

**Common Course Outline**  
**Math 133**  
**Concepts of Mathematics III: Statistics and Functions**  
**4 Semester Hours**  
**The Community College of Baltimore County**

**Description**

**MATH 133 – 4 Credits – Concepts of Mathematics III: Statistics and Functions** explores statistical methodology and use of critical judgment in analyzing data sets. Also, students will develop the concept of a function on an intuitive and conceptual basis appropriate for elementary education majors. Topics include descriptive statistics, introduction to probability, normal distributions, regression, correlation, curve fitting, and functions including linear, quadratic, and exponential. This is not a “methods in teaching” course.

**4 credits; 4 lecture hours per week**

**Prerequisite: MATH 083 or sufficient math placement score and (ENGL 052 or ESOL 052) and (RDNG 052 or ESOL 054).**

**Overall Course Objectives**

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

1. Demonstrate the relationship of statistics to the modern world (I,IV,V,1,2,3,6,7);
2. Apply technology to statistical problems (IV,4);
3. Assess statistical reasoning in everyday life (I,1,3,6,7);
4. Describe data with appropriate measures of central tendency and variability (I, IV, V, 1, 3, 4,6,7);
5. Evaluate statistical graphs.(I,IV,V,1,3,4,6,7);
6. Analyze linear regression and correlation problems (I,IV,V,1,3,4,5,6,7);
7. Examine statistical concepts as they apply to diverse populations (III, V);
8. Compute binomial probabilities (I,IV,1,4,6,7);
9. Compute normal distribution probabilities (I,IV,1,4,6,7);
10. Apply the fundamentals of probability and the addition and multiplication rules to introductory problems.(I,IV,1,3,4,6,7);
11. Produce and compare graphs of linear functions. (I, IV, 1, 4);
12. Produce and compare graphs of quadratic functions. (I, IV, 1, 4);
13. Perform operations with functions. (I, IV, 1,3, 4);
14. Produce and compare graphs of polynomial functions. (I, IV, 1, 4);
15. Produce and compare graphs of exponential and logarithmic functions. (I, IV, 1, 4);
16. Identify the zeros of polynomial functions; apply the Fundamental Theorem of Algebra. (I, IV, 1, 3, 4, 5);
17. Solve inequalities in one and two variables. (I, IV, 1, 4);
18. Solve absolute value inequalities in one variable. (I, IV, 1, 4);
19. Construct a solution to real world problems using problem-solving methods individually and in groups. (II, III, V, VI, 2, 3, 7);
20. Examine the mathematical contributions made by people from diverse cultures throughout history (V,5);

21. Articulate a solution to mathematical problems. (II, 2)

## **Major Topics**

### **I. Introduction**

- A. Introductory definitions
- B. Use of statistics in everyday life

### **II. Descriptive Statistics**

- A. Graphs
- B. Measures of Central Tendency
- C. Measures of Variability

### **III. Probability**

- A. Fundamentals and basic concepts
- B. Addition rule
- C. Multiplication rule

### **IV. Binomial Distribution**

- A. Use and interpret binomial probabilities
- B. Mean and standard deviation of a binomial random variable

### **V. Normal Distribution**

- A. Characteristics of the normal distribution
- B. Use and interpret normal probabilities
- C. The Central Limit Theorem

### **VIII. Regression and correlation**

- A. Scatter plot
- B. Use and interpret the correlation coefficient
- C. Use and interpret the linear regression line

### **IX. Linear Functions**

- A. Slopes and Equations of a Line (Review)
- B. Function Notation (Review)
- C. Domain and Range
- D. Absolute value and Piecewise-defined Functions

### **X. Inequalities in One and Two Variables**

- A. Inequalities in One Variable (Review)
- B. Compound Inequalities in One Variable
- C. Absolute Value Equations and Inequalities in One Variable
- D. Linear Inequalities in Two Variables
- E. Systems of Linear Inequalities in Two Variables

### **XII. Quadratic Functions**

- A. Quadratic Functions, Function Notation, and Their Zeros (Review)
- B. Mathematical Models
- C. Roots of Quadratic Equations

### **XIII. Functions**

- A. Operations on Functions
- B. Inverse Functions; Square Root Function

### **XIV. Exponential and Logarithmic Functions**

- A. Exponential Functions
- B. Applications of Exponential Functions

- C. Logarithmic Functions
- D. Modeling with Exponential and Logarithmic Functions
- XV. Polynomial Functions
  - A. Power Functions
  - B. Polynomial Functions and Their Zeros
  - C. Fundamental Theorem of Algebra

**Course Requirements (General Education Goal #VII)**

Students will be given opportunity to collaborate via group work and/or oral presentation of problem solutions. There will be multiple opportunities for the instructor to assess student progress in the course through class work and/or homework.

Grading: Grading procedures will be determined by the individual faculty member but will include the following:

Tests, Exams, and/or Quizzes: At least two tests will be required. Individual faculty will notify students of the testing procedures to be used.

Other components, such as Projects or Group Work, may be part of the grade.

Final Grades: Grades will be determined by individual faculty members.

The Community College of Baltimore County is committed to providing a high-quality learning experience that results in growth in knowledge, attitudes, and skills necessary to function successfully as a transfer student, in a career and as a citizen. To accomplish this goal, we maintain high academic standards and expect students to accept responsibility for their individual growth by attending classes, completing all homework and other assignments, participating in class activities and preparing for tests.

We take seriously our responsibility to maintain high-quality programs and will periodically ask you to participate in assessment activities to determine whether our students are attaining the knowledge, attitudes and skills appropriate to various courses and programs. The assessment activities may take many different forms such as surveys, standardized or faculty-developed tests, discussion groups or portfolio evaluations. We ask that you take these activities seriously so that we can obtain valid data to use for the continuous improvements of CCBC's course and programs.

Created: 9/08/03  
Title changed: 02/06/04  
Updated: 10.10.06  
Updated: 03.05.07