Northern Marianas College
CURRICULUM ACTION REQUEST

Effective Semester / Session: Summer 2009

Type of Action:

- __ New
- X Modification
- __ Move to Inactive (Stop Out)
- __ Cancellation

Course Alpha and Number: MA 091

Course Title: Beginning Algebra

Reason for initiating, revising, or canceling:
This course guide is being modified to include a prerequisite: BE 110 College Life Skills and MA 089 Pre-Algebra, and changes in student learning outcomes.

Lyte Chapap   4/17/09

Proposer   Date

Glenn Keaton   4/17/09

Department Chair   Date

Bruce Johnson   4/21/09

English and Format Reviewer   Date

Dr. Debra Cabrera   4/22/09

Dean of Academic Programs and Services   Date

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Course: MA 091 Beginning Algebra

1. Department
Science, Mathematics, Health and Athletics

2. Purpose
This course further develops the fundamental math skills and basic algebraic concepts covered in MA 088 and MA 089. It introduces students to the basic concepts of algebra, including solving equations, polynomials, problem solving, graphing equations and inequalities, and solving real-life problems using algebraic principles. A passing grade in this course qualifies students for entrance into MA 132, Intermediate Algebra.

3. Description

A. Required/Recommended Textbook(s) and Related Materials
Required Text(s): Julie Miller & Molly O'Neill, <u>Beginning Algebra</u>, New York, NY, McGraw-Hill, 2004.
Readability Level: grade 9.3

Required Calculator: TI-82/83/89 or equivalent graphics calculator.

B. Contact Hours
1. **Lecture:** 4 contact hours per week / 60 per semester
2. **Lab:**
3. **Other:**

C. Credits
1. **Number:** 4
2. **Type:** NDU (Non Degree Units)

D. Catalogue Course Description
Note: MA 088, MA 089 and MA 091 are preparatory courses in mathematics and do not carry college degree credit (i.e., NDU = non degree units.)

This course further develops the fundamental math and basic algebraic concepts covered in MA 088 and MA 089. It introduces students to the general concepts of algebra, including solving equations in one and two variables, problem solving, graphing linear equations and inequalities, and solving real-life problems using algebra. Students are required to do assignments using a TI-82/83/89 graphic calculator. Prerequisite: BE 110 College Life Skills, or concurrent enrollment.

English Placement Level: EN 093/094. Math Placement Level: MA 091.

E. Degree or Certificate Requirements Met by Course
None. A passing grade in this course satisfies only the mathematics proficiency requirement for entry into MA 132, Intermediate Algebra.

F. Course Activities and Design
Course activities include lecture, group work and discussions, homework assignments, viewing relevant audio-visual material, quizzes, scheduled testing, calculator exploration, and a comprehensive exit final exam. Students will be required to participate fully in class discussions and other course assignments.

4. Course Prerequisite(s); Concurrent Course Enrollment; Required English/Mathematics Placement Level(s)
Prerequisites: BE 110 College Life Skills or concurrent enrollment, and successful completion of MA 089, or a qualifying placement test score.

Mathematics Placement Level: MA 091

English Placement Level: EN 093/094

5. Estimated Cost of Course; Instructional Resources Needed
Cost to the Student: Tuition for a 4-credit course; cost of textbook; cost of TI-82, TI-83 or TI-89 graphic calculator; other instructional material resources.

Cost to the College: Instructor's salary; classroom.
Instructional resources needed for this course include chalk and chalkboard, an ELMO and TV, and a TI-82/83/89 graphic calculator.

6. Method of Evaluation
Successful completion of this course requires a score of 70% or higher on the department final exam. Only P (Pass) or NP (No Pass) or TF (Technical Failure) grades are given in this NDU Course. (TF is assigned only for excessive absences, i.e., >9 absences.) NMC's grading and attendance policies and the SMH&A department's attendance policies will be followed.

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7. Course Outline

This is a topical outline and does not necessarily indicate the sequence in which the material will be presented.

1.0 Set of Real Numbers
    1.1 Sets of Numbers and the Real Number Line
    1.2 Order of Operations
    1.3 Addition of Real Numbers
    1.4 Subtraction of Real Numbers
    1.5 Multiplication and Division of Real Numbers
    1.6 Properties of Real Numbers and Simplifying Expressions
    1.7 Connections to Graphing: Rectangular Coordinate System

2.0 Linear Equations and Inequalities
    2.1 Addition, Subtraction, Multiplication, and Division Properties of Equality
    2.2 Solving Linear Equations
    2.3 Applications of Linear Equations: Introduction to Problem Solving
    2.4 Linear Equations: Clearing Fractions and Decimals
    2.5 Applications of Geometry
    2.6 Applications of Linear Equations: Word Problems
    2.7 Linear Inequalities
    2.8 Connections to Graphing: Linear Equations in 2 Variables

3.0 Polynomials and Properties of Exponents
    3.1 Exponents: Multiplying and Dividing Common Bases
    3.2 Properties of Exponents
    3.3 Definitions of b^0 and b^{-n}
    3.4 Scientific Notation
    3.5 Addition and Subtraction of Polynomials
    3.6 Multiplication of Polynomials
    3.7 Division of Polynomials
    3.8 Connections to Graphing: Introduction to Nonlinear Graphs

4.0 Factoring Polynomials
    4.1 Greatest Common Factor and Factoring by Grouping
    4.2 Factoring Trinomials: Grouping Method
    4.3 Factoring Trinomials: Trial-and-Error Method
    4.4 Factoring Perfect Square Trinomials and the Difference of two Squares

4.5 Factoring the Sum and Difference of Cubes, and General Factoring Summary
4.6 The Zero Product Rule
4.7 Connections to Graphing: x- and y-intercepts

5.0 Rational Expressions
    5.1 Introduction to Rational Expressions
    5.2 Multiplication and Division of Rational Expressions
    5.3 Least Common Denominator
    5.4 Addition and Subtraction of Rational Expressions
    5.5 Complex Fractions
    5.6 Rational Equations
    5.7 Applications of Rational Equations and Proportions

6.0 Graphing Linear Equations in two Variables
    6.1 Linear Equations in Two Variables
    6.2 Slope of a Line
    6.3 Slope-Intercept Form of a Line
    6.4 Point-Slope Formula
    6.5 Connections to Graphing: Applications of Linear Equations

7.0 Systems of Linear Equations in Two Variables
    7.1 Introduction to Systems of Linear Equations
    7.2 Substitution Method
    7.3 Addition Method
    7.4 Applications of Linear Equations in Two Variables
    7.5 Connections to Graphing: Linear Inequalities in two Variables

8. Instructional Goals

This course will introduce students to:

1.0 The basic concepts and skills of algebra, including the definitions and/or algebraic principles of:
    1.1 The set of Real Numbers and their properties;
    1.2 Polynomials and quadratic equations;
    1.3 Translating mathematical statements, equations and inequalities;
    1.4 Using Algebra to set up and solve Real-life Word Problems;
    1.5 Factoring polynomials;
    1.6 Linear equations and inequalities;
    1.7 Systems of linear equations;
    1.8 Algebraic fractions (rational expressions and equations, complex

fractions and proportions);
1.9. The properties of exponents;
1.10 Formulas;
2.0 Algebraic principles and processes that can be used as problem solving models for real-life problems;
3.0 Graphs of equations, inequalities and systems of equations; and
4.0 Conversions of imperial and metric measurements;

9. Student Learning Outcomes

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

1.0 Perform Operations on Real Numbers by Using the Algebraic Properties of Real Numbers;
2.0 Evaluate and Solve Simple Polynomials and Quadratic Equations;
3.0 Translate English Phrases and Sentences to Mathematical/Algebraic Statements;
4.0 Formulate Algebraic Equations for Setting up and Solving Real-life Word Problems using Algebra;
5.0 Use Appropriate Methods in Factoring Polynomials;
6.0 Distinguish and Solve Linear Equations and Inequalities;
7.0 Solve Systems of Linear Equations in Two Variables and Verify Solutions to the System;
8.0 Apply the Principles of Algebra to Simplify and Solve Algebraic Fractions (Rational Expressions and Equations, Complex Fractions, and Proportions);
9.0 Apply the Properties of Exponents for Simplifying Algebraic Expressions and Solving Algebraic Equations;
10.0 Use Various Formulas to Solve Algebraic Word Problems;
11.0 Integrate Algebraic Principles and Multi-step Processes that can be Used as Problem Solving Models for Real-life Problems;
12.0 Integrate the use of Graphing Utilities as a Tool for Sketching, Interpreting, Analyzing and Solving Graphs of Linear Equations and Inequalities, and Systems of Equations;
13.0 Apply Conversions to Imperial and Metric Measurements;

10. Assessment Measures
The methods of assessment for each of the student learning outcomes are:

1.0 The departmental exit examination which evaluates the student's knowledge and abilities in cognitive reasoning and the interpretation,

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identification, comprehension, calculation and application of basic algebraic concepts; and

2.0 Tests, quizzes, and assignments. Students must also attend class regularly and participate in classroom discussions.