SCHOOL OF STEM SYLLABUS

TERM:

INSTRUCTOR:

COURSE CODE: MAT-111

OFFICE HOURS:

COURSE TITLE: Calculus I

OFFICE LOCATION:

DAY(S) AND TIME(S):

EMAIL:

LOCATION:

PHONE:

COURSE PREREQUISITE: Complete MAT-110

CREDITS: 4

COURSE DESCRIPTION:

This course considers the limits, continuity, theory, and techniques of differentiation and integration, with applications of both processes to science/engineering. The use of mathematical software in problem-solving is emphasized.

STUDENT LEARNING OUTCOMES:
Upon successfully completing this course, students will be able to:

1. Understand the concepts of a limit and one-side limits, continuity, and differentiability. Determine the limits numerically, algebraically, and from a graph.
2. Determine limits of indeterminate forms.
3. Apply limits to determine horizontal and vertical asymptotes
4. Understand the concepts of continuity and differentiability and the relationship between them.
5. become conscious of the mean value theorem
6. Know the differentiation formulas for polynomial, rational, trigonometric, inverse trigonometric, exponential, and logarithmic functions.
7. Apply the rules and techniques of differentiation to any combination of functions (Chain rule).
8. Apply the derivative to solve a variety of problems (related rates problems, optimization problems, curve sketching).
9. Use the derivative to find the linear approximation of a function.
10. Understand the concept of the antiderivative, and find ant antiderivatives
11. Evaluate indefinite integrals
12. understand approximating the area under a curve

13. Recognize and put together Riemann sum
14. Use the fundamental theorem of calculus and apply it to determine areas under curves
15. Use the substitution method to evaluate definite and indefinite integrals

TEXTBOOK AND SUPPLEMENTAL MATERIALS:

Textbook: Calculus, Early Transcendental functions, 8th edition,
Author: Ron Larson-Bruce Edwards, published by Cengage Learning.

Recommended Supplemental Materials:

- LarsonCalculus.com
- CalcChat.com
- CengageBrain.com

GRADING POLICY:

Grading Components	% of Final Grade
Attendance	5 %
Participation	10 %
Homework	15%
Three in-class Exams	45 %
Final Exam (Cumulative)	25 %
TOTAL	**100 %**

SAMPLE COURSE SCHEDULE:

week	Section	Topic
1, 2	**Chapter 2**	**Limits and Their Properties**
	2.1	A Preview of Calculus
	2.2	Finding Limits Graphically and Numerically
	2.3	Evaluating Limits Analytically
	2.4	Continuity and One-Sided Limits
	2.5	Infinite Limits

3, 4	**Chapter 3**	**Differentiation**
	3.1	The Derivative and the Tangent Line Problem
	3.2	Basic Differentiation Rules and Rates of Change
	3.3	Product and Quotient Rules and Higher-Order Derivatives
	3.4	The Chain Rule
	3.5	Implicit Differentiation
5, 6	**Exam 1**	
	3.6	Derivatives of Inverse Functions
	3.7	Related Rates
	3.8	Newton's Method
7, 8, 9	**Chapter 4**	**Applications of Differentiation**
	4.1	Extrema on an Interval
	4.2	Rolle's Theorem and the Mean Value Theorem
	4.3	Increasing and Decreasing Functions and the First Derivative Test
	4.4	Concavity and the Second Derivative Test
	4.5	Limits at Infinity
	4.6	A Summary of Curve Sketching
	Exam 2	
	4.7	Optimization Problems
	4.8	Differentials
10, 11, 12	**Chapter 5**	**Integration**
	5.1	Antiderivatives and Indefinite Integration
	5.2	Area
	5.3	Riemann Sums and Definite Integrals
	5.4	The Fundamental Theorem of Calculus

	5.5	Integration by Substitution
	Exam 3	
	5.6	Indeterminate Forms and L'Hôpital's Rule
	5.7	The Natural Logarithmic Function: Integration
13	5.8	Inverse Trigonometric Functions: Integration
	5.9	Hyperbolic Functions
	Review	
14	**Final Exam**	

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