



## COURSE OUTLINE

<b>Course Number</b> MAT033	<b>Course Title</b> Basic Mathematics	<b>Credits</b> 4
<b>Hours:</b> lecture/Lab/Other 4	<b>Co- or Pre-requisite</b> None	<b>Implementation</b> sem/year Spring 2007

### **Catalog description (2006-2009 Catalog):**

Developmental mathematics course designed for students needing a review of basic arithmetic, including an introduction to algebra. Topics include operations with whole numbers, decimals, fractions, percents, ratio and proportion, signed numbers, and an introduction to algebraic equations. [Foundation course does not fulfill mathematics elective requirement.]

**Is course New, Revised, or Modified?** Revised Spring 2008

### **Required texts/other materials:**

Texts: Mathematics in Action – Prealgebra Problem Solving by Consortium for Foundations Mathematics (Pearson Custom Publishing) packaged with Selected Problems to Accompany Mathematics in Action.

### **Revision date:**

Spring 2008

### **Course coordinator:**

Betty Peterson, [petersob@mccc.edu](mailto:petersob@mccc.edu), 609-570-3421

### **Information resources:**

There are many resources available for this course. The library has a wide assortment of books available on these topics. There are many websites that assist the beginning mathematics learner including, [www.mccc.edu/~keld/olmlc.html](http://www.mccc.edu/~keld/olmlc.html) .

### **Other learning resources:**

Tutoring available at both campuses.

## **Course Competencies/Goals:**

As this is a foundations level mathematics course, the objective of the course is to begin to prepare students to take a college level mathematics course. Crucial to success in a mathematics course is an ability to think “algebraically”, that is to be able to demonstrate an ability to move beyond arithmetic algorithms into abstract reasoning.

### ***The student will be able to:***

- I. Recognize equivalent forms of rational numbers and write rational numbers in an equivalent form.
- II. Use proportional reasoning to solve application problems.
- III. Apply order of operations, recognizing various methods to indicate multiplication in algebra.
- IV. Understand the relative size of both integers and rational numbers, and be able to make comparisons.
- V. Translate written English to the language of mathematics and understand the concept of a variable with its role in a formula.
- VI. Perform basic arithmetic properties and the operations of addition, subtraction, multiplication, division, exponents and rounding.
- VII. Recognize and interpret information given in graphs and tables.

## **Course-specific General Education Knowledge Goals and Core Skills.**

### **General Education Knowledge Goals**

**Goal 2. Mathematics.** Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

### **MCCC Core Skills**

**Goal B. Critical Thinking and Problem-solving.** Students will use critical thinking and problem solving skills in analyzing information.

**Goal F. Collaboration and Cooperation.** Students will develop the interpersonal skills required for effective performance in group situations.

## **Units of study in detail.**

### **Unit I      **Whole Numbers****

#### **Learning Objectives**

#### ***The student will be able to...***

- Compare whole numbers using inequality symbols. (Course Competency IV; Gen Ed Goal 2)
- Read and write numbers with words and digits and understand how to express numbers both ways. (Course Competency V; Gen Ed Goal 2)
- Round whole numbers to specified place values and use rounded numbers for estimation. (Course Competency VI; Gen Ed Goal 2)
- Perform the operations of addition, subtraction, multiplication, and division, by hand as well as by using a calculator. (Course Competency VI; Gen Ed Goal 2)
- Recognize the associative and commutative property for both addition and multiplication and understand that commutative property does not hold for subtract nor division. (Course Competency VI; Gen Ed Goal 2)

## **Unit I Whole Numbers (continued)**

### **Learning Objectives**

#### ***The student will be able to...***

- Be able to read and interpret tables and graphs. (Course Competency VII; Gen Ed Goal 2; Core Skill B)
- Use exponential notation and apply the multiplication rule for numbers given in exponential notation. (Course Competency VI; Gen Ed Goal 2)
- Evaluate arithmetic expressions and apply order of operations. (Course Competency VI; Gen Ed Goal 2)
- Factor whole numbers, listing all factors as well as recognizing prime and composite numbers. (Course Competency VI; Gen Ed Goal 2)

## **Unit II Ratios, Proportions Variables and Problem Solving**

### **Learning Objectives**

#### ***The student will be able to...***

- Write fraction notation for ratios. (Course Competency I; Gen Ed Goal 2)
- Determine whether two pairs of numbers are proportional. (Course Competency II; Gen Ed Goal 2)
- Solve a proportion using cross products. (Course Competency II; Gen Ed Goal 2)
- Solve applications using proportions. (Course Competency II; Gen Ed Goal 2; Core Skill F)
- Recognize and understand the concept of a variable in context and symbolically. (Course Competency V; Gen Ed Goal 2; Core Skill B)
- Translate a written statement into a statement involving variables. (Course Competency V; Gen Ed Goal 2; Core Skill B)
- Evaluate variable expressions. (Course Competency V; Gen Ed Goal 2)
- Apply formulas to solve contextual problems. (Course Competency V; Gen Ed Goal 2; Core Skill B)
- Apply fundamental principles of algebra to solve equations of the form  $x + a = b$ ,  $x - a = b$  and  $ax = b$  (Course Competency VI; Gen Ed Goal 2; Core Skill B)

## **Unit III Rational Numbers: Integers**

### **Learning Objectives**

#### ***The student will be able to...***

- Identify integers. (Course Competency IV)
- Represent quantities in real-world situations using integers. (Course Competency IV)
- Compare integers using inequality symbols. (Course Competency IV; Gen Ed Goal 2)
- Calculate the absolute value of integers. (Course Competency IV; Gen Ed Goal 2)
- Perform the mathematical operations of addition, subtraction, multiplication and division on integers, both by hand and by using a calculator. (Course Competency VI; Gen Ed Goal 2)
- Apply exponents to integers. (Course Competency VI; Gen Ed Goal 2; Core Skill B)
- Use order of operations with expressions that involve integers. (Course Competency III; Gen Ed Goal 2; Core Skill B)
- Evaluate formulas involving integers. (Course Competency V; Gen Ed Goal 2)

## **Unit IV      Rational Numbers: Fractions and Decimals**

### **Learning Objectives**

#### ***The student will be able to...***

- Write equivalent fractions with both larger and smaller denominators. (Course Competency I; Gen Ed Goal 2)
- Convert mixed numbers to improper fractions and improper fractions to mixed numbers. (Course Competency I; Gen Ed Goal 2)
- Compare fractions and recognize which fraction of a pair is larger, or whether they are equivalent. (Course Competency IV; Gen Ed Goal 2)
- Perform the mathematical operations of addition and subtraction of fractions and mixed numbers with both common and different denominators both by hand and with a calculator. (Course Competency VI; Gen Ed Goal 2)
- Perform the mathematical operations of multiplication and division on fractions and mixed numbers. (Course Competency VI; Gen Ed Goal 2)
- Identify place values of numbers written in decimal form and round to a given place. (Course Competency VI; Gen Ed Goal 2)
- Convert between decimal and fraction or mixed number and recognize that they are equivalent numbers. (Course Competency I; Gen Ed Goal 2)
- Compare decimal numbers and fractions to determine relative size. (Course Competency IV; Gen Ed Goal 2)
- Perform the mathematical operations of addition, subtraction, multiplication and division on decimal numbers. (Course Competency VI; Gen Ed Goal 2)
- Use the order of operations to evaluate expressions involving decimals. (Course Competency III; Gen Ed Goal 2)

## **Unit V      Rational Numbers: Proportions and Percents**

### **Learning Objectives**

#### ***The student will be able to...***

- Understand the distinction between absolute and relative measure. (Course Competency IV; Gen Ed Goal 2)
- Write a ratio in its fraction, decimal and percent formats. (Course Competency I; Gen Ed Goal 2)
- Use proportions to solve for an unknown if given a known relationship. (Course Competency II; Gen Ed Goal 2; Core Skill B)
- Solve application problems involving percentage increases and percentage decreases. (Course Competency II; Gen Ed Goal 2; Core Skill B)
- Calculate an additional percentage off and recognize that 20% off of an item already reduced by 20% is not the same as 40% off the original. (Course Competency I; Gen Ed Goal 2; Core Skill B)
- Use proportions to solve problems that involve rates. (Course Competency II; Gen Ed Goal 2; Core Skill B)
- Apply unit or dimensional analysis to solve application problems. (Course Competency V; Gen Ed Goal 2; Core Skill B)

**Evaluation of student learning:**

Grade will be based on the following percentages:

Four unit tests 60%

Group Projects 10%

Homework and Quizzes 10%

Final 20%

Multiple choice questions on the departmental unit tests will reflect each of the unit objectives listed above and administered in the testing center. No extra credit should be given on these tests. Partial credit should not be given for work. As an alternative to this policy, instructors may write their own free answer tests, but these tests need to be reviewed by the course coordinator before administration to ensure that both the learning objectives are being met and that the tests are clearly written to be fair for the students.

During the review period for the unit, the students should complete a group project which will reinforce the material in the unit as well as connect it with a real world application. A minimum of two projects should be collected for a grade.

For the homework and quizzes portion of the grade instructors are free to do any or all of the following suggestions. Homework could be checked for completion or collected and graded. Quizzes should be given on a weekly basis when there are no tests assigned for completion. Most students need to practice the skills presented in class in order to perform well on a test. Attendance in class is important but is not enough and weekly graded opportunities should be used to ensure that the students are practicing on a regular basis. Two other possibilities for a grade in this area would be to check notebooks to ensure that the students are taking notes during class or assigning minute papers to check for understanding of the day's material.

The final is comprehensive and passing the final is required to pass the class.

**Academic Integrity Statement:**

Mercer County Community College is committed to academic integrity – the honest, fair and continuing pursuit of knowledge, free from fraud or deception.

Students should never:

- Knowingly represent the work of others as their own
- Knowingly represent previously completed academic work as current
- Fabricate data to support academic work
- Use or obtain unauthorized assistance in the execution of any academic work
- Give fraudulent assistance to other students
- Unethically use technological means to gain academic advantages

Violators of the above actions will be penalized. For a single violation the faculty member will determine the course of action. This may include assigning a lower grade on the assignment, lowering the course grade, failing the student, or another penalty that is appropriate to the violation. The student will be reported to the Academic Integrity Committee, who may impose other penalties for a second (or later) violation. The student has right to a hearing and also to appeal any decisions. These rights are outlined in the student handbook.