COURSE REQUIREMENTS, PROCEDURES AND GRADING—Advanced Placement Statistics

Mr. Suarez Room 112 William B. Travis High School

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Email: itzel.suarez@austinisd.org Conference: 2nd/6th period

Tutoring: After school Wednesdays 4:15-5:15pm

Before school or any other days by appointment

## Text: The Practice of Statistics – TI-83 Graphing Calculator Enhanced, Second Edition, by Daniel Yates, David S. Moore and Daren S. Starnes, W. H. Freeman and Company, 2006.

### Calculators: A TI-83+, TI-84+ or TI-89 or any other Statistics graphing calculator will be required for this class. The calculator will be used on class work, homework, and tests. I have a classroom set of TI-84+ calculators for student use in class. These calculators are also available for use whenever I am in the classroom (i.e. before school, after school, etc.).

### General Description: The purpose of this statistics course is to introduce you to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. There are four broad conceptual themes in this course:

1. Planning a Study: Deciding what and how to measure
2. Exploring Data: Observing patterns and departures from patterns
3. Anticipating Patterns: Producing models, using probability and simulation
4. Statistical Inference: Confirming the validity of models

### Academic Honesty: Often you will be working in-groups for homework, projects, and computer labs. This work is expected to be a collaborative effort and exchange of ideas and work is part of this assignment. It is expected that all students perform their own work on tests, quizzes and individual projects. Cheating on a test, quiz or project will result in a zero. Remember, most universities will send you home for cheating.

### Interactive Notebook: You will be required to view videos of lectures before class and take notes (method of delivery may vary from traditional notes to student-produced foldables) in your interactive notebook. Though you will not be graded on the notes section, the left side of the notebook will be taken as formative assessment grades (as it is the student-produced side) from time to time depending on topics. It is your responsibility to keep up with the videos on your own time (most videos are between 3-7 minutes long) in order to set yourself up for success in this class!

### Grading:

### Formative Assessments (Daily assignments and quizzes) 15%

Summative Assessments (Chapter Tests, Projects, 6 Weeks Exam) 85%

### Assignments: Homework is assigned each class in the form of videos, notes, and/or assigned problems. Homework may count as a formative assessment grade depending on the topic. Full credit is earned if every problem is attempted with sufficient work displayed, each problem is graded and corrections shown. Points will be lost for incomplete assignments. If a student has been absent, then it is his or her responsibility to make up all missed work.

If you don’t do the homework you have a 99% chance of failing the course.

If you make an effort to do every assignment and re-learn what you got wrong before the test, you have a 95% chance of passing the class.

### Quizzes: Quizzes and graded assignments (group quizzes) will be given at selected times during the chapter and will resemble problems that might be encountered on the test. Quiz corrections for points back are not accepted. Realize that correcting your quiz will help prepare for the chapter exam as well as help develop the required five “safety tips” for each test. Quizzes taken after the review day (day before the test) will be corrected but not be of value in the grade book.

### Tests: Each test will be half multiple choice and half free response. In addition to chapter tests, a 6 weeks exam will be given covering those chapters. Corrections may be done on a test to recover *some* points.

If a student is absent the day before a test, he or she will be required to take the test with the rest of the class. You have 5 days in which to make up a missed test. This class moves at a fast pace in order to get through all the material-don’t put off making up a test!

### Absences: Students are responsible for making up all work missed due to *any* type of absence. Don’t set yourself up to fail by missing class and getting behind!

**Late Work & Corrections Policy:** Students will be informed of their grade weekly. Once informed, they will have one week to make-up or correct any assignments from the previous week. Corrections may be done on quizzes and tests for half credit and must be done while in tutoring.

#### Hints:

1. Find a partner or a study group and meet with them regularly. Do homework and study for quizzes and tests together.
2. Write vocabulary words and other concepts on index cards. Bring them to class everyday and use them to study for quizzes and tests. I might give surprise quizzes or allow you to use those cards on some of your quizzes!
3. Watch the videos!!! There are some good explanations and examples.

4. Keep all notes, homework, and quizzes for reference. They will help on you to review for tests. You **will** need all these when reviewing for the Fall Final and the AP exam.

5. Spend sufficient time on your homework. A perfect grade on a homework assignment does you no good if you crash and burn on your quizzes and tests because you copied it or really didn’t understand what you were doing.

6. Ask questions and come in for extra help. Do NOT be shy! I am here to help you!

**Be prepared to help teach others as you**

**gain understanding of a concept.**

**Outline of Lesson Plans**

**Number of days Topics Covered Possible Labs**

|  |  |  |
| --- | --- | --- |
| **I. Introduction** |  |  |
|  | Course overview |  |
| **II. Experimental Design and data collection** | | |
| 5 blocks  Note: This unit is continued throughout the course in all labs and as part of the discussion of homework problems and quizzes.  Introduction of TI-84 random number generator | Random numbers and selection including SRS, stratified, systematic.  Observational Studies  Experimental Design including blocking, matched pairs, confounding variables, bias, control groups, treatments,  Survey design  Populations, samples, and generalizing results | Random Rectangles  Brownie Comparison  Random number investigation  Blocking Dogs  Demonstrations of Random Rectangles and Blocking Dogs using Fathom software to generate more samples after students have the opportunity to attempt smaller samples without technology. |
| **III. Graphical displays and summary statistics for univariate data** | | |
| 7 blocks  A great deal of class time is spent familiarizing students with the TI-84 calculator including data entry, graphical displays, summary statistics. | Interpretation and design of graphical displays including circle graphs, bar graphs, frequency tables, stemplots and boxplots  Comparative graphical displays and interpretation  Note: center, shape, spread, and unusual features are used for describing distributions  Mean, median, mode  Standard deviation, IQR, variance, range  Proportions  Percentiles, z-scores, quartiles  Outlier rules    Transformations of statistics | Rent-a-Date – comparative graphs  Graphical name displays  GPA and Class Rank – summary statistics, position  Bed to door – a gender comparison |
| **Number of days Topics Covered Labs** | | |
| **IV. Bivariate Data** | | |
| 7 blocks  Instruction in TI-84 calculator regression functions | Scatterplots  Correlation  Least squares regression line  Residuals, outliers, influential points, extrapolation  Nonlinear regression  Two-way tables  Simpson’s paradox | Cheerios and circle areas – nonlinear exploration  Guess my age – bivariate and regression activity  Students will interpret r, r2, slope, and y-intercept in context from computer output using Minitab. Predictions using the least squares equation will also be required. |
| **V. Probability** | | |
| 5 blocks | Basic Probability Rules including addition, multiplication, complements, independence  General Probability Laws  The Law of Large Numbers | Pig Rollin’  Lid flipping |
| **VI. Probability distributions** | | |
| 8 blocks  Instruction in TI-84 functions AFTER students become proficient at sketching distributions, using the normal chart, and completing calculations using formulas. | Random variables  Probability distributions including mean, variance, standard deviation, independence, dependence  Transformations and combinations  Binomial and geometric distributions  Normal distributions  Using the normal distribution to approximate a binomial distribution  Interpretation of probabilities | Ellipse area estimation  Looking for normal  The draft lottery  Farkle |
| **Number of days Topics Covered Labs** | | |
| **Review and exams** | | |
| 4 blocks |  |  |
| **VII. Simulations and Sampling Distributions** | | |
| 7 blocks  TI-84 used for some simulation problems. | Simulation design and interpretation  Sampling distributions for means and proportions  The Central Limit Theorem  Independence  Combining Distributions | Central Limit Theorem Lab  M&M’s Lab  Computer applets will be used to generate several sampling distributions, observe changes in mean and standard deviation, and compute probabilities. (Rice, Rossman/Chance) |
| **VIII. Confidence Intervals and Hypothesis Tests for single samples** | | |
| 8 blocks  TI-84 functions explored AFTER students become proficient at using tables, formulas, and interpreting results. | Point estimates  Margin of error  t-distribution  Confidence intervals for single sample means and proportions including the meaning of the confidence level and the meaning of the interval  Hypothesis tests for single sample means and proportions including the logic involved, the meaning of the hypotheses and p-value, the significance level  Type I errors, type II errors, and power | Water, water everywhere-beach globe lab  Rossman/Chance applets will be used to demonstrate generating several confidence intervals. The meaning of the confidence level will be discovered by students.  Interpreting computer output in context for inference procedures will be included. |
| **IX. Confidence Interevals and Hypothesis Tests for two samples** | | |
| 7 days  TI-84 functions explored AFTER students become proficient at using tables, formulas, and interpreting results. | Two sample tests for means and proportions  Independence vs dependent  Paired t-tests | Frog lab  Interpreting computer output in context for inference procedures will be included. |
| **Number of days Topics Covered Labs** | | |
| **X. Chi-square test** | | |
| 4 days  TI-84 functions explored AFTER students become proficient at using tables, formulas, and interpreting results. | Chi-square distribution  Test for homogeneity  Test for independence  Test for goodness of fit | How Do You Learn  Interpreting computer output in context for inference procedures will be included. |
| **XI. Regression revisited** | | |
| 7 days  TI-84 functions used. | Review of linear regression topics  Nonlinear regression and transformations  Test for slope of least-squares regression line | Horsepower lab  The wave |
| **XII. AP Review and Practice Exam** | | |
| 7 days | Study Design  Describing data  Probability  Inference |  |
| **XIII. Post Exam (many students absent due to other exams)** | | |
| 7 days | Final Research Project |  |

**Major Project Requirements**

۰ Student generated topic

۰ Project description including a viable plan for statistical analysis

۰ Data collection

۰ Data organization, summary, and graphical displays as appropriate

۰ Data analysis

۰ Conclusions

۰ Comments on conditions necessary for statistical procedures and study design

**In class Labs/Activities**

All in-class labs/activities require students to consider the design of the study or experiment including proper randomization. Finished work must use the statistical vocabulary of the design unit as well as the proper vocabulary of the unit being studied. For instance, terms such as binomial distribution, correlation coefficient, null hypothesis, sampling distribution of the sample mean, etc. will be used rather than layman’s terms. As the course progresses, students are expected to incorporate all necessary concepts into the lab including design, descriptive statistics of the results, the proper use of probability during randomization and interpretation of p-value, and the inference procedure necessary to make an informed conclusion.