7/18/2022 DATE
☐ REQUIRED COURSE
☑ ELECTIVE COURSE

MSD DIVISION
☐ NEW COURSE
☑ REVISION

Lake Land College
Course Information Form

COURSE NUMBER:	MAT-140		TITLE: *(30 Characters Max)*		Algebra with Trigonometry		

SEM CR HRS:	6	Lecture:	6		Lab:	0		ECH:	6

Course Level:	☐ Gen Ed / IAI ☑ Baccalaureate /Non-IAI	☐ Career/Technical ☐ Dev Ed/ Not in Degree Audit	Clinical Practicum:	0	Work-based Learning:	0	WBL ECH:	0

COURSE PCS #	11 - 27.0101	IAI Code			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. Also one year of high school geometry or MAT-009.
Corequisite	None
Catalog Description: (40 Word Limit)	Integrated course covering topics from College Algebra and Trigonometry. Credit not granted for both this course and MAT-129 College Algebra Pathway or MAT-130 College Algebra. Graphing calculator required.

List the Major Course Segments (Units)	Contact Lecture Hours	Contact Lab Hours	Clinical Practicum	Work-based Learning
Functions and Their Graphs	12			
Solving Equations and Inequalities	12			
Polynomials and Rational Functions	13			
Exponential and Logarithmic Functions	15			
Basic Trigonometry	26			
Analytic Trigonometry	12			
TOTAL	90	0	0	0

EVALUATION

QUIZZES ☑	EXAMS ☑	ORAL PRES ☐	PAPERS ☐
LAB WORK ☐	PROJECTS ☐	COMP FINAL ☑	OTHER ☐

COURSE MATERIALS

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

MAJOR COURSE SEGMENT	HOURS	LEARNING OUTCOMES
		The student will be able to:
Functions and Their Graphs		
Graphs of Equations	1	1. Demonstrate the rectangular coordinate system. 2. Graph equations y = f(x) manually and on a graphing calculator. 3. Apply graphs to find zeros of an equation
Lines in the Plane	2	4. Recognize distinction between relation and function. 5. Find domain and range from graph or rule of a relation. 6. Recognize slope of a line.
Functions	2	7. Demonstrate forms of line equation point-slope, slope-intercept, vertical line, general.
Graphs of Functions	2	8. Graph linear functions manually and on a graphing calculator 9. Calculate average rate of change.
Transformations of Graphs	2	10. Demonstrate and Recognizeing of function graphs, their transformations, and their properties 11. Recognize one-to-one functions
Combinations and Compositions of Functions	1	12. Recognize when an inverse exists and form the inverse when possible
Inverse Functions	2	
Solving Equations and Inequalities		
Linear Functions and Problem Solving	2	1. Set up and solve word problems for linear functions 2. Demonstrate ability to solve equations using INTERSECT

Solving equations graphically	1	feature on a graphing calculator 3. Recognize the complex numbers and their operations 4. Solve quadratic equations by completing the square, factoring, and quadratic formula 5. Demonstrate how to 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 and Apply this for predictions.
Complex Numbers	1	
Solving Quadratic Equations Algebraically	3	
Solving Other Types of Equations	2	
Solving Inequalities	2	
Linear Models and Scatterplots	1	
Polynomials and Rational Functions		
Quadratic Functions	2	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. Demonstrate characteristics of power functions $f(x) = xn$. 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	2	
Reals Zeros of Polynomial Functions	2	
Fundamental Theorem of Algebra	2	
Rational Functions and Asymptotes	2	
Graphs of Rational Functions	3	
Logarithmic Functions & Exponential Models		
Exponential Functions and Graphs	3	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. Recognize connection between exponential and logarithmic expressions. 5. Evaluate and graph logarithmic equations. 6. Recognize 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	3	
Properties of Logarithms	3	
Solving Exponential and Logarithmic Equations	3	
Exponential and Logarithmic Models	3	
Basic Trigonometry		
Measures of Angles	3	1. Demonstrate a working Demonstrateledge of how to describe an angle. 2. Convert between radian and degree measure 3. Demonstrate the ability to identify a unit circle and its relationship to real numbers 4. Evaluate trigonometric functions of any angles. 5. Apply the fundamental trigonometric identities 6. Demonstrate the ability to sketch the graphs of trigonometric functions and translations of graphs of sine and cosine functions 7. Demonstrate the ability to evaluate the inverse trigonometric functions and to evaluate the compositions of trigonometric functions and inverse trigonometric functions. 8. Sketch and solve right triangle, using trigonometric functions
Converting degrees to Radians, Radians to Degrees	2	
Basic and Co-function Identities	2	
Trigonometric Functions of Acute Angles	3	
Trigonometric Functions of a Real Variable	3	
Graphs of Trigonometric Functions, Amplitude Vertical Change, Variation and Periodicity	6	
Inverse Trigonometric Functions	4	

Right Triangle Trigonometric Applications	3	
Analytic Trigonometry		1. Demonstrate the Demonstrateledge of how to apply fundamental trigonometric identities to evaluate trigonometric functions. 2. Simplify trigonometric expressions, to verify trigonometric identities 3. Demonstrate the ability to Apply sum and difference formulas, double angle formulas and half-angle identities to rewrite and evaluate trigonometric functions 4. Apply standard algebraic techniques and inverse trigonometric functions to solve trigonometric equations
Basic Trigonometric Identities	4	
Apply Sum, Difference, Double-Angle, Half-angle Identities, to verify Trigonometric Identities	4	
Trigonometric Equations	4	
	90	

Outcomes*	At the successful completion of this course, students will be able to:
Course Outcome	Demonstrate an understanding of function graphs, their transformations, and their properties
Course Outcome	Identify the domain and range of a function, recognize when an inverse function exists, and form the inverse when possible
Course Outcome	Graph quadratic, polynomial, rational, exponential, and logarithmic functions and demonstrate, through application to real-world situations, knowledge of the p
Course Outcome	Apply appropriate theorems and techniques to locate the roots of second and higher degree polynomial equations
Course Outcome	Define and evaluate any trigonometric function at any angle given an input in radian or degree measure
Course Outcome	Graph any of the six trigonometric functions as well as transformations of sine and cosine graphs
Course Outcome	Apply basic trigonometric identities to verify new identities and transform trigonometric expressions
Course Outcome	Find all solutions (and solutions in a specified domain) for a trigonometric equation
Course Outcome	Solve right or oblique triangles, applying the Law of Sines and the Law of Cosines as needed
Course Outcome	Apply inverse trigonometric functions as appropriate and graph inverse trigonometric functions
Course Outcome	Apply the algebraic, trigonometric, and graphing principles learned in this course to solve applications encountered in subsequent math courses
Course Outcome	Apply technology appropriately in problem solving and in exploring and developing mathematical concepts
Program Outcome	
Laker Learning Competency	

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