



# BROWARD COMMUNITY COLLEGE COURSE OUTLINE

**LAST REVIEW: 2006-2007**  
*(i.e. 2003-2004)*

**NEXT REVIEW: 2011-2012**  
*(i.e. 2008-2009)*

**TATUS: A**  
*(A, I, D)*

**COURSE TITLE: PREALGEBRA**

**COMMON COURSE NUMBER: MAT 0012**

**CREDIT HOURS: 4**

**CONTACT HOUR BREAKDOWN**

*(per 16 week term)*

**CLOCK HOURS:**  
*(Voc. Course ONLY)*

Lecture: **48**

Lab:

Clinic:

Other:

**PREREQUISITE(S):**       **None.**

**COREQUISITE(S):**       **MAT 0012L**

**PRE/COREQUISITE(S):**

**COURSE DESCRIPTION:** *(750 characters, maximum)*

A course designed to improve the student's abilities with arithmetic, basic algebra, and problem solving. Topics to be studied include number families, arithmetic, order of operations, geometric formulas, unit analysis, linear equations in one variable, and data analysis. Problem solving is an integral part of this course. This course teaches the student to understand and communicate concepts of arithmetic and algebra, both orally and written, and helps prepare the student for college-level mathematics and math-based courses. It is nontransferable. Due to the nature of this course, calculators are not permitted.

## UNIT TITLES

1. Whole Numbers: Operations and Applications
2. Integers: Operations and Applications
3. Fractions & Mixed Numbers: Operations and Applications
4. Decimal Numbers: Operations and Applications
5. Linear Equations in One Variable
6. Ratios, Rates, and Proportions
7. Percents
8. Geometric Calculations
9. Measurements and Unit Analysis
10. Square Roots (OPTIONAL)
11. Charts and Graphs



# BROWARD COMMUNITY COLLEGE COURSE OUTLINE

## ASSESSMENT:

Please provide a brief description (250 characters maximum) that details how students will be assessed on the course outcomes.

Written Quizzes/Examinations.

Cumulative Final Examination.

*\*\*\* Complete the following only if course is seeking general education status \*\*\**

## GENERAL EDUCATION Competencies and Skills\*:

Please highlight in green font all Competencies/Skills from the list below that apply to this course. In the box to the right of the Competency/Skill, enter all specific learning outcome numbers (i.e. 1.1, 2.7, 5.12) that apply.

1. Read with critical comprehension	
2. Speak and listen effectively	
3. Write clearly and coherently	
4. Think creatively, logically, critically, and reflectively (analyze, synthesize, apply, and evaluate)	
5. Demonstrate and apply literacy in its various forms: (highlight in green ALL that apply) ( 1. technological, 2. informational, 3. mathematical, 4. scientific, 5. cultural, 6. historical, 7. aesthetic and/or 8. environmental )	
6. Apply problem solving techniques to real-world experiences	
7. Apply methods of scientific inquiry	
8. Demonstrate an understanding of the physical and biological environment and how it is impacted by human beings	
9. Demonstrate an understanding of and appreciation for human diversities and commonalities	
10. Collaborate with others to achieve common goals.	
11. Research, synthesize and produce original work	
12. Practice ethical behavior	
13. Demonstrate self-direction and self motivation	
14. Assume responsibility for and understand the impact of personal behaviors on self and society	
15. Contribute to the welfare of the community	

\* General Education Competencies and Skills endorsed by '05-'06 General Education Task Force



**Common Course Number: MAT 0012**

**Unit 1      Whole Numbers: Operations and Applications**

**General Outcome:**

- 1.0      The student shall be able to perform operations involving whole numbers and solve appropriate word problems without the aid of a calculator.**

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 1.1      Graph whole numbers on a number line.
- 1.2      Identify the place values of each digit of a whole number.
- 1.3      Write whole numbers using words, and vice versa.
- 1.4      Round whole numbers to a given place value.
- 1.5      Determine which of two whole numbers is greater using inequality symbols.
- 1.6      Identify the properties and words/phrases associated with the operations of addition, subtraction, multiplication, division, and exponentiation of whole numbers (e.g. sum, quotient, less than, a multiple of, cubed).
- 1.7      Translate word phrases into mathematical expressions, and vice versa (e.g. five less than twice a number =  $2n - 5$ ).
- 1.8      Apply “shortcut rules” for divisibility by 2, 3, 4, 5, 6, 9, and 10.
- 1.9      Add, subtract, multiply, divide, and exponentiate whole numbers.
- 1.10     Estimate sums, differences, products, and quotients of whole numbers by rounding.
- 1.11     Simplify numerical expressions using the order of operations.
- 1.12     Define the terms “prime number” and “composite number.”
- 1.13     Explain why the number one (1) is not prime.
- 1.14     Determine whether a whole number is prime, composite, or neither.
- 1.15     Determine all factors of whole numbers.
- 1.16     Determine the prime factorization of whole numbers.
- 1.17     Solve appropriate arithmetic word problems using operations on whole numbers.



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**Unit 2      Integers: Operations and Applications**

**General Outcome:**

**2.0      The student shall be able to perform operations involving integers and solve appropriate word problems without the aid of a calculator.**

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 2.1      Graph integers on a number line.**
- 2.2      Define the term “absolute value” with respect to distance.**
- 2.3      Define the term “nonnegative,” and be able to distinguish it from the term “positive.”**
- 2.4      Evaluate the absolute value of numbers and of numerical expressions (e.g.  $|3 - 6^2|$ ).**
- 2.5      Determine which of two integers is greater using inequality symbols.**
- 2.6      Identify the properties and words/phrases associated with the operations of addition, subtraction, multiplication, division, and exponentiation of integers.**
- 2.7      Translate word phrases into mathematical expressions, and vice versa.**
- 2.8      Add, subtract, multiply, divide, and exponentiate integers.**
- 2.9      Simplify numerical expressions using the order of operations.**
- 2.10     Solve appropriate arithmetic word problems using operations on integers.**



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**Unit 3 Fractions & Mixed Numbers: Operations and Applications**

**General Outcome:**

**3.0 The student shall be able to perform operations involving fractions and mixed numbers and solve appropriate word problems without the aid of a calculator.**

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 3.1** Identify a fraction's numerator and denominator, and explain what each represents.
- 3.2** Represent fractions pictorially, and determine the fraction represented by a figure (e.g. the portion of a shaded figure).
- 3.3** Determine when a fraction is undefined.
- 3.4** Define the terms "proper fraction," "improper fraction," and "mixed number."
- 3.5** Identify fractions as proper or improper.
- 3.6** Write improper fractions as mixed numbers, and vice versa.
- 3.7** Graph fractions and mixed numbers on a number line.
- 3.8** Determine equivalent representations of integers, fractions and mixed numbers.
- 3.9** Reduce fractions and mixed numbers to lowest terms.
- 3.10** Determine the least common denominator of two fractions.
- 3.11** Identify which of two fractions/mixed numbers is greater using inequality symbols.
- 3.12** Determine the reciprocal of integers, fractions, and mixed numbers.
- 3.13** Identify the properties and words/phrases associated with the operations of addition, subtraction, multiplication, division, and exponentiation of fractions and mixed numbers.
- 3.14** Translate word phrases into mathematical expressions, and vice versa.
- 3.15** Add, subtract, multiply, divide, and exponentiate fractions and mixed numbers.
- 3.16** Simplify complex fractions.
- 3.17** Simplify numerical expressions using the order of operations.
- 3.18** Solve appropriate arithmetic word problems using operations on fractions and mixed numbers.



**Common Course Number: MAT 0012**

**Unit 4      Decimal Numbers: Operations and Applications**

**General Outcome:**

**4.0      The student shall be able to perform operations involving decimal numbers and solve appropriate word problems without the aid of a calculator.**

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 4.1**      Graph decimal numbers on a number line.
- 4.2**      Identify the place values of each digit of a decimal number.
- 4.3**      Round a decimal number to a given place value.
- 4.4**      Rewrite terminating decimal numbers as a fraction or a mixed number, and vice versa.
- 4.5**      Rewrite appropriate fractions as repeating decimals.
- 4.6**      Define the terms “rational number,” “irrational number,” and “real number.”
- 4.7**      Identify decimal numbers and square roots as rational or irrational.
- 4.8**      Identify which of two decimal numbers is greater using inequality symbols.
- 4.9**      Identify the properties and words/phrases associated with the operations of addition, subtraction, multiplication, division, and exponentiation of decimal numbers.
- 4.10**    Translate word phrases into mathematical expressions, and vice versa.
- 4.11**    Add, subtract, multiply, divide, and exponentiate decimal numbers.
- 4.12**    Estimate sums, differences, products, and quotients of decimal numbers by rounding.
- 4.13**    Add, subtract, multiply, divide, and exponentiate rational numbers presented in any mixture of formats, and simplify numerical expressions using the order of operations (e.g.  $\frac{1}{2} - 0.8^2$ ).
- 4.14**    Evaluate the mean, median, mode, and range of lists of real numbers.
- 4.15**    Solve appropriate arithmetic word problems using operations on real numbers.



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**Unit 5      Linear Equations of One Variable**

**General Outcome:**

**5.0      The student shall be able to correctly solve linear equations in one variable, and solve appropriate word problems without the aid of a calculator.**

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 5.1**      Define the term “variable.”
- 5.2**      Define the term “linear equation.”
- 5.3**      Define the term “solution to an equation in one variable.”
- 5.4**      Determine if a given variable value is a solution to an equation in one variable.
- 5.5**      Solve one-step linear equations in one variable requiring the addition property of equality and involving any mixture of numbers (i.e. integers, fractions, mixed numbers and decimals intermixed).
- 5.6**      Solve one-step linear equations in one variable requiring the multiplication property of equality and involving any mixture of numbers (i.e. integers, fractions, mixed numbers and decimals intermixed).
- 5.7**      Solve multi-step linear equations in one variable requiring both the addition and multiplication properties of equality and involving any mixture of numbers (i.e. integers, fractions, mixed numbers and decimals intermixed).
- 5.8**      Solve linear equations in one variable with variables on both sides of the equal sign and involving any mixture of numbers (i.e. integers, fractions, mixed numbers and decimals intermixed).
- 5.9**      Solve linear equations in one variable requiring the distributive property and involving any mixture of numbers (i.e. integers, fractions, mixed numbers and decimals intermixed).
- 5.10**     Solve appropriate word problems by modeling them with linear equations in one variable.
- 5.11**     Evaluate formulas (e.g. For  $d = rt$ , find  $r$  when  $d = 128$  miles and  $t = 4$  hours.).



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**Unit 6 Ratios, Rates, and Proportions**

**General Outcome:**

- 6.0 The student shall be able to write and simplify ratios and rates, create and solve proportions, and solve appropriate word problems without the aid of a calculator.**

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 6.1** Define the terms “ratio,” “rate,” and “proportion.”
- 6.2** Write ratios using reduced-fraction notation.
- 6.3** Write rates using reduced-fraction notation.
- 6.4** Determine if two rational numbers are proportional.
- 6.5** Solve proportions.
- 6.6** Solve appropriate word problems using ratios, rates, and proportions.



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**Unit 7 Percents**

**General Outcome:**

**7.0 The student shall be able to identify and manipulate percents, and solve appropriate word problems without the aid of a calculator.**

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 7.1** Define the term “percent.”
- 7.2** Rewrite a percent as a decimal number and as a fraction or a mixed number, and vice versa.
- 7.3** Solve basic percent problems using linear equations in one variable and/or proportions (e.g. Twelve is 15% of what number? What percent of 10 is 35?).
- 7.4** Solve appropriate word problems involving percents, including percent increase/decrease, taxes, commissions, and simple interest.



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**Unit 8 Geometric Calculations**

**General Outcome:**

**8.0 The student shall be able to name basic two-dimensional shapes, and calculate various measurements associated with them without the aid of a calculator.**

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 8.1** Identify a triangle, parallelogram, rectangle, square, trapezoid and circle.
- 8.2** Define the terms “perimeter,” “area,” “radius,” “diameter,” and “circumference.”
- 8.3** Calculate the perimeter of triangles, parallelograms, rectangles, squares, and trapezoids (with appropriate units).
- 8.4** Approximate  $\pi$  to at least 2 decimal places.
- 8.5** Calculate the circumference of circles (with appropriate units).
- 8.6** Calculate the area of triangles, parallelograms, rectangles, squares, trapezoids, and circles (with appropriate units).



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**Unit 9      Measurements and Unit Analysis**

**General Outcome:**

**9.0      The student shall be able to identify and convert among units of measurement without the aid of a calculator.**

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 9.1      Recognize standard U.S. system units of length, area, volume, and weight.**
- 9.2      Convert between different U.S. system units for a given measurement using unit analysis.**
- 9.3      Recognize standard metric system units of length, area, volume, and weight.**
- 9.4      Convert between different metric system units for a given measurement using decimal-point translation. (OPTIONAL)**
- 9.5      Given the conversion factors, convert between U.S. system and metric system units for a given measurement using unit analysis.**
- 9.6      Convert between the Celsius and Fahrenheit units of temperature measurement. (OPTIONAL)**



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**Unit 10 Square Roots (OPTIONAL)**

**General Outcome:**

**10.0 The student shall be able to evaluate exact and approximate square roots, and solve problems involving the Pythagorean Theorem without the aid of a calculator.**

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 10.1** Define the terms “square root” and “perfect square.”
- 10.2** Find exact square roots of perfect squares.
- 10.3** Determine between what two adjacent whole numbers the square root of a number lies, and which whole number it is closer to.
- 10.4** Explain what the Pythagorean Theorem says and means.
- 10.5** Use the Pythagorean Theorem to solve right triangles.
- 10.6** Solve appropriate word problems using the Pythagorean Theorem.



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**Unit 11      Charts and Graphs**

**General Outcome:**

**11.0    The student shall be able to interpret data illustrated on bar graphs, line graphs, and pie charts without the aid of a calculator.**

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 11.1    Identify a bar graph, and analyze and interpret data illustrated by a bar graph.**
- 11.2    Identify a line graph, and analyze and interpret data illustrated by a line graph.**
- 11.3    Identify a pie chart, and analyze and interpret data illustrated by a pie chart.**