

# Montclair High School

## Course Syllabus

**Department: Math**

**Course: Probability and Statistics**

**Level:**

**Credits: 5**

### **Course Description:**

The purpose of this course in statistics and probability is to introduce students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data.

Students are exposed to four broad conceptual themes:

1. Exploring Data: Describing patterns and departures from patterns
2. Sampling and Experimentation: Planning and conducting a study
3. Anticipating Patterns: Exploring random phenomena using probability and simulation
4. Applying Statistics to Make Decisions: Finding Confidence Intervals and Performing Hypothesis Tests

### **Standards: NEW JERSEY STUDENT STANDARD ALIGNMENT**

#### Interpreting Categorical and Quantitative Data

- Summarize, represent, and interpret data on a single count or measurement variable
- Summarize, represent, and interpret data on two categorical and quantitative variables
- Interpret linear models
- Making Inferences and Justifying Conclusions
- Understand and evaluate random processes underlying statistical experiments
- Make inferences and justify conclusions from sample surveys, experiments and observational studies
- Conditional Probability and the Rules of Probability
- Understand independence and conditional probability and use them to interpret data
- Use the rules of probability to compute probabilities of compound events in a uniform probability model
- Using Probability to Make Decisions
- Calculate expected values and use them to solve problems
- Use probability to evaluate outcomes of decisions

### **Anchor Text(s):**

N/A

### **Supplementary Materials:**

- Chapter Packets
- Worksheets
- Handouts
- Calculator

**Units of Study:**

- Introduction to Statistics (Chapter 1: 1-1 – 1-3)
- Descriptive Statistics (Chapter 2: 2-1 – 2-5)
- Probability (Chapter 3: 3-1 – 3-4)
- Discrete Probability Distributions (Chapter 4: 4-1 – 4-3)
- The Normal Probability Distribution (Chapter 5: 5-1 – 5-4)
- Confidence Intervals (Chapter 6: 6-1 – 6-3)
- Hypothesis Testing (Chapter 7: 7-1 – 7-3)

**Proficiencies:**

At the completion of this course, student will be able to:

- Plan, implement, and describe the outcome of an observational or experimental study
- Create and interpret distribution charts and tables
- Summarize numerical data using the mean and standard deviation as well as the 5-number summary
- Describe a distribution's shape, outliers, center and spread
- Perform a simple linear regression and interpret the meaning of scatter plots, correlation coefficient,  $r^2$  value, slope and y-intercept
- Calculate simple and conditional probabilities of compound events
- Use probabilities to determine independence of events
- Represent events and probabilities using tree diagrams, Venn diagrams and outcome tables
- Calculate random variables and represent their distributions
- Calculate the mean and standard deviation of sampling distributions
- Create and interpret confidence intervals based on a random sample
- Perform a hypothesis test in one variable
- Use Microsoft Excel to organize and to perform statistical calculations
- Interpret Microsoft Excel output created by others
- Apply the statistical knowledge gained from this course by completing a cumulative project

**Evaluation & Assessment:**

• Tests/Quizzes	3 - 5 per marking period	40%
• Projects/Activities	3 - 5 per marking period	40%
• Homework	Daily	10%
• Classwork (Notes & Class Participation)	Daily	10%

The Final Grade will consist of each marking period (22.5% each), the midterm exam (5%), and the final exam (5%).