## MATH 1101 - Mathematical Modeling ( version 201003L )

## Course Title Course Development Learning Support <br> Mathematical Modeling <br> 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.
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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 <br> 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 <br> Domain <br> Cognitive | Level of <br> Learning <br> Application |
| :---: | :--- | :--- | :--- |
| 2 | Demonstrate the concept of sets and set notation. | 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 |

Order Description Learning Level of

|  |  | Domain | 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 |

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 |

Quadratic Functions

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

Polynomial Functions

| Order | Description | Learning | Level of <br> Learning |
| :---: | :--- | :--- | :--- |
| 1 | Construct polynomial models that describe real-world phenomena. | Cognitive | Analysis |
| 2 | Solve and analyze polynomial models. | Cognitive | Analysis |

Exponential Functions

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

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Logarithmic Functions

| Order | Description | Learning | Level of <br> Learning |
| ---: | :--- | :--- | :--- |
| 1 | Construct logarithmic models that describe real-world phenomena. | Cognitive | Analysis |

Systems of Equations

| Order | Description | Learning | Level of <br> Learning |
| :---: | :--- | :--- | :--- |
| 1 | Solve systems of linear equations with two unknowns. | Cognitive | Application |
| 2 | Solve application problems involving linear systems. | Cognitive | Analysis |

Optional Topics in Algebra

| Order | Description | Learning <br> Domain <br> Cognitive | Level of <br> Learning <br> Analysis |
| :---: | :--- | :--- | :--- |
| 2 | Recognize and interpret piecewise-defined models of 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 |

