

**Common Course Outline**  
**Math 153**  
**Introduction to Statistical Methods**  
**4 Semester Hours**  
**The Community College of Baltimore County**

**Description**

**MATH 153 – 4 credits - Introduction to Statistical Methods** develops an understanding of statistical methodology and use of critical judgment in analyzing data sets. Topics include descriptive statistics, introduction to probability, normal and binomial distributions, hypothesis testing, confidence intervals, regression and correlation, and chi-square distribution. A statistical computer package, e.g. Minitab, is introduced as a computational tool and integrated throughout the course.

**4 credits**

**Prerequisites: RDNG 052 or ESOL 054 and MATH 083**

**Overall Course Objectives**

Upon successful completion of this course students will be able to:

1. demonstrate statistical reasoning in everyday life using real world data;
2. apply technology to manage data, explore data, perform inference, and check conditions;
3. describe data with appropriate measures of central tendency and variability;
4. generate and interpret statistical graphs;
5. analyze bivariate data using linear regression;
6. apply statistical methods to data from diverse cultural and global populations;
7. construct and interpret probability models for discrete random variables;
8. solve a normal probability distribution application;
9. apply the fundamentals of probability in application;
10. construct and interpret confidence intervals in order to make inferences about parameters;
11. perform hypothesis testing to draw inferences regarding parameters;
12. perform a test of independence using the chi-square distribution;
13. construct a solution to real world problems using problem methods individually and in teams;
14. examine the mathematical contributions made by people from diverse cultures throughout history; and
15. effectively communicate the results of a statistical analysis.

**Major Topics**

**I. Introduction**

- A. Statistical terminology
- B. Sampling techniques
- C. Statistical literacy

**II. Descriptive Statistics**

- A. Graphs
- B. Measures of central tendency
- C. Measures of variability
- D. Measures of position

- III. Probability
  - A. Fundamentals and basic concepts
  - B. Addition rule
  - C. Multiplication rule
  - D. Conditional probability
- IV. Discrete Random Variables
  - A. Probability distributions
  - B. Expected value and standard deviation
  - C. Use and interpret binomial probabilities
  - D. Mean and standard deviation of a binomial random variable
- V. Normal Distribution
  - A. Characteristics of the normal distribution
  - B. Use and interpret normal probabilities
- VI. Sampling Distributions
  - A. Central Limit Theorem(CLT)
  - B. Mean and standard error
  - C. Apply CLT in application
- VII. Estimates and Confidence Intervals
  - A. Introduction to the t-distribution
  - B. Confidence interval for a population mean
  - C. Confidence interval for a population proportion
- VIII. Hypothesis testing
  - A. Purpose of a hypothesis test
  - B. Hypothesis test of a population mean
  - C. Hypothesis test of a population proportion
  - D. Hypothesis testing for two population proportions and means
- IX. Regression and correlation
  - A. Scatter plot
  - B. Use and interpret the correlation coefficient
  - C. Use and interpret the linear regression
- X. Chi-Square Distribution: Test of Independence

### **Course Requirements**

Grading: Grading procedures will be determined by the individual faculty member but will include the following: A minimum of two exams will be required in addition to a final exam. Individual faculty will notify students of the testing procedures to be used.

### **Other Course Information**

This course is taught in a computerized environment. Individual faculty members may include additional course objectives, major topics, and other course requirements to the minimum expectations stated in the Common Course Outline.