

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 |