

5/28/2025

DATE



REQUIRED COURSE



ELECTIVE COURSE

MSD

DIVISION



NEW COURSE



REVISION

Lake Land College

Course Information Form

COURSE NUMBER:	MAT-241		TITLE: (30 Characters Max)		Analytic Geometry & Calculus I								
SEM CR HRS:	5.0	Lecture:	5.0		Lab:	0.0	ICCB Lab:	0.0	ECH:	5.0			
Course Level:	<input checked="" type="checkbox"/> Gen Ed/IAI <input type="checkbox"/> Career/Technical <input type="checkbox"/> Baccalaureate/Non-IAI <input type="checkbox"/> Dev Ed/Not in Degree Audit				Clinical Practicum:	0.0	Work-based Learning:	0.0	WBL ECH:	0.0			
COURSE PCS #	11 - 27.0101		IAI Code		M1 900-1, MTH901			Contact Hours (Minutes/Week)					
Repeatable (Y/N):	N	Pass/Fail (Y/N):	N	Variable Credit (Y/N):	N	Min:		Max:		16 Wks	250	8 Wks	500
Prerequisites:	Placement by assessment or a grade of "C" or higher in MAT-132 or MAT-140. Also one year of high school geometry.												
Corequisite:	None												
Catalog Description: (40 Word Limit)	Differential and integral calculus of elementary functions of one variable, such as polynomial, rational, radical, trigonometric, inverse trigonometric, exponential and logarithmic functions, will be covered. Applications include rates of change, optimization, curve sketching and area. A graphing calculator is required. Ask instructor for calculator recommendations.												

List the Major Course Segments (Units)	Contact Lecture Hours	Contact Lab Hours	Clinical Practicum	Work-based Learning
Preparation for calculus	4			
Limits	13			
Differentiation	20			
Applications of differentiation	17			
Integration	21			
TOTAL	75	0	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:	Calculus: Early Transcendental Functions
AUTHOR:	Ron Larson & Bruce Edwards
PUBLISHER:	Cengage Learning
VOLUME/EDITION/URL:	7th edition
COPYRIGHT DATE:	2019

MAJOR COURSE SEGMENT	HOURS	LEARNING OUTCOMES
		<i>The student will be able to:</i>
Preparation for Calculus		1. Graph linear and other elementary functions using x- and y- intercepts, symmetry, reflection, and translation. 2. Find domain and range of functions. 3. Identify the definition and properties of the natural logarithmic and exponential function. 4. Illustrate properties of inverse functions, including how to find the inverse.
Graphs, lines and functions	1	
Inverse functions	1	
Exponential and logarithmic functions	2	
Limits		1. Find limits graphically, numerically and analytically. 2. Identify properties of limits and definition of continuity. 3. Find one-sided limits, infinite limits, and vertical asymptotes.
Finding limits graphically and numerically	2	
Finding limits analytically	3	
Continuity and one-sided limits	4	
Infinite limits and vertical asymptotes	2	
Review/Exam	2	
Differentiation		1. Demonstrate the connection between derivative and slope of tangent line. 2. Identify the basic rules of differentiation, including
Tangent line problem	2	
Basic rules	2	
Rates of change	2	

Product and quotient rules	3	product, quotient and chain rules. 3. Find the derivative using the limit definition. 4. Differentiate polynomials, rational and trigonometric functions. 5. Illustrate logarithmic and exponential functions to bases other than e . 6. Differentiate logarithmic and exponential functions.
Chain rule	3	
Implicit differentiation	2	
derivatives of inverse functions	2	
Related rates	2	
Review/Exam	2	
Application of differentiation		1. Find absolute extrema on a closed interval. 2. Find relative extrema on an interval. 2. Identify first and second derivative tests and extreme value theorem. 3. Illustrate the connection between second derivative and concavity. 4. Find limits at infinity and horizontal asymptotes. 5. Combine all techniques of analytic geometry and calculus so far to graph functions. 6. Solve optimization problems.
Extrema	2	
Rolle's theorem and mean value	2	
First derivative test	3	
Second derivative test and concavity	3	
Limits at infinity and horizontal asymptotes	2	
Curve sketching	2	
Optimization	1	
Review/Exam	2	
Integration		1. Identify the connection between antiderivatives and indefinite integrals. 2. Identify basic integration rules. 3. Solve initial condition problems. 4. Illustrate the area interpretation of definite integral. 5. Identify fundamental theorem of calculus. 6. Perform integration by substitution. 7. Find integrals involving inverse trigonometric functions.
Antiderivatives and indefinite integrals	2	
Area	3	
Definite integrals	2	
Fundamental theorem of calculus	3	
Integration by substitution	4	
Integration with natural log	3	
Integrating inverse trigonometric functions	2	
Review/Exam	2	
		75

Outcomes*	Outcome Title	At the successful completion of this course, students will be able to:
Course Outcome 1	Continuity Funct	Analyze the continuity of functions.
Course Outcome 2	Limits Funct	Find the limits of functions graphically and algebraically.
Course Outcome 3	Derivatives Funct	Find derivatives of algebraic and transcendental functions.
Course Outcome 4	Derivatives Graphs	Demonstrate the first and second derivatives to analyze graphs of functions.
Course Outcome 5	Find Integrals	Find integrals of some algebraic and transcendental functions.
Course Outcome 6	Apply Integrals	Use integrals to solve applied problems.
Primary Laker Learning Competency	Critical Thinking: Students connect knowledge from various disciplines to formulate logical conclusions.	
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.