MTH 134

COLLEGE ALGEBRA

3 Credit Hours

Prepared by:
Constance Kuchar

Revised Date: November 17, 2006

Arts & Sciences Education
Dr. Mindy Selsor, Dean

MTH134 COLLEGE ALGEBRA
I. CATALOG DESCRIPTION

Prerequisite: COMPASS Algebra score of at least 66, or COMPASS College Algebra score of at least 31, or COMPASS Trigonometry score of at least 31, or Intermediate Algebra ASSET score of at least 40, or Math ACT score of 20 or higher, or MTH128 with a grade of “C” or better.
3 semester hours credit

College Algebra consists of several non-sequential algebraic topics. The student will explore these topics within the realms of both the real number system and the complex number system. This course will meet the requirement for the Associate of Arts Degree. Students may not apply both MTH134 and MTH141 toward graduation. A graphing calculator is required. (F,S,Su)

II. GENERAL COURSE OBJECTIVES

Upon successful completion of this course the student should be able to:

A. Demonstrate proficiency in all objectives covered under Intermediate Algebra (ch.1)
B. Graph algebraic functions using a graphing utility (1.1)
C. Solve equations that are quadratic in form (including radicals) (1.6)
D. Determine whether a relation is a function (2.1)
E. Find the domain and range of a function (2.1)
F. Determine whether a function is even, odd, or neither (2.2)
G. Analyze linear functions and models (2.3)
H. Perform regression analysis given a set of data (omit logistic) (2.3, 3.1, 4.5)
I. Determine the graph of a function using transformations (2.5)
J. Add, subtract, multiply, and divide functions (2.6)
K. Perform function composition and function decomposition (2.6)
L. Find the inverse of a one to one function (2.7)
M. Find the distance between two points in the plane and the midpoint on a line segment in the plane (2.8)
N. Use the standard form for the equation of a circle to graph a circle (2.8)
O. Analyze a quadratic function (3.1)
P. Analyze the graph of a polynomial function (3.2)
Q. Use algebraic theorems to determine the real or complex roots of a polynomial function (3.3, 3.4)
R. Solve polynomial inequalities (3.6)
S. Analyze the graph of a rational function (optional – 3.5)
T. Solve rational inequalities (optional – 3.6)
U. Solving problems involving direct and inverse variation (optional – 3.7)
V. Perform conversion between exponential equations and logarithmic equations and vice-versa. (4.1, 4.2)
W. Use logarithm properties to simplify/expand logarithmic expressions (4.3)
X. Solve exponential and logarithmic equations (4.4)
Y. Solve systems of linear equations in two and three variables (5.1, 5.2)
Z. Solve systems of non-linear equations in two variables (5.4)
AA. Solve systems of linear equations using matrices (6.1, 6.2)
BB. Perform the matrix operations of addition, subtraction, scalar multiplication, and matrix multiplication (optional – 6.3)
CC. Find the inverse of a square matrix (optional – 6.4)
DD. Find the determinant of a 2 x 2 and 3 x 3 matrix (optional – 6.5)
EE. Solve systems of linear equations using Cramer’s Rule (optional – 6.5)
FF. Recognize arithmetic and geometric sequences; find the sum and \( n^{th} \) term from general formulas (optional – 8.1, 8.2, 8.3)
GG. Expand a binomial raised to a power (optional – 8.5)

III. COURSE OUTLINE
A. Equations and Inequalities

1. Graphs and Graphing Utilities
2. Linear Equations and Rational Equations
3. Models and Applications
4. Complex Numbers
5. Quadratic Equations
6. Other Types of Equations
7. Linear Inequalities and Absolute Value Inequalities

B. Functions and Graphs

1. Basic Functions and Their Graphs
2. More on Functions and Their Graphs
3. Linear Functions and Slope
4. More on Slope
5. Transformations of Functions
6. Combinations of Functions; Composite Functions
7. Inverse Functions
8. Distance and Midpoint Formulas; Circles

C. Polynomial and Rational Functions

1. Quadratic Functions
2. Polynomial Functions and Their Graphs
3. Dividing Polynomials; Remainder and Factor Theorems
4. Zeros of Polynomial Functions
5. Rational Functions and Their Graphs (optional)
6. Polynomial and Rational Inequalities
7. Models Using Variation (optional)

D. Exponential and Logarithmic Functions
1. Exponential Functions
2. Logarithmic Functions
3. Properties of Logarithms
4. Exponential and Logarithmic Equations
5. Exponential Growth and Decay; Modeling Data

E. Systems of Equations
1. Systems of Linear Equations in Two Variables
2. Systems of Linear Equations in Three Variables
3. Systems of Nonlinear Equations in two Variables

F. Matrices and Determinants
1. Matrix Solutions to Linear Systems
2. Inconsistent and Dependent Systems and Their Applications
3. Matrix Operations and Their Applications (optional)
4. Multiplicative Inverses of Matrices and Matrix Equations (optional)
5. Determinants and Cramer's Rule (optional)

G. Sequences, Induction and Probability
1. Arithmetic Sequences (optional)
2. Geometric Sequences and Series (optional)
3. The Binomial Theorem (optional)

V. METHOD OF INSTRUCTION
A. Lecture
B. Discussion
C. Interactive Computer Assignments (some sections)
D. Lab projects (some sections)

VI. REQUIRED TEXTBOOK(S) WITH PUBLICATION INFORMATION

VII. REQUIRED MATERIALS (STUDENT)

Graphics calculator required. TI-83/84 recommended. Symbolic manipulating calculators prohibited.

VIII. SUPPLEMENTAL REFERENCES

A. Student Solutions Manuals
B. My Math Lab

IX. METHOD OF EVALUATION (STUDENT)

A. Homework
B. Quizzes
C. On-line Assignments
D. Tests
E. Comprehensive Final Examination