

2/14/2025 DATE  
☐ REQUIRED COURSE  
☒ ELECTIVE COURSE

MSD DIVISION  
☐ NEW COURSE  
☒ REVISION

## Lake Land College

### Course Information Form

COURSE NUMBER:	MAT-129	TITLE: (30 Characters Max)		College Algebra Pathway									
SEM CR HRS:	5.0	Lecture:	4.0	Lab:	2.0	ICCB Lab:	2.0	ECH:	6.0				
Course Level:	<input type="checkbox"/> Gen Ed / IAI <input checked="" type="checkbox"/> Baccalaureate /Non-IAI		<input type="checkbox"/> Career/Technical <input type="checkbox"/> Dev Ed/ Not in Degree Audit		Clinical Practicum:	0.0	Work-based Learning	0.0	WBL ECH:	0.0			
Course PCS & CIP:	11 - 27.0101		IAI Code:	N/A		Contact Hours (Minutes/Week)							
Repeatable (Y/N):	N	Pass/Fail (Y/N):	N	Variable Credit (Y/N):	N	Min:		Max:		16 Wks	300	8 Wks	600
Prerequisites:	Placement by Assessment or either MAT-115 or MAT-124 with a grade of "C" or higher or STEM Transitional Math (TM001). Also one year of high school geometry or MAT-009.												
Corequisites:	None												
Catalog Description: (40 Word Limit)	Develop concepts of a function and graph, inverse, exponential and logarithmic functions, theory of equations, systems of equations, sequences and series. Graphing calculator required. Intended for students who do not assess directly into MAT-130 College Algebra. Includes supplemental instruction lab.												

List the Major Course Segments (Units)	Contact Lecture Hours	Contact Lab Hours	Clinical Practicum	Work-based Learning
Functions and their graphs	12	6		
Solving equations and inequalities	12	6		
Polynomials and rational functions	13	7		
Exponential and logarithmic functions	15	7		
Systems of equations	6	3		
Sequences and series	2	1		
TOTAL	60	30	0	0

EVALUATION			
QUIZZES <input checked="" type="checkbox"/>	EXAMS <input checked="" type="checkbox"/>	ORAL PRES <input type="checkbox"/>	PAPERS <input type="checkbox"/>
LAB WORK <input type="checkbox"/>	PROJECTS <input type="checkbox"/>	COMP FINAL <input checked="" type="checkbox"/>	OTHER <input type="checkbox"/>

COURSE MATERIALS	
TITLE:	Algebra and Trigonometry: Real Mathematics, Real People
AUTHOR:	Ron Larson
PUBLISHER:	Brooks/Cole Cengage Learning
VOLUME/EDITION/URL:	7th edition
COPYRIGHT DATE:	2016

MAJOR COURSE SEGMENT	HOURS	LEARNING OUTCOMES
		<i>The student will demonstrate:</i>
Functions and their graphs		
Graphs of equations	2	1. Identify the rectangular coordinate system. 2. Graph equations $y = f(x)$ manually and on a graphing calculator.
Lines in the plane	3	3. Apply graphs to find zeros of an equation 4. Show distinction between relation and function. 5. Find domain and range from graph or rule of a relation.
Functions	3	6. Show slope of a line. 7. Identify forms of line equation point-slope, slope-intercept, vertical line and general.
Graphs of functions	3	8. Graph linear functions manually and on a graphing calculator.
Transformations of graphs	3	9. Calculate average rate of change. 10. Demonstrate function graphs, their transformations and their properties.
Combinations and compositions of functions	2	11. Show one-to-one functions.
Inverse functions	2	12. Identify when an inverse exists and form the inverse when possible.

<b>Solving equations and inequalities</b>		
Linear functions and problem solving	3	
Solving equations graphically	2	1. Set up and solve word problems for linear functions. 2. Solve equations using INTERSECT feature on a graphing calculator. 3. Show the complex numbers and their operations. 4. Solve quadratic equations by completing the square, factoring and quadratic formula. 5. Solve radical and absolute value equations. 6. Solve inequalities and graph the solution set using interval and set notation. 7. Find lines of best fit using the graphing calculator. 8. Apply this for predictions.
Complex numbers	2	
Solving quadratic equations algebraically	4	
Solving other types of equations	3	
Solving inequalities	3	
Linear models and scatterplots	1	
<b>Polynomials and rational functions</b>		
Quadratic functions	4	1. Find vertex, axis of symmetry and intercepts of a quadratic function both manually and on a graphing calculator and apply to word problems. 2. Identify characteristics of power functions $f(x) = x^n$ . 3. Identify polynomials and their degrees and zeros. 4. Analyze graphs of polynomials. 5. Perform polynomial division by long and by synthetic division. 6. Apply remainder, factor, rational zeros, boundedness and intermediate value theorems to analyze real zeros of a polynomial. 7. Construct polynomial with specified zeros. 8. Find domain and analyze graph of a rational function.
Polynomial functions of higher degree	3	
Reals zeros of polynomial functions	3	
Fundamental theorem of algebra	3	
Rational functions and asymptotes	3	
Graphs of rational functions	4	
<b>Exponential and logarithmic functions</b>		
Exponential functions and graphs	5	1. Evaluate and graph exponential functions. 2. Model exponential growth/decay and compare two functions using growth rates. 3. Find exponential models for data using graphing calculator and determine if it is appropriate. 4. Show connection between exponential and logarithmic expressions. 5. Evaluate and graph logarithmic equations. 6. Show properties of logarithms. 7. Apply Change of Base Theorem for logarithmic bases other than 10 and e. 8. Solve logarithmic and exponential equations both manually and on a graphing calculator.
Logarithmic functions and graphs	4	
Properties of logarithms	4	
Solving exponential and logarithmic equations	4	
Exponential and logarithmic models	5	
<b>Systems of equations</b>		
Solving systems of equations	3	1. Solve $2 \times 2$ and $3 \times 3$ systems of linear equations by substitution or eliminations. 2. Solve systems of equations on a graphing calculator. 3. Solve a system of non-linear equations.
Systems of linear equations in two variables	3	
Systems of non-linear equations	3	

Sequences and series	3	1. Show infinite sequences, factorial notation, sigma notation and series
	90	

Outcomes*	Outcome Title	At the successful completion of this course, students will be able to:
Course Outcome 1	Function Graphs	Demonstrate function graphs, their transformations and their properties.
Course Outcome 2	Domain Range	Identify the domain and range of a function, forming the inverse function when it exists.
Course Outcome 3	Real-world Applic	Graph quadratic, polynomial, rational, exponential and logarithmic functions, demonstrating the properties of these functions through real-world situations.
Course Outcome 4	Polynomial Roots	Show appropriate theorems and techniques to locate the roots of second- and higher-degree polynomial equations.
Course Outcome 5	Subsequent Math	Apply the algebraic and graphing techniques to solve applications encountered in subsequent math courses.
Course Outcome 6	Technology Applic	Apply technology appropriately in problem solving and in exploring and developing mathematical concepts.
Primary Laker Learning Competency	Creative Thinking & Problem Solving: Students think creatively to solve problems.	
Secondary Laker Learning Competency	Quantitative Literacy: Students analyze data and mathematical patterns in real-life situations.	

\*Course and program outcomes will be used in the software for outcomes assessment and should include at least 1 primary and 1 secondary Laker Learning Competency. Limit to 3-5.