# MATH 1101 - Mathematical Modeling (version 201003L)

### Course Title Course Development Learning Support

Mathematical Modeling Standard No

## **Course Description**

Emphasizes functions using real-world applications as models. Topics include fundamental concepts of algebra; functions and graphs; linear, quadratic, polynomial, exponential, and logarithmic functions and models; systems of equations; and optional topics in algebra.

## **Pre-requisites**

Appropriate algebra placement test score. Appropriate algebra placement test score.

### **Regstr. Co-requisites**

Regstr. Co-requisites: None

### **True Co-requisites**

True Co-requisites: None

## **Course Length**

	Lecture Contact Time	Regular Lab Type	Reg. Lab Contact Time	Other Lab Type	Oth. Lab Contact Time	Total Contact Hrs
Contact Hours Per Week	3 hrs	N/A	0 hrs	N/A	0 hrs	3 hrs
Contact Min/Hrs Per Semester	2250 min		0 min		0 min	45 hrs
	Lecture C	redit Hours	Lab Credit Hours	s Total Cree	dit hours	WLU
Semester Credit Hours		3	C	)	3	101.25

#### **Competencies & Outcomes**

#### **Order Description**

#### 1 Fundamental Concepts of Algebra

Order	Description	Learning Domain	Level of Learning
1	Demonstrate the concept of sets and set notation.	Cognitive	Application
2	Find complements, unions, and intersections of sets.	Cognitive	Knowledge
3	Compute the value of expressions using the laws of exponents.	Cognitive	Application
4	Simplify radicals and use them in arithmetic operations.	Cognitive	Application
5	Perform arithmetic operations on polynomials.	Cognitive	Application
6	Identify all factors of algebraic expressions.	Cognitive	Knowledge
7	Perform arithmetic operations on rational expressions.	Cognitive	Application

#### 2 Functions and Graphs

Order	Description	Learning	Level of
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1	Graph first- and second-degree equations	Domain Cognitive	Learning Application
2	Define functions.	Cognitive	Knowledge
3	Graph functions.	Cognitive	Application
4	Find sum, difference, product, and quotient of functions.	Cognitive	Application

### 3 Linear Functions

Order	Description	Learning Domain	Level of Learning
1	Solve linear equations.	Cognitive	Application
2	Solve rational equations with ratio and proportion when applicable.	Cognitive	Application
3	Solve linear inequalities.	Cognitive	Application
4	Construct linear models that describe real-world phenomena.	Cognitive	Analysis
5	Solve and analyze linear models.	Cognitive	Analysis

#### 4 Quadratic Functions

Order	Description	Learning Domain	Level of Learning
1	Solve quadratic equations.	Cognitive	Application
2	Construct quadratic models that describe real-world phenomena.	Cognitive	Analysis
3	Solve and analyze quadratic models.	Cognitive	Analysis

## 5 Polynomial Functions

Order	Description	Learning Domain	Level of Learning
1	Construct polynomial models that describe real-world phenomena.	Cognitive	Analysis
2	Solve and analyze polynomial models.	Cognitive	Analysis

## 6 Exponential Functions

Order	Description	Learning Domain	Level of Learning
1	Construct exponential models that describe real-world phenomena.	Cognitive	Analysis
2	Solve and analyze exponential models.	Cognitive	Analysis

## 7 Logarithmic Functions

Order	Description	Learning Domain	Level of Learning
1	Construct logarithmic models that describe real-world phenomena.	Cognitive	Analysis

## Cognitive Analysis

## 8 Systems of Equations

Order	Description	Learning Domain	Level of Learning
1	Solve systems of linear equations with two unknowns.	Cognitive	Application
2	Solve application problems involving linear systems.	Cognitive	Analysis

## 9 Optional Topics in Algebra

Order	Description	Learning Domain	Level of Learning
1	Recognize and interpret piecewise-defined models of real-world phenomena.	Cognitive	Analysis
2	Apply counting principles to real-world phenomena.	Cognitive	Application
3	Determine the probability of an event.	Cognitive	Application
4	Find measures of central tendency and dispersion.	Cognitive	Knowledge
5	Find the composition of two functions.	Cognitive	Application
6	Find and/or graph the inverse of a function.	Cognitive	Application
7	Set-up and solve problems with direct, inverse, or joint variations.	Cognitive	Application
8	Solve systems of linear equations with matrices.	Cognitive	Application
9	Solve simple linear programming problems.	Cognitive	Analysis