

8/30/2022

DATE

MSD DIVISION

 REQUIRED COURSE NEW COURSE ELECTIVE COURSE REVISION

Lake Land College

Course Information Form

COURSE NUMBER:	MAT-241	TITLE: (30 Characters Max)		Analytic Geometry & Calculus I					
SEM CR HRS:	5	Lecture:	5	Lab:	0	ECH:		5	
Course Level:	<input checked="" type="checkbox"/> Gen Ed / IAI <input type="checkbox"/> Baccalaureate /Non-IAI	<input type="checkbox"/> Career/Technical <input type="checkbox"/> Dev Ed/ Not in Degree Audit	Clinical Practicum:	0	Work-based Learning:	0	WBL ECH:	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 MAT-140 with a grade of "C" or higher; MAT-129/MAT-130 and MAT-132 with a grade of "C" or higher may be substituted for MAT-140. Also one year of high school geometry or MAT-009.								
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
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. Know the definition and properties of the natural logarithmic and exponential function. 4. Understand 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. Know 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		<ol style="list-style-type: none"> 1. Demonstrate the connection between derivative and slope of tangent line. 2. Know the basic rules of differentiation, including product, quotient and chain rules. 3. Be able to find the derivative using the limit definition. 4. Be able to differentiate polynomials, rational and trigonometric functions. 5. Understand logarithmic and exponential functions to bases other than e. 6. Know how to differentiate logarithmic and exponential functions.
Tangent line problem	2	
Basic Rules	2	
Rates of change	2	
Product and Quotient rules	3	
Chain Rule	3	
Implicit differentiation	2	
derivatives of inverse functions	2	
Related rates	2	
Review/Exam	2	
Application of Differentiation		<ol style="list-style-type: none"> 1. Find absolute extrema on a closed interval. 2. Be able to find relative extrema on an interval. 2. Know First and Second Derivative Tests and Extreme Value Theorem. 3. Understand connection between second derivative and concavity. Find limits at infinity and horizontal asymptotes. 4. Combine all techniques of analytic geometry and calculus so far to graph functions. 5. Be able to 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		<ol style="list-style-type: none"> 1. Recognize the connection between antiderivatives and indefinite integrals. 2. Know basic integration rules. Solve initial condition problems. 3. Understand the area interpretation of definite integral. 4. Know Fundamental Theorem of Calculus. 5. Be able to perform integration by substitution. 6. 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 trig functions	2	
Review/Exam	2	
		75

Outcomes*	At the successful completion of this course, students will be able to:
Course Outcome	Analyze the continuity of functions
Course Outcome	Find the limits of functions graphically and algebraically
Course Outcome	Find derivatives of algebraic and transcendental functions
Course Outcome	Demonstrate the first and second derivatives to analyze graphs of functions
Course Outcome	Find integrals of some algebraic and transcendental functions, and use integrals to solve applied problems
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.