JEFFERSON COLLEGE
COURSE SYLLABUS

MTH 128
INTERMEDIATE ALGEBRA

3 Credit Hours

Prepared by:
David P. Leach

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by
Beverly Meyers

Arts & Science Education
Dr. Mindy Selsor, Dean
MTH128 Intermediate Algebra

I. CATALOG DESCRIPTION

Prerequisite: COMPASS Algebra score of at least 42, or ASSET Elementary Algebra score of at least 40, or ACT Math score of 18 or higher, or MTH002 with a grade of “C” or better.

Intermediate Algebra continues the development of the algebraic skills introduced in Basic Algebra through in-depth exploration of those topics covered in Basic Algebra, along with additional topics in algebra. Intermediate Algebra counts as an elective towards an Associate of Arts degree (F, S, Su)

II. GENERAL COURSE OBJECTIVES

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

A. Demonstrate proficiency in all objectives covered under Basic Algebra.

B. Solve equations and inequalities involving absolute value.

C. Find the equation of a line given certain information about the line.

D. Solve a linear inequality in two variables.

E. Understand and apply the concept of “function”.

F. Evaluate a function given a value for its input.

G. Use appropriate methods to solve a system of two equations in two variables.

H. Use synthetic division to find the quotient and remainder in polynomial division.

I. Simplify complex rational expressions.

J. Work with algebraic expressions involving rational exponents.

K. Understand and use the relationship between rational exponents and radicals.

L. Simplify, add, subtract, multiply and divide radical expressions.

M. Solve radical equations.
N. Perform arithmetic operations with complex numbers.

O. Demonstrate proficiency in solving quadratic equations using four different methods.

P. Understand and use the properties of a quadratic function.

III COURSE OUTLINE

A. Linear Equations and Inequalities

B. Equations and Inequalities and Functions

C. Systems of Linear Equations

D. Polynomials

E. Rational Expressions and Equations

F. Rational Exponents and Radicals

G. Quadratic Equations

H. Additional Properties of Functions

IV UNIT OBJECTIVES

A. Linear Equations and Inequalities
   1. Solve first-degree equations with one unknown
   2. Solve literal equations and formulas
   3. Solve absolute value equations
   4. Use equations to solve word problems
   5. Solve linear inequalities
   6. Solve compound inequalities
   7. Solve absolute value inequalities

B. Equations and Inequalities and Functions
   1. Graph a linear equation
   2. Find the slope of a line
   3. Determine if two lines are parallel or perpendicular
   4. Use the slope-intercept form for the equation of a line
   5. Use the point-slope form for the equation of a line
   6. Determine the equation of a line given two points on the line
   7. Determine the equation of a line given the slope and y-intercept
   8. Determine the equation of a line given the slope and a point on the
line
9. Graph a linear inequality
10. Determine the domain and range of a relation
11. Determine if a relation is a function
12. Evaluate a function using function notation
13. Graph a function given an equation
14. Graph a function given a table of values

C. Systems of Linear Equations
1. Determine whether an ordered pair is a solution to a system of two equation in two unknowns.
2. Solve a system of two equations in two variables by the graphing method.
3. Solve a system of two equations in two variables by the substitution method.
4. Solve a system of two equations in two variables by the elimination method.
5. Identify systems of equations that have zero, one, or an infinite number of solutions
6. Solve an applied problem requiring the use of a system of two linear equations in two variables.

D. Polynomials
1. Add, subtract, and multiply two or more polynomials
2. Divide a polynomial by a monomial
3. Use polynomial long division to divide a polynomial by a polynomial
4. Use synthetic division to divide a polynomial by a binomial
5. Factor out the greatest common factor from a polynomial
6. Factor a polynomial by the grouping method
7. Factor a trinomial
8. Factor a binomial that is the difference of two perfect squares
9. Factor a binomial that is the sum or difference of two perfect cubes
10. Combine the factoring techniques to completely factor any polynomial
11. Recognize polynomials that are prime
12. Solve a quadratic equation by factoring
13. Solve applied problems that involve a factorable quadratic equation

E. Rational Expressions and Equations
1. Simplify, multiply or divide two rational expressions
2. Find the LCD of two or more rational expressions
3. Add or subtract two or more rational expressions
4. Simplify complex rational expressions
5. Solve rational equations
6. Solve a rational formula for a specific variable
7. Solve ratio problems

F. Rational Exponents and Radicals
1. Simplify expressions with rational exponents
2. Evaluate \( n^{th} \) root radical expressions
3. Convert between rational exponent and radical notation
4. Simplify radical expressions
5. Add or subtract radical expressions
6. Multiply radical expressions
7. Divide radical expressions
8. Rationalize the numerator or denominator of a radical expression
9. Solve radical equations
10. Simplify complex number expressions
11. Add or subtract complex numbers
12. Multiply or divide complex numbers
13. Evaluate complex numbers of the form \( i^n \)

G. Quadratic Equations
1. Solve quadratic equations by the square root property
2. Solve quadratic equations by completing the square
3. Solve quadratic equations using the Quadratic Formula
4. Determine the nature of the roots of a quadratic equation by using the discriminant
5. Write a quadratic equation given the solutions of the equation
6. Solve an equation that is quadratic in form
7. Solve a quadratic equation containing several variables
8. Solve problems requiring use of the Pythagorean Theorem
9. Solve applied problems requiring the use of a quadratic equation
10. Find the vertex of a quadratic function
11. Graph a quadratic function
12. Use the distance formula (optional)
13. Use the midpoint formula (optional)
14. Use the standard form for the equation of a circle (optional)

H. Additional Properties of Functions
1. Evaluate a function using function notation
2. Use function notation to solve applied problems
V. METHOD OF INSTRUCTION

A. Lecture

B. Discussion

VI. REQUIRED TEXTBOOK(S) WITH PUBLICATION INFORMATION

My Math Lab, required for selected sections (See course schedule)

VII. REQUIRED MATERIALS (STUDENT)

Notebook paper and pencils.
Calculator at instructor’s discretion.
Laboratory Manual required for selected sections (See course schedule)

VIII. SUPPLEMENTAL REFERENCES

Supplemental internet program, My Math Lab, optional for selected sections
Videotapes, CDs available on Reserve in Mathematics Laboratory, Hillsboro Library, JCNW and JCA Learning Centers

IX. METHOD OF EVALUATION

A. Homework

B. Quizzes

C. Tests

D. Comprehensive final examination