8/30/2022 DATE

☐ REQUIRED COURSE

☑ ELECTIVE COURSE

DIVISION

☐ NEW COURSE

☑ REVISION

Lake Land College

Course Information Form

COURSE NUMBER:	MAT-211			**TITLE:** *(30 Characters Max)*		Mathematical Analysis				**ECH:**	4
SEM CR HRS:	4	**Lecture:**	4		**Lab:**	0					
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 - 27.0301		**IAI Code**	M1 900-B				**Contact Hours (Minutes Per Week)**			
Repeatable (Y/N):	N	**Pass/Fail (Y/N):**	N	**Variable Credit (Y/N):**		**Min:**		**Max:**		**16 Wks**	200	**8 Wks**	400
Prerequisites:	Placement by assessment or either MAT-129 or MAT-130 or MAT 140 with a grade of 'C' or higher; also 1 yr high school geometry or MAT-009										
Catalog Description: (40 Word Limit)	This course covers mathematical analysis of polynomial calculus with applications to business and social sciences. It includes the mathematics of finance, techniques and applications of differentiation & integration, optimization theory and area. Graphing calculator required.										

List the Major Course Segments (Units)	Contact Lecture Hours	Contact Lab Hours	Clinical Practicum	Work-based Learning
Mathematics of finance: simple and compound interest, future and present value, geometric series, annuities and sinking funds, loan amortization	10			
Differential calculus of algebraic functions: limits and tangent lines, differentiation rules	15			
Applications of derivatives to business and social sciences: maxima and minima, first and second derivative tests, extreme value theorem, curve sketching for functions of one variable; maxima and minima and second partials test for functions of two variables	15			
Integral calculus of algebraic functions: antiderivatives, Riemann sums and area, integration skills including substitution and integration by parts; applications to business and social sciences	15			
Tests	5			
TOTAL	60	0	0	0

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

COURSE MATERIALS	
TITLE:	Mathematics with Applications
AUTHOR:	Lial, Hungerford, and Holcomb
PUBLISHER:	Addison-Wesley
VOLUME/EDITION/URL:	12th
COPYRIGHT DATE:	2019

MAJOR COURSE SEGMENT	HOURS	LEARNING OUTCOMES
		The student will be able to:
Chapter 5		Learn applications of compounding to business and science and amortization to real-world experiences
Simple interest formula with application to present/future value.	2	
Simple compound interest, effective rate, continuous compounding	4	
Sequences/Annuities/Amortization	4	
Chapter 11		Recognize the limit process. Learn the derivative as limit of a difference quotient and as slope of tangent. Learn rules of differentiation.
Limits of functions using calculators and/or algebra	3	
Rates of change and tangent lines	3	
Derivatives of polynomial functions and techniques for finding	2	
Power and quotient rules for differentiation	2	
Chain Rule for differentiation	2	
Transcendental functions: ln x, ex and their derivatives	2	
Continuous functions of algebra and continuous functions of business	1	
Chapter 12		Demonstrate first and second derivative tests to find maxima and minima. Apply differentiation to
Test for increasing/decreasing, maxima/minima, and first derivative	2	
Second derivative test & test for concavity	2	
Optimization applications to business and social science	2	

Curve sketching	2	business and social sciences and to curve sketching.
Chapter 14		Recognize limits, partial derivatives, and critical points of functions of two variables. Learn Second Partials Test. Application problems in business and social sciences involving optimization of functions of two variables
Limits of functions of two variables	1	
Partial derivatives of functions of two variables	2	
Critical points of functions of two variables	1	
Second partials test	2	
Optimization applications in business and social sciences	1	
Chapter 13		Learn integration as opposite of differentiation. Apply integration to business and social sciences.
Anti-derivatives with applications	3	
Integration by substitution with applications	3	
Integration by parts	2	
Area under graphs of algebraic functions	3	
The Fundamental Theorem of Calculus	2	
Business and social science applications	2	
Tests	5	
	60	

COURSE OUTCOMES*	At the successful completion of this course, students will be able to:
	• Demonstrate finance formulas to solve problems involving simple and compound interest, annuities, and the present value of annuities.
	• Find the limits of functions graphically and algebraically
	• Find derivatives of algebraic, logarithmic, and exponential functions, and Demonstrate derivatives to solve applied problems
	• Demonstrate the first and second derivatives to analyze graphs of functions
	• Find integrals of some algebraic and exponential functions, and Demonstrate integrals to solve applied problems.

** Course Outcomes will be Demonstrated in the Assessment Software for Outcomes Assessment. Limit to 3 - 5.*