MASTER SYLLABUS

MATH 106 - INTERMEDIATE ALGEBRA

Created by: Jesse Clark-Stone and Jonathan Thompson

Updated by: Claire Medve
A. **TITLE:** INTERMEDIATE ALGEBRA

B. **COURSE NUMBER:** MATH 106

C. **CREDIT HOURS:** (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)

- # Credit Hours: 3 !
- # Lecture Hours: 3 per week !
- # Lab Hours: 0 per week !
  Other: plus 1 hour recitation per week for supplemental instruction.

Course Length: 15 Weeks

D. **WRITING INTENSIVE COURSE:** Yes ☐ No ☒

E. **GER CATEGORY:** None ☐ Yes ☒ GER 1 Mathematics

*If course satisfies more than one:

F. **SEMESTER(S) OFFERED:** Fall ☐ Spring ☐ Fall & Spring ☒

G. **COURSE DESCRIPTION:**

This course reviews and builds on the basic, fundamental concepts of algebra, which are required in many other courses and areas of study. Topics include: a review of fundamental concepts, first degree equations and inequalities, graphing and systems of equations, products and factoring, rational expressions, exponents and radicals, quadratic equations.

H. **PRE-REQUISITES:** None ☐ Yes ☒ If yes, list below:

Beginning Algebra (MATH 100) with a grade of C or better, or New York State Math A or Integrated Math Regents or equivalent examination with a grade of 70 or above, or permission of instructor.

**CO-REQUISITES:** None ☒ Yes ☐ If yes, list below:
I. **STUDENT LEARNING OUTCOMES:** *(see key below)*

By the end of this course, the student will be able to:

<table>
<thead>
<tr>
<th>Course Student Learning Outcome [SLO]</th>
<th>Program Student Learning Outcome [PSLO]</th>
<th>GER [If Applicable]</th>
<th>ISLO &amp; SUBSETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solve linear and absolute value equations and inequalities, and compound inequalities and write solutions in interval notation.</td>
<td></td>
<td>1 3</td>
<td>Foundational Skills QTR</td>
</tr>
<tr>
<td>Write equations of lines using a variety of methods.</td>
<td></td>
<td>1 3</td>
<td>Foundational Skills QTR</td>
</tr>
<tr>
<td>Evaluate and interpret functions and their graphs.</td>
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<td>1 3</td>
<td>Foundational Skills QTR</td>
</tr>
<tr>
<td>Solve systems of equations by graphing, substitution, and addition (elimination), with rational coefficients.</td>
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<td>1 3</td>
<td>Foundational Skills QTR</td>
</tr>
<tr>
<td>Perform basic operations with polynomials and factor completely (including sums and differences of cubes) and solve quadratic equations using the quadratic formula.</td>
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<td>1 3</td>
<td>Foundational Skills QTR</td>
</tr>
<tr>
<td>Perform basic operations on rational expressions and complex fractions and solve rational equations.</td>
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<td>1 3</td>
<td>Foundational Skills QTR</td>
</tr>
<tr>
<td>Perform basic operations with radical expressions and solve radical equations.</td>
<td></td>
<td>1 3</td>
<td>Foundational Skills QTR</td>
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**KEY**

<table>
<thead>
<tr>
<th>ISLO #</th>
<th>Institutional Student Learning Outcomes [ISLO 1 – 5]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Communication Skills Oral [O], Written [W]</td>
</tr>
<tr>
<td>2</td>
<td>Critical Thinking Critical Analysis [CA], Inquiry &amp; Analysis [IA], Problem Solving [PS]</td>
</tr>
<tr>
<td>3</td>
<td>Foundational Skills Information Management [IM], Quantitative Lit./Reasoning [QTR]</td>
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<tr>
<td>4</td>
<td>Social Responsibility Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</td>
</tr>
<tr>
<td>5</td>
<td>Industry, Professional, Discipline Specific Knowledge and Skills</td>
</tr>
</tbody>
</table>

*Include program objectives if applicable. Please consult with Program Coordinator*
J. **APPLIED LEARNING COMPONENT:** Yes ☐ No ✗

If YES, select one or more of the following categories:

- Classroom/Lab
- Internship
- Clinical Placement
- Practicum
- Service Learning
- Community Service
- Civic Engagement
- Creative Works/Senior Project
- Research
- Entrepreneurship (program, class, project)

K. **TEXTS:**

Currently using: *INTERMEDIATE ALGEBRA FOR COLLEGE STUDENTS*  

L. **REFERENCES:**

Worksheets, software, computer tutorials, and other texts are available on the network, in the Math Lab, and the Library.

M. **EQUIPMENT:** None ☐ Needed:

Smart classroom (computer projection and access to the internet) and liberal chalkboard/whiteboard space. **NOTE:** calculators will not be allowed in this course for tests and quizzes.

N. **GRADING METHOD:** A – F

O. **SUGGESTED MEASUREMENT CRITERIA/METHODS:**

- Homework
- Quizzes
- Tests

P. **DETAILED COURSE OUTLINE:**

I. Linear Equations and Inequalities
   - A. Conditional, Contradiction, and Identities
   - B. Literal Equations
   - C. Linear Inequalities
     1. Graph solutions on a number line and write answers in interval notation
     2. Compound – three part, “and”, “or”
   - D. Absolute Value Equations and Inequalities
II. Graphing
   A. Coordinate System
   B. Functions and Relations
      1. Identify domain and range given a set of ordered pairs
      2. Identify functions
         a. Given a set of ordered pairs
         b. Given a graph (use vertical line test)
      3. Functional notation
   C. Graphing Linear Equations
      1. Using intercepts
      2. Using \( y = mx + b \)
   D. Slope – Intercept Form
      1. Find the slope given two points
      2. Find the slope and \( y \)-intercept given a graph or an equation of the line
      3. Write an equation in slope-intercept form
   E. Point – Slope Form
      1. Write the equation of a line given a point and the slope
      2. Write the equation of a line passing through two points
      3. Determine parallel and perpendicular lines
         a. Given two points
         b. Given two equations
      4. Write the equation of a line through a given point and parallel/perpendicular to the graph of a given equation

III. Systems of Linear Equations
   A. Determine if an ordered pair is a solution of a system of linear equations
   B. Solve systems of equations
      1. Graphically
      2. By substitution
      3. By addition method (elimination)
   C. Use systems of linear equations to solve applications

IV. Polynomials
   A. Basic Operations (\(+, -, x, /\))
      1. Use long division to divide polynomials
   B. Factoring
      1. Greatest Common Factor
         a. Factor a common binomial factor
      2. Difference of Two Squares
      3. Sum and Difference of Two Cubes
      4. General Trinomial
      5. Perfect Square Trinomial
      6. Factor by Grouping
   C. Solve Quadratic Equations by Factoring

V. Rational Expressions and Equations
   A. Find the Domain and Note Restricted Values
   B. Reduce Rational Expressions
   C. Basic Operations (\(+, -, x, /\))
   D. Simplify Complex Fractions
   E. Solve Rational Equations (with variable denominators)
VI. Roots and Radicals
   A. Evaluate Radical Expressions
   B. Write a radical expression in exponential form and vice versa
   C. Simplify expressions with rational exponents
   D. Simplify radical expressions
   E. Basic Operations (+, -, x, /)
      1. Rationalize a denominator using the conjugate
   F. Solve Radical Equations with radical on only one side of an equation
   G. Solve Quadratic Equations
      1. Square Root Property
      2. Quadratic Formula

Q. **LABORATORY OUTLINE:** None ☒ Yes ☐