/Absences: If you are absent for any reason, it is your responsibility to obtain all materials missed, including notes, homework solutions, assignments, etc. All assignments for the entire year are posted at the beginning of the year on the class web site; please refer to it for assignments. It is a good idea to also choose someone in class that you can call or email if you are absent. The timeline for turning in makeup work is outlined in your student planner. Other than as outlined in the student planner, all makeup work, disputed work, or makeup test **MUST** be completed prior to the start of semester finals for semester in question, or zero's will be given. If you miss an exam or quiz, you will take an alternate version of the assessment immediately upon your return. Any assignments that were assigned before you were absent & due on a day you miss must be handed in immediately upon your return. Since exams are announced well in advance, missing a single class period before an exam does not get you out of taking the exam on the scheduled date. If you are in class on the scheduled date of an exam or quiz, you will take it. Finals are taken on the day scheduled by the school, no exceptions. If you miss a final exam for any reason, you will need to arrange to take a make-up exam some time after the scheduled exam.

The AP Exam: It is assumed that all students are in this class with the intention of taking the AP exam in May. If you are a senior and already know the schools you are applying to for next fall, you should contact them to find out their policy for accepting AP credit. If, for any reason, you decide not to take the AP exam, you are still required to complete all work and participate in all review activities in class with respect to the AP exam.

Course Outline (organized by chapters in primary textbook):

Chap 1: The Role of Statistics (1.5 days)

Activity 1.1 Head Sizes, Understanding Variability

Chap 3 Graphical Methods for describing Data (Graphical displays include, but are not limited to using boxplots, dotplots, stemplots, back-to-back stemplots, histograms, frequency plots, parallel boxplots, and bar charts.

3.1-3.2 Graphical Methods

3.3 Graphical Displays

3.4 Scatter Plots

Activity 3.1 Locating States

Chap 4 Numerical Methods for Describing Data

4.1 Numerical Summaries

4.2 Variance, SD & IQR

4.3 Box Plots

4.4 Empirical Rule

Activity 4.1 Collecting & Summarizing Numerical Data.

Activity 4.2 Boxplot Shapes

Graphing Calculator Exploration

Chapter 5: Summarizing Bivariate Data

5.1 Correlation

5.2 Linear Regression

5.3 Residual Plots

5.4 Non linear data

5.5 Interpreting Results

Activity 5.1 Exploring Correlation & Regression Technology – Computer lab

Chapter 6: Probability

6.1 Chance experiments

6.2 Definitions of Probability

6.3 Basic Properties of Probability

6.4 Conditional Probability

6.5 Independence

6.6 General Probability Rules

6.7 Estimating p Empirically & with simulations

Activity 6.1 - Hershey Kiss

Activity 6.2 Euro coin dilemma

Chapter 7: Random Variables & Probability Distribution

7.1 Random Variables

7.2 Probability Dist for Discrete Random Variables

7.3 Probability Dist for Continuous Random Variable

7.4 Mean & SD

7.6 Normal Distribution

7.7 Normal Dist

7.5 Binomial & Geometric Random Variable

Graphing Calculator Exploration

Chapter 2: The Data Analysis Process & Collecting Data Sensibility

2.1 The data analysis process

2.2 Sampling

2.3 Stat studies: Observational & Experimental

2.4 Simple comparative experiments

2.5 More Experimental Designs

2.6 More Observational Designs

1st Semester Final

Chapter 8: Sampling Variability and Sampling Distributions

8.1 Stats & Sampling Variability

8.2 The sampling distribution of a sample mean

8.3 The sampling distribution of the sample proportion

Graphing Calculator Exploration

Chapter 9: Estimation Using a Single Sample

9.1 Point Estimation

9.2 Large sample CI for pop prop

9.3 CI for a pop mean

9.4 Chap wrap up

Activity 9.1 Getting a feel for CI

Activity 9.2 An alternative CI for Pop Proportion

Graphing Calculator Exploration

Chapter 10: Hypothesis Testing Using a Single Sample

10.1 Hypo & test procedures

10.2 Errors in Hypo testing

10.3 Large sample Hypo test for pop prop

10.4 Hypo test for pop mean

10.5 Power & the Probability of Type II Error

10.6 Chap wrap up:

Graphing Calculator Exploration

Chapter 11: Comparing Two Populations or Treatments

11.1 Inferences between 2 pop/treat mean using Independent samples

11.2 Inferences between 2 pop/treat mean using paired samples

11.3 Large sample Infer between 2 pop/treat prop

11.5 Chap wrap up

Graphing Calculator Exploration

Chapter 12: The Analysis of Categorical Data & Goodness of Fit Tests

12.1 Chi-sq for univariate categorical data

12.2 Test for homogeneous & Independent in a 2way table

12.3 Chap Wrap up

Activity 12.1 Pick a number, any number

Graphing Calculator Exploration

Chapter 13: Simple Linear Regression & Correlation: Inferential Methods

13.5 Infer about pop Correlation Coefficient

13.6 Chap wrap up

Review for AP test

AP Test

Continue with Chapter 13 & possibly Chapter 14 if time permits

13.1 Simple Linear Reg

13.2 Inferences about slope of pop regression line

13.3 Checking Model Adequacy

13.4 Infer based on Est Reg Line

Chapter 14: Multiple Regression Analysis

14.1 Mult Reg models

14.2 Fitting a model & assessing Utility

14.3 Infer based on an Est model

14.4 Other issues in Mult Reg