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.

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 Credit Hours	Lab Credit Hours	Total Credit hours	WLU
Semester Credit Hours	**3**	**0**	**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 Domain	Level of Learning

1	Graph first- and second-degree equations.	Cognitive	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
2	Solve and analyze logarithmic models.	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