

CATALOG INFORMATION

Dept and Nbr: MATH 156      Title: INT ALGEBRA B-STEM  
Full Title: Intermediate Algebra for Business and STEM Majors  
Last Reviewed: 10/22/2018

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	5.00	Lecture Scheduled	5.00	17.5	Lecture Scheduled	87.50
Minimum	5.00	Lab Scheduled	0	8	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	5.00		Contact Total	87.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 175.00

Total Student Learning Hours: 262.50

Title 5 Category: AA Degree Applicable  
Grading: Grade or P/NP  
Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP  
Also Listed As:  
Formerly: MATH 56

**Catalog Description:**  
An intermediate algebra course that incorporates the use of graphing technology. Topics include functions and their graphs, equations and inequalities in one variable, systems of equations in two and three variables, exponential and logarithmic functions and equations, and conic sections.

**Prerequisites/Corequisites:**  
Completion of MATH 150 or MATH 150B or MATH 151 or AB705 placement into <a href='https://assessment.santarosa.edu/math-placement-calculations' class='NormalSiteLink' target='\_New'>Math Tier 1 or higher</a>

**Recommended Preparation:**

**Limits on Enrollment:**

**Schedule of Classes Information:**  
Description: An intermediate algebra course that incorporates the use of graphing technology. Topics include functions and their graphs, equations and inequalities in one variable, systems of equations in two and three variables, exponential and logarithmic functions and equations, and conic sections. (Grade or P/NP)

Prerequisites/Corequisites: Completion of MATH 150 or MATH 150B or MATH 151 or AB705 placement into [Math Tier 1 or higher](https://assessment.santarosa.edu/math-placement-calculations)

Recommended:

Limits on Enrollment:

Transfer Credit:

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>		<b>Effective:</b>	<b>Inactive:</b>
	B	Communication and Analytical Thinking	Summer 2019	
	MC	Math Competency		
<b>CSU GE:</b>	B	Communication and Analytical Thinking	Fall 1981	Fall 1999
	MC	Math Competency		
	<b>Transfer Area</b>		<b>Effective:</b>	<b>Inactive:</b>
	B4	Math/Quantitative Reasoning	Fall 1981	Fall 1988
<b>IGETC:</b>	<b>Transfer Area</b>		<b>Effective:</b>	<b>Inactive:</b>
<b>CSU Transfer:</b>		<b>Effective:</b>	<b>Inactive:</b>	
<b>UC Transfer:</b>		<b>Effective:</b>	<b>Inactive:</b>	

**CID:**

**Certificate/Major Applicable:**

Both Certificate and Major Applicable

## **COURSE CONTENT**

### **Student Learning Outcomes:**

At the conclusion of this course, the student should be able to:

1. Analyze functions and solve equations and inequalities using graphing technology and algebraic methods.
2. Create mathematical models and solve applications of linear and nonlinear functions.
3. Solve systems of linear equations using matrix methods and graphing technology.
4. Graph conic sections, including parabolas, ellipses, and hyperbolas.

### **Objectives:**

At the conclusion of this course, the student should be able to:

1. Define function, domain, and range, and use function notation.
2. Identify basic features of the graphs of polynomial, radical, absolute value, exponential and logarithmic functions.
3. Use graphing technology to construct graphs, to solve nonlinear equations and inequalities in one variable, and to locate roots, intersection points, and extrema.
4. Use algebraic methods to solve equations that involve polynomial, radical, absolute value, rational, exponential and logarithmic expressions.
5. Find algebraic solutions to literal equations.
6. Apply algebraic or graphical methods, as appropriate, to solve application problems

involving polynomial, radical, absolute value, rational, exponential and logarithmic functions.

7. Apply properties of exponents and logarithms.
8. Express an understanding of the number  $e$ .
9. Graph conic sections, including parabolas, ellipses, and hyperbolas.
10. Use algebraic and graphical methods to solve linear and nonlinear systems in two variables, and use Reduced Row Echelon Form (RREF) to solve systems of linear equations in three variables.
11. Solve application and modeling problems that require the use of a system of linear equations.
12. Find graphical solutions to systems of linear inequalities.

## **Topics and Scope:**

### **I. Use of Technology**

- A. Evaluate and graph functions
- B. Solve equations and inequalities graphically
- C. Matrices and RREF

### **II. Functions**

- A. Definition of relation, function, domain, and range
- B. Function notation and evaluation
- C. Interval notation, intersection and union
- D. Analyze graphs of polynomial, absolute value, radical, exponential, and logarithmic functions with and without graphing technology
- E. Mathematical models and other applications of linear and nonlinear functions

### **III. Equations and Inequalities**

- A. Equations
  1. Solutions of literal equations
  2. Algebraic and graphical solutions of linear, quadratic, radical, rational, absolute value, exponential, and logarithmic equations
- B. Inequalities
  1. Algebraic solutions to absolute value inequalities
  2. Graphical solutions of linear and nonlinear inequalities using graphing technology

### **IV. Quadratic Functions**

- A. Vertex and general forms
- B. Discriminant
- C. Solutions to quadratic equations using factoring, quadratic formula, and completing the square
- D. Applications and modeling

### **V. Rational Expressions and Equations**

- A. Simplification of rational expressions, including complex fractions
- B. Operations on rational expressions
- C. Solving rational equations
- D. Applications and modeling

### **VI. Exponential and Logarithmic Functions**

- A. The number  $e$
- B. Common and natural logarithms
- C. Laws of logarithms
- D. Applications and modeling

### **VII. Introduction to Conic Sections**

- A. Midpoint and Distance Formulas, Circles
- B. Parabolas
- C. Ellipses

- D. Hyperbolas
- VIII. Systems of Equations/Inequalities
  - A. Linear and nonlinear systems of equations
  - B. Matrices and RREF
  - C. Systems of linear inequalities
  - D. Applications and modeling

### Assignment:

1. Reading outside of class (0-60 pages per week)
2. Problem sets (1-8 per week)
3. Quizzes (0-4 per week)
4. Projects (0-10)
5. Exams (3-8)
6. Final exam

### Methods of Evaluation/Basis of Grade:

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments are more appropriate for this course.

Writing  
0 - 0%

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Problem sets

Problem solving  
5 - 20%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None

Skill Demonstrations  
0 - 0%

**Exams:** All forms of formal testing, other than skill performance exams.

Exams and quizzes

Exams  
70 - 95%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

Projects

Other Category  
0 - 10%

### Representative Textbooks and Materials:

Intermediate Algebra: A STEM Approach. Woodbury, George. Pearson. 2019

Intermediate Algebra. 5th ed. Miller, Julie and O'Neill, Molly and Hyde, Nancy. McGraw Hill

