A.   COURSE DESCRIPTION

AP Statistics is the high school equivalent of a one semester, introductory college statistics course. In this course, students develop strategies for collecting, organizing, analyzing, and drawing conclusions from data. Students design, administer, and tabulate results from surveys and experiments. Probability and simulations aid students in constructing models for chance behavior. Sampling distributions provide the logical structure for confidence intervals and hypothesis tests. Students use a TI-83/84 graphing calculator and Web-based java applets to investigate statistical concepts. To develop effective statistical communication skills, students are required to prepare written and oral analyses of real data.

B.   LEARNING OBJECTIVES

Course Goals:

In Statistics, students are expected to learn:

Skills
- To produce convincing oral and written statistical arguments, using appropriate terminology, in a variety of applied settings.
- When and how to use technology to aid them in solving statistical problems.

Knowledge
- Essential techniques for producing data (surveys, experiments, observational studies), analyzing data (graphical & numerical summaries), modeling data (probability, random variables, sampling distributions), and drawing conclusions from data (inference procedures – confidence intervals and significance tests).

Habits of mind
- To become critical consumers of published statistical results by heightening their awareness of ways in which statistics can be improperly used to mislead, confuse, or distort the truth.

C.   MATERIALS OF INSTRUCTION
1.   Required student materials:
   a. **Textbook**: The Practice of Statistics – 5th edition by Starnes, Tabor, Yates, and Moore
   b. **Graphing Calculator**
      - TI 83/84 models are recommended.

2.   Optional student materials: **None**

3.   Miscellaneous instructor and/or student material (videos, software, workbooks,etc.):
      - Students will have access to online applets that are provided with the textbook.

D.   LEARNING RESOURCE CENTER SUPPORT MATERIALS

The Learning Resource Center may have supplemental materials that students can use to access additional information.

E. METHODS OF INSTRUCTION
Instructional methods used in this course may include, among others, the following:
1. Lectures
2. Projects
3. Discussions
4. Activities
5. Assignments

F. EVALUATION OF STUDENT ACHIEVEMENT

The instructor's policies on evaluation will be distributed to students and the division office at the outset of the course.

The methods of evaluating student achievement will include, at minimum, the following:

1. Three Tests per quarter and one quiz per chapter **(all assessments are weighted 80% of final grade.**
2. Homework assignments – homework will be assigned from every section. (**All homework assignments are weighted 20% of final grade)**

Grading Scale:
   A   90 - 100
   B   80 - 89
   C   70 - 79
   D   60 - 69
   F   Below 60

G. ATTENDANCE POLICY
- Attendance is expected every day. If you miss a day of class it your responsibility to come in and get the assignment and/or email your teacher for make-up work. **NO LATE WORK IS ACCEPTED.**

H. COURSE CONTENT

The following topics are to be covered during the instructional process:

1.   Exploring data: Describing patterns and departures from patterns.
   - Constructing and interpreting graphical displays of distributions of univariate data
     - Dotplot, stemplot, histogram, cumulative frequency plot
   - Summarizing distributions of univariate data
     - Measures of central tendency
     - Measures of variability
     - Quartiles, percentiles, z-scores
   - Exploring bivariate data
     - Analyzing patterns in scatterplots
     - Correlation and linearity
     - Least-square regression line
     - Residual plots, outliers, and influential points

- Exploring categorical data
  - Frequency tables and bar charts
  - Marginal and joint frequencies for two-way tables
  - Conditional relative frequencies and association
  - Comparing distributions using bar charts

2. Sampling and experimentation: Planning and Conducting a Study
   - Overview of methods to data collection
     - Census, sample survey, experiment, observational study
   - Planning and conducting surveys
     - Populations, samples, random selection
     - Sources of bias in sampling and surveys
     - Sampling methods, including simple random sample, stratified random sampling, and cluster sampling
     - Characteristics of a well-designed and well-conducted survey
   - Planning and conducting experiments
     - Characteristics of a well-designed and well-conducted experiment
     - Treatments, control groups, experimental units, random assignments, and replication
     - Sources of bias and confounding, including placebo effect and blinding
     - Completely randomized design
     - Randomized block design

3. Anticipating patterns: exploring random phenomena using probability and simulation
   - Probability
     - Interpreting probability
     - Addition rule, multiplication rule, conditional probabilities, and independence
   - Random Variables
     - Discrete random variables and their probability distributions, including binomial
     - Mean and standard deviation of a random variable
     - Linear transformation of a random variable
   - The Normal Distribution
     - Properties of the Normal distribution
     - Using tables of the Normal distribution
   - Sampling distributions
     - Sampling distribution of a sample proportion
     - Sampling distribution of a sample mean
     - Central limit theorem
     - Sampling distribution of a difference between two independent sample proportions
     - Sampling distribution of a difference between two independent sample means
     - T-distribution
     - Chi-square distribution

4.   Statistical Inference: Estimating population parameters and testing hypothesis
- Estimation
  - Estimating population parameters and margins of error
  - Properties of point estimators
  - Logic of confidence intervals, meaning of confidence level and confidence intervals, and properties of confidence intervals
  - Large-sample confidence interval for a proportion
  - Large-sample confidence interval for a difference between two proportions
  - Large-sample confidence interval for a mean
  - Large-sample confidence interval for a difference between two means
  - Confidence intervals for the slope of a least-squares regression line
- Tests of Significance
  - Logic of significance testing, null and alternative hypothesis; P-values; one and two-sided tests; concepts of Type 1 and Type 2 errors; concept of power
  - Large sample test for a proportion
  - Large sample test for a difference in two proportions
  - Test for a mean
  - Test for a difference in two means
  - Chi-square test for goodness of fit, homogeneity or proportions, and independence (one- and two-way tables)
  - Test for the slope of a least-squares regression line

I.   **Basic Supplies Needed:** Laptop, Graphing Calculator (TI-83 or TI-84), Pencil, 1.5 in. Binder, and (Reinforced) Loose Leaf Filler Paper. **You are expected to bring these to class every day.**