

**HOSTOS COMMUNITY COLLEGE
DEPARTMENT OF MATHEMATICS**

MAT 010 **BASIC MATHEMATICS SKILLS FOR SCIENCE STUDENTS**

CREDIT HOURS: **0**

EQUATED HOURS: **4.5**

CLASS HOURS: **4.5**

PREREQUISITE: **NONE**

REQUIRED TEXTS: **Akst/Bragg: Basic Mathematics, 4th Edition, Addison Wesley, 2004.
(Mathxl Lab Software & Video Lecture C.D.)**

DESCRIPTION: **This course provides the basic arithmetic skills that will be utilized in all subsequent mathematics and science courses. Topics: operations with whole numbers, fractions, decimals, ratio, proportion, percent, scientific notation, the metric system, word problems and applications.**

EXAMINATIONS: **A minimum of three partial tests, a departmental midterm and a comprehensive departmental final examination. The midterm will count a minimum of 15% while the final exam will count a minimum of 25% of the course grade.**

The minimum grade required to pass this course is a C which is 70% or higher. In addition the department recommends that if a student receives less than a 60% on the departmental final exam then they must repeat the course.

GRADES: **A, A-, B+, B, B-, C+,C, R, I, F.**

Student Learning Outcomes

Students will be able to:

- **Set up a Real Number Line and plot on this line: whole numbers, fractions, decimals as well as integers**
- **Read and write real numbers including: Whole numbers, fractions and decimals.**
- **Compare and order real numbers using the less than or more than symbols**
- **Round off whole numbers and decimals**
- **Convert between representations of real numbers including: decimals, fractions, and percents as well as between scientific notation and either decimal or whole number.**
- **Perform operations in correct order (order of operations): addition, subtraction, multiplication and division on real numbers**
- **Set up and solve application problems involving selecting and applying operations on real numbers. Set up and solve application problems involving ratio, rates and proportions as well as percent application problems.**
- **Simplify complex fractions**
- **Conversions within and between systems of measurements including the English (US) and metric system.**

MAT 010

COURSE OUTLINE

1. The Whole Number System: (1 week)

- 1. Introduction to the Real Number Line.**
- 2. Sets of Natural Numbers and Whole Numbers.**
- 3. Reading and Writing Whole Numbers in the Decimal System.**
- 4. Comparing and Ordering Whole Numbers (<, =, >).**
- 5. Rounding Whole Numbers.**
- 6. Addition of Whole Numbers and Properties of Addition.**
- 7. Subtraction of Whole Numbers and Properties of Subtraction.**
- 8. Multiplication of Whole Numbers and Properties of Multiplication.**
- 9. Multiplication of Whole Numbers by Positive Powers of 10.**
- 10. Division of Whole Numbers and Properties of Division.**
- 11. Division of Whole Numbers by Positive Powers of 10.**
- 12. Use of Estimation in Carrying Out Operations.**
- 13. Test of Divisibility Using 2, 3, 5 as Divisors or Factors.**
- 14. Prime Numbers and Prime Factorization.**

15. **Order of Operations Including the Four Basic Operations and Grouping Symbols.**
16. **Average**
17. **Multiples of a Given Natural Number.**
18. **Least Common Multiple of Natural Numbers.**
19. **Introduction of Key Words and Phrases Representing Basic Operations.**
20. **Evaluation of Formulas.**
21. **Operations with Denominate Numbers (i.e. Measures of Time, Weight, etc).**
22. **Word Problems.**

II. FRACTIONS: (3 week)

1. **Introduction to the System of Rational Numbers.**
2. **Set of Fractions.**
3. **Varied Interpretations: Part of Whole, as a Quotient.**
4. **Proper and Improper Fractions (Mixed Numbers).**
5. **Equivalent Fractions.**
6. **Reducing Fractions to Lowest Terms by Prime Factoring and/or canceling.**
7. **Amplifying Fractions.**
8. **Least Common Denominator – The concept of like Fractions.**
9. **Comparing and Ordering Fractions (<; =; >).**
10. **Fractions and the Number Line.**
11. **Multiplication of Fractions and Mixed Numbers.**
12. **The Concept of Reciprocal.**
13. **Dividing Fractions and Mixed Numbers.**
14. **Addition of Fractions and Mixed Numbers.**
15. **Average.**
16. **Subtraction of Fractions and Mixed Numbers.**
17. **Order of Operations to Simplify Arithmetic Expressions Involving Whole Number, Fractions, Mixed Numbers, Grouping Symbols.**
18. **Simplifying Complex Fractions.**
19. **Word Problems.**

III. Decimals: (2 weeks)

- 1. Meaning of a Decimal as a fraction.**
- 2. Reading and Writing Decimals.**
- 3. Comparing and Ordering Decimals. ($<$; $=$ $>$).**
- 4. Locating Decimals on the Number Line.**
- 5. Writing Decimals as Fractions.**
- 6. Writing Fractions as Decimals.**
- 7. Rounding Decimals.**
- 8. Addition with Decimals.**
- 9. Subtraction with Decimals.**
- 10. Multiplication with Decimals.**
- 11. Multiplication of Decimals by Powers of 10.**
- 12. Division with Decimals.**
- 13. Use of Estimation in Carrying Out Operations.**
- 14. Terminating Decimals, Non-terminating Repeating, and Non-repeating Decimals.**
- 15. Division of Decimals by Powers of 10.**
- 16. Order of Operations to Simplify Arithmetic Expressions Involving Whole Numbers, Fractions and Decimals.**
- 17. Average.**
- 18. Changing Dollars to Dimes and Cents and Vice Versa.**
- 19. Word Problems.**

IV. RATIOS, PROPORTIONS (1 ½ week or 4 sessions)

- 1. The Concepts of Ratio and Rate as Comparisons.**
- 2. Ratios and Rates.**
- 3. Definitions of a Proportion.**
- 4. Solving a Proportion Involving Whole Numbers, Fractions and Decimals.**
- 5. Word Problems Involving Proportions.**
- 6. Percent as a Ratio.**

MIDTERM: (two sessions review and test 15% of grade minimum-8th week)

V. PERCENTS: (3 weeks)

- 1. Writing Percents as Fractions and Decimals.**
- 2. Writing Fractions and Decimals as Percents.**
- 3. The Major Components Involved in Percent Problems.**
- 4. Solving Percent Problems Using Proportions.**
- 5. Word Problems Involving Percents.**

VI. MEASUREMENT SYSTEMS: (1 week)

- 1. Informal Discussion of Measurement.**
- 2. Overview of the U.S – English System of Measurement.**
- 3. Conversion of Units of Length Weight and Capacity within the U.S. – English system.**
- 4. Introduction of Units of Length, Weight, and Capacity within the Metric System.**
- 5. Conversion of Units of Length, Weight, and Capacity within the Metric System.**
- 6. Conversion Between the U.S – English and Metric Systems.**
- 7. Addition and Subtraction of Denominated Numbers.**
- 8. Introduction of Units of Area and Volume.**
- 9. a. Finding Perimeters and Areas of Rectangles.
b. Finding the volume a Cube**

VII. SCIENTIFIC NOTATION: (1 week)

- 1. Introduction to the Set of Integers:
a. Integers on the Number Line.
b. Comparing Integers (<; =; >).
c. Absolute Value.
d. Addition and Subtraction of Integer.**
- 2. Powers of Ten (Positive, Negative, and Zero).**
- 3. Definition of Scientific Notation.**
- 4. Writing Numbers in Scientific Notation.**
- 5. Writing Numbers, Give in Scientific Notation, in Standard Decimal Notation.**
- 6. Word Problems.**
- 7. Multiplication of Powers of Ten.**
- 8. Multiplication of Numbers Expressed in Scientific Notation.**
- 9. Division of Powers of Ten.**
- 10. Division of Numbers Expressed in Scientific Notation.**
- 11. Simplification of Numbers Involving Multiplication and Division of Numbers Written in Scientific Notation.**

REVIEW FOR FINAL (1 week 25% of grade minimum)