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 blocksNote: 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 StudiesExperimental Design including blocking, matched pairs, confounding variables, bias, control groups, treatments, Survey designPopulations, samples, and generalizing results | Random RectanglesBrownie ComparisonRandom number investigationBlocking DogsDemonstrations 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 blocksA 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 boxplotsComparative graphical displays and interpretationNote: center, shape, spread, and unusual features are used for describing distributionsMean, median, modeStandard deviation, IQR, variance, rangeProportionsPercentiles, z-scores, quartilesOutlier rules Transformations of statistics | Rent-a-Date – comparative graphsGraphical name displaysGPA and Class Rank – summary statistics, positionBed to door – a gender comparison |
| **Number of days Topics Covered Labs** |
| **IV. Bivariate Data** |
| 7 blocksInstruction in TI-84 calculator regression functions  | ScatterplotsCorrelationLeast squares regression lineResiduals, outliers, influential points, extrapolationNonlinear regressionTwo-way tablesSimpson’s paradox | Cheerios and circle areas – nonlinear explorationGuess my age – bivariate and regression activityStudents 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, independenceGeneral Probability LawsThe Law of Large Numbers | Pig Rollin’Lid flipping |
| **VI. Probability distributions** |
| 8 blocksInstruction in TI-84 functions AFTER students become proficient at sketching distributions, using the normal chart, and completing calculations using formulas. | Random variablesProbability distributions including mean, variance, standard deviation, independence, dependenceTransformations and combinationsBinomial and geometric distributionsNormal distributionsUsing the normal distribution to approximate a binomial distributionInterpretation of probabilities | Ellipse area estimationLooking for normalThe draft lotteryFarkle |
|  **Number of days Topics Covered Labs** |
| **Review and exams** |
| 4 blocks |  |  |
| **VII. Simulations and Sampling Distributions** |
| 7 blocksTI-84 used for some simulation problems. | Simulation design and interpretationSampling distributions for means and proportionsThe Central Limit TheoremIndependenceCombining Distributions | Central Limit Theorem LabM&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 blocksTI-84 functions explored AFTER students become proficient at using tables, formulas, and interpreting results. | Point estimatesMargin of errort-distributionConfidence intervals for single sample means and proportions including the meaning of the confidence level and the meaning of the intervalHypothesis tests for single sample means and proportions including the logic involved, the meaning of the hypotheses and p-value, the significance levelType I errors, type II errors, and power | Water, water everywhere-beach globe labRossman/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 daysTI-84 functions explored AFTER students become proficient at using tables, formulas, and interpreting results. | Two sample tests for means and proportionsIndependence vs dependentPaired t-tests | Frog labInterpreting computer output in context for inference procedures will be included. |
|  **Number of days Topics Covered Labs** |
| **X. Chi-square test** |
| 4 daysTI-84 functions explored AFTER students become proficient at using tables, formulas, and interpreting results. | Chi-square distributionTest for homogeneityTest for independenceTest for goodness of fit | How Do You LearnInterpreting computer output in context for inference procedures will be included. |
| **XI. Regression revisited** |
| 7 daysTI-84 functions used. | Review of linear regression topicsNonlinear regression and transformationsTest for slope of least-squares regression line | Horsepower labThe wave |
| **XII. AP Review and Practice Exam**  |
| 7 days | Study DesignDescribing dataProbabilityInference |  |
| **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.