**AP Statistics Syllabus—Mr. White**

**Primary Text**
Yates, Daniel S., David S. Moore, and Darren S. Starnes. *The Practice of Statistics*, third edition. New York, NY: W.H. Freeman and Company, 2008.

**Course Description**
This course is designed to be the equivalent of a one semester college level statistics course. Throughout the course, students will become competent in four main areas of statistics. They will learn to analyze data using graphical and numerical techniques, plan and conduct a study in valid ways, probability phenomena will be explored, and statistical inference will be examined using models that are appropriate for the given situations. Students will employ the use of a TI-83/84 graphing calculator, as well as statistical software and other web based applets to inquire more deeply into statistical concepts. Students will also be required to complete frequent writing assignments to display their competency in analysis of data as well as to prepare them for the AP examination.

**Course Outline** (organized by chapters in primary textbook)

**Preliminary Chapter: What Is Statistics?**
- Data Production: Where do you get good data?
- Data Analysis: Making sense of data
- Probability: What are the chances?
- Statistical Inference: Drawing conclusions from data

**Chapter 1: Exploring Data**
- Case Study: Nielsen ratings
- Displaying distributions with graphs
- Activity 1A: How fast is your heart beating?
- Activity 1B: The one-variable statistical calculator
- Describing distributions with numbers
- Activity 1C: The mean and median applet

**Chapter 2: Describing Location in a Distribution**
- Case Study: The New SAT
- Measures of relative standing and density curves
- Normal distributions
- Activity 2C: The normal curve applet

**Chapter 3: Examining Relationships**
- Case Study: Are baseballs "juiced"?
- Activity 3A: CSI stats: The case of the missing cookies
- Scatter plots and Correlation
- Activity 3B: Correlation and Regression applet
- Least-Squares Regression
- Activity 3C: Investigating properties of the least-squares regression line
- Correlation and Regression Wisdom
- Case Closed! Are baseballs "juiced"?

**Chapter 4: More about Relationships between Two Variables**
- Case Study: It's a matter of life and death
- Activity 4: Modeling the spread of cancer in the body
- Transforming to Achieve Linearity
- Relationships between Categorical Variables
- Establishing Causation
- Case Closed! It's a matter of life and death

**Chapter 5: Producing Data**
- Case Study: Can eating chocolate be good for you?
- Activity 5: Class survey
- Designing Samples
- Activity 5B: The Simple Random Sample applet
- Activity 5C: The class survey revisited
- Designing Experiments
- Activity 5D: Good news for chocoholics!
- Activity 5E: Selecting random samples by calculator
- Case Closed: Can eating chocolate be good for you?

**Chapter 6: Probability and Simulation: The Study of Randomness**
- Case Closed! False alarms at airports are an explosive issue
- Activity 6A: Austin and Sara's game
- Activity 6B: Is this discrimination?
- Probability Models
- Activity 6C: The spinning wheel
- Activity 6D: Proportion of heads versus count of heads
- General Probability Rules
- Case Closed! False alarms at airports

**Chapter 7: Random Variables**
- Activity: Casino Labs
- Case Study: Lost income and the courts
- Discrete and Continuous Random Variables
- Activity 7B: Means of Random variables
- Means and Variance of Random Variables
- Activity 7C: Combining random variables
- Case Closed! Lost income and the courts

**Chapter 8: The Binomial and Geometric Distributions**
- Case Study: Psychic probability
- Activity 8A: Everyone's worst nightmare
- The Binomial Distributions
- Binomial Mean and Standard Deviation
- The Geometric Distributions
- Activity 8B: Mrs. Hathaway's homework offer
- Activity: The Twelve Days of Christmas
- Case Closed! Psychic probability

**Semester Exam**
- Review topics using AP released items and other resources

**Chapter 9: Sampling Distributions**
- Case Study: Building better batteries
- Activity 9A: Young women's heights
- Sampling Distributions
- Sample proportions
- Sample means: The Central Limit Theorem
- Activity 9B: Sampling pennies

**Chapter 10: Estimating with Confidence**
- Case Study: Need help? Give us a call!
- Activity 10A: Read any good books lately?
- Confidence Intervals: The basics
- Activity 10B: Confidence Interval Applet
- Estimating a Population Mean
- Activity 10C: Comparing the z and t Distribution
- Estimating a Population Proportion
- Activity 10D: Give me a kiss!
- Case Closed! Need help? Give us a call!

**Chapter 11: Testing a Claim**
- Case Study: I'm getting a headache
- Activity 11A: Pick a Card
- Significance Tests: The basics
- Carrying out Significance Tests
- Use and Abuse of Tests
- Using Inference to make decisions
- Activity 11C: Exercise is good!
- Case Closed! I'm getting a headache!

**Chapter 12: Significance Tests in Practice**
- Case Study: Do you have a fever?
- Activity: Is One Side of a Coin Heavier?
- Tests about a Population Mean
- Tests about a Population Proportion
- Case closed! Do you have a fever?

**Chapter 13: Comparing Two Population Parameters**
- Case Study: Fast-food frenzy!
- Activity 13: Paper airplane experiment
- Comparing Two means
- Comparing Two proportions
- Case Closed! Fast-food Frenzy

**Chapter 14: Inference for Distributions of Categorical Variables: Chi-Square Procedures**
- Case Study: Does Acupuncture promote pregnancy?
- Activity 14A: "I didn't get enough reds!"
- Test for Goodness of Fit
- Inference for Two-way Tables
- Activity 14B: Should marijuana be legalized for medical purposes?
- Case Closed! Does acupuncture promote pregnancy?

**Chapter 15: Inference for Regression**
- Case Study: Three-pointers in college basketball
- Activity 15: Ideal proportions
- The Regression Model
- Testing the Hypothesis of No Linear Relationship

**Post AP Exam**
- Review for final exam
- CATS state testing
- School Service Project

***AP EXAM—MAY ???? Afternoon Session*** **It is expected that you take the AP exam!! You have a great opportunity to earn college credit through a passing score (3 or better) on the exam as well as a $100 bonus from the NMSI grant we are a part of.**

**Grading**

Tests: Tests will be given on a regular basis. They will be formatted like the AP exam and will generally count for 100 points. Opportunities to correct questions for partial credit will be given. All corrections will be due within 3 days of the test being handed back. There will also be several take home tests. These are to be completed on your own, individually, with help only from notes and the text.

Quizzes: Quizzes will be given on a regular basis. There will be no opportunity to correct quizzes. Quizzes will be worth varying point values.

Assignments/Homework: Assignments and homework will be given varying point values. Each chapter will have accompanying homework problems and assignments. We will review selected problems daily and homework will be collected as a chapter packet for points to be assigned. If I notice that students are consistently not completing their work I will revise this policy and collect work on a daily basis.

Projects: As a class we may develop projects to be completed to enhance our instruction in the classroom. Further information will be available at those times.

Practice AP Exam and Final Exam: We will consistently utilized released and practice exam questions to prepare you for the actual test. There will also be a final exam administered for those not taking the AP exam. *Although it is expected that you take the AP Exam!*

**Tentative Survey Project (2nd Trimester, exact dates to be determined)**

Students will be required to design and carry out a survey. Students will be responsible for choosing the topic of the survey and the outcome of the survey must strive to answer a question of bias.

- Does the wording of the question effect the outcome?
- Does who asks the question affect the outcome?
- How do the choices of responses affect the outcome?

This project will be completed in pairs. Each student will receive the same grade so the work should be shared equally. The final product should include a written report that incorporates graphs using a computer statistical tool.

The written report should also include all of the steps of your experiment. You should identify what form of bias you were seeking to investigate. Your method for experimentation should be included. A report of the results and any conclusions that you find should also be included.

**Note:** You will be required to submit a proposal to me before any research can be conducted. In your proposal, you should include a brief explanation of your topic, how you will conduct your experiment, how you will find subjects (you must have at least 50), and examples of questions for your survey should be included.

Once the project is completed, you will be required to make a presentation of the findings. You can make a poster or any other type of presentation you choose. An oral explanation will accompany your presentation.

**Tentative Final Research Project (3rd Trimester, exact dates to be determined)**

Students will be required to do research to answer a question of their choosing. When choosing your question, be creative. The following are examples of possible questions you could seek to answer, try not to copy one of them exactly, but come up with an ingenious question of your own.

Do People Know More About Their Life Aspirations As They Progress Through High School?
Do recent high school seniors who plan to attend college have a major area of study selected?
Do Mothers or Fathers Influence Children's Political Views More?
Do Mothers or Fathers Influence Children's _____ Views More?
Is There an Association Between Batting Side And Fielding Position Among Current Major League Baseball Players?
Do More Vehicles containing Children Use a McDonald's Drive-Thru?
A low-fat diet was compared to a "Mediterranean diet." Which leads to better health?
How does one select employees to perform physically demanding jobs?
What proportion of the Mac purchasers are new computer owners?
What proportion of population plans to purchase a new computer within the next 6 months?
Do physicians discriminate against overweight patients?
Do _____ discriminate against _____?
How many hours of weekly television watching is typical for a teen between 13 and 18?
How many hours of _____ is typical for a teen between 13 and 18?
Do people really believe hypnosis can be used to cure pain???
Do people really believe _____ can be used to cure pain???
Can the application of magnetic fields be an effective treatment for pain?
Which brand of cola drink is preferred by high school students???
Which brand of _____ is preferred by high school students???
The average age for people on food stamps?
The average age for people who _____?
Does temperature (weather) affect number of crimes committed?
Does temperature (weather) affect _____?

To answer your question, design some type of experiment or study to gain information. You can do another survey or you can actually perform some type of experiment. Such as having students taste Coke and Pepsi and then choosing which they like best.

After you have gathered your information you will need to write a paper. Your paper should describe your question and how you seek to answer that question. Further, you should outline your experiment or study and why you chose to gather information in the way you did. Use what you have learned in this class about design to give your description. Also include

the results you found and what conclusion, if any, you are able to draw. This is an open assignment. By that I mean the only criteria is that you carry out some type of study or experiment to answer a question of your choosing, then write a paper telling me what you discovered.

If you use any source of information other that your experiment or study, such as online articles or stats from a professional sports team, you must cite your source in a Bibliography.

**Before beginning your project please clear your question with me. I do not want you to spend time working on a question that will be far to complex to answer or that is incredibly obscure.

TRIMESTER A

WEEK 1— Review of syllabus and course expectations. Preliminary chapter "What is Statistics?"
WEEK 2— Chapter 1 "Exploring Data"
Graphical displays and mean/median

WEEK 3— Continue with graphical displays
Salary schedule, Chapter 1 TEST

WEEK 4— Chapter 2 "Describing Location in a Distribution"
Percentiles, Density curves and Normal Distributions

WEEK 5— Coin flip and dice roll distributions
Continue with z scores and normal distributions
Chapter 2 TEST

WEEK 6— Chapter 3 "Examining Relationships"
Height and hand span measures
Variables, scatterplots
Stats on the calculator

WEEK 7— Continue with Chapter 3
Regression line
Correlation, r and r squared
Chapter 3 TEST

WEEK 8— Chapter 4 "More About Relationships Between Two Variables"
Transforming to achieve linearity
Marginal Distributions and descriptions of relationships

WEEK 9— Continue with Chapter 4
Simpson's Paradox
Chapter 4 TEST

WEEK 10— Chapter 5 "Producing Data"
Observational studies versus experiment
Population, census, sample
Simple random sample (SRS)
Other sampling methods

WEEK 11— Continue with Chapter 5
Designing experiments
Chapter 5 TEST

WEEK 12— Chapter 6 "Probability and Simulation"
Simulations, probability models and rules of probability
Conditional probability

TRIMESTER B

WEEK 1— Continue with Chapter 6
More with probability
Chapter 6 TEST

WEEK 2— Chapter 7 "Random Variables"
Discrete and continuous random variables
Probability histograms
Normal probability distributions

WEEK 3— Continue with Chapter 7
Means and variance of random variables
Law of large numbers
Rules for means and variances
Chapter 7 TEST

WEEK 4— Chapter 8 "Binomial and Geometric Distributions"
Binomial setting and distributions
Binomial formulas

WEEK 5— Continue with Chapter 8
Binomial probabilities
Binomial mean and standard deviation
Binomial distribution with calculator
Geometric Distribution

WEEK 6— Finish Chapter 8
Chapter 8 TEST

WEEK 7— Practice AP Exam review
Practice AP exam

WEEK 8— Chapter 9 "Sampling Distributions"
Parameter and statistics
Sample proportions and sample means
Central limit theorem

WEEK 9— Continue with Chapter 9
Chapter 9 TEST

WEEK 10— Chapter 10 "Estimating with Confidence"
Confidence intervals
Z's and t's

WEEK 11— Continue with Chapter 10
Estimating population means
More with z's and t's
Chapter 10 TEST

WEEK 12— Chapter 11 "Testing a Claim"
Significance tests
P values
Hypotheses (Null and Alternative)

TRIMESTER C

WEEK 1— Continue with Chapter 11
Statistical Significance
Chapter 11 TEST

WEEK 2— Chapter 12 "Significance Tests in Practice"
Tests about a population mean
Tests about a population parameter

WEEK 3— Continue with Chapter 12
Chapter 12 TEST

WEEK 4— Chapter 13 "Comparing Two Population Parameters"
Comparing two means
Comparing two proportions

WEEK 5— Chapter 14 Chi Square
Chi Square tests

WEEK 6—Chapter 15 "Inference for Regression"

WEEK 7— Review for AP Exam

WEEK 8— Review for AP Exam

WEEK 9— Review for AP exam

WEEK 10— AP TEST

WEEK 11— Final Project

WEEK 12— Final Project