

Common Course Outline

MATH 102

Algebra for Precalculus

3 Semester Hours

The Community College of Baltimore County

Description

This course is designed to reinforce and extend high school and college algebra skills to prepare a student for Precalculus Mathematics. Topics will include linear, quadratic, and absolute value equations and inequalities with applications; matrices, Gauss-Jordan elimination; Cramer's Rule; applications of systems of linear and non-linear equations, series and sequences, mathematical induction, binomial theorem, and conic sections.

Prerequisites: Reading Skill 2, English Skill 1, Algebra I and II, one year of geometry and a satisfactory score on the Mathematical Placement Test; or satisfactory completion of Math 083 or 101; or consent of instructor.

Overall Course Objectives

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

1. Solve non-linear systems of equations and inequalities and model applications.
2. Model applications using linear, quadratic, and non-linear reducible to linear or quadratic equations.
3. Solve systems of linear equations by Gauss-Jordan elimination, or Cramer's Rule and model applications.
4. Solve partial fraction problems.
5. Model applications using matrices and find inverse matrices.
6. Define sequences. Write terms of sequences. Write the general term of a given sequence.
7. Write series using summation notation.
8. Use mathematical induction to prove the validity of propositions.
9. Write the n th term of a geometric and an arithmetic sequence. Find the sum of an arithmetic or geometric series.
10. Write the expansion of a power of a binomial using the binomial formula. Write the n th term of an expanded power of a binomial.
11. Evaluate the number of permutations or combinations of " n " objects taken " r " at a time.
12. Graph circles, parabolas, ellipses, and hyperbolas with translation. Write the equation of a circle, parabola, ellipse, or hyperbola in standard form given information about foci, axes, etc.
13. Model applications using the conic sections.

Major Topics

1. Review of Algebra I and II
 - A. Polynomial factoring
 - B. Evaluate and simplify rational expressions
 - C. Simplify radicals using exponent properties
 - D. Solve applications of linear equations
 - E. Solve quadratic equations and inequalities including complex solutions
 - F. Solve rational and radical equations
 - G. Solve absolute value equations and inequalities
 - H. Solve rational and polynomial inequalities
2. Systems of Linear Equations
 - A. Solve using Gauss-Jordan Elimination
 - B. Find inverses of matrices
 - C. Solve using matrices
 - D. Solve using determinants
 - E. Solve using Cramer's Rule
 - F. Model applications using systems of linear equations
3. Systems of non-linear equations
 - A. Solve
 - B. Model applications
4. Partial Fractions
 - A. Decomposition of repeating and non-repeating linear factors
 - B. Decomposition of repeating and non-repeating quadratic factors
5. Sequences and Series
 - A. Find and write general terms of sequences and series
 - B. Write series in summation notation
 - C. Use mathematical induction to prove propositions
 - D. Define arithmetic and geometric sequences
 - E. Find terms and sums of arithmetic and geometric sequences
 - F. Expand an expression or find the n th term of an expression using the Binomial Formula
 - G. Evaluate the number of permutations or combinations of " n " objects taken " r " at a time
 - H. Model applications using permutations and combinations
6. Conic Sections
 - A. Graph circles, parabolas, ellipses, and hyperbolas with or without translation
 - B. Write equations of the conic sections in standard form
 - C. Model applications using the conic sections

Course Requirements

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 classwork and/or homework.

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

1. Tests, Exams, and/or Quizzes: At least two written examinations will be given. Individual faculty will notify students of testing procedures to be used.
2. Final Exam: The course will include a final exam.
3. Other projects: Individual faculty will notify students of other projects that are assigned. These may include individual work, group work, and oral presentation of homework solutions.

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

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

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 improvement of CCBC's courses and programs.