



MAT 118 – CALCULUS WITH APPLICATIONS TO BUSINESS AND ECONOMICS

Date Updated: 5/2/2023

Credit Hours/week: 3 hrs./wk. – 3 cr.

BEGINNING SPRING 2023

Catalog description: A course covering functions, derivatives, and integration, with special consideration of applications to the business and economics areas. Partial differentiation is introduced.

Prerequisite: MAT 110 (grade of “C” or better) or equivalent.

Text: Bittinger, Ellenbogen, Surgent, *Calculus And Its Application – Brief Version*, 12th ed. (Pearson)

Syllabus:

Period	Text Sections	Topics
1	R1 – 3	Graphs and equations, functions and models, domain and range
2	R4 – 5	Slope and linear functions, nonlinear functions and models
3 – 4	1.1, 1.2	Limits: A numerical and graphical approach, Algebraic limits and continuity
5	1.3	Average Rates of Change
6 – 7	1.4, 1.5	Differentiation using limits of difference quotients, Leibniz Notation and the power and sum-difference rules
8	1.6	Product and quotient rules
9	1.7	Chain Rule
10	1.8	Higher-order derivatives
11		Test no. 1
12	3.1	First derivatives to find maximum and minimum values and sketch graphs
13 – 14	3.2, 3.3	Second derivatives to find maximum and minimum values and sketch graphs, Graph sketching: Asymptotes and rational functions
15	3.4	Optimization: Finding absolute maximum and minimum values
16	3.5	Optimization: Business, Economics, and general applications
17	3.8	Implicit differentiation and Logarithmic Differentiation
18	2.1, 2.2	Exponential and logarithmic functions of the Natural Base, e, Derivatives of exponential (Base-e)
19	2.3, 2.6	Natural logarithmic functions, a^x and $\log_a x$
20		Midterm Exam
21	4.1	Antidifferentiation
22	4.2	Antiderivatives as areas
23	4.3	Area and definite integrals
24	4.5	Integration techniques: substitution
25		Test no. 2
26	5.1	Consumer and Producer Surplus, (omit): Price Floors, Price Ceilings, and Deadweight Loss
27	5.7	Differential equations
28	6.1	Functions of Several Variables
29	6.2	Partial derivatives
30		FINAL EXAM

Statement of Course LEARNING OUTCOMES

- **Differentiate** algebraic, exponential and logarithmic functions, including use of product, quotient, generalized power and chain rules.
- **Solve** application problems from business and economics involving graphing, minimization and maximization and economic lot size using differentiation.
- **Integrate** functions using the basic rules of integration and substitution.
- **Solve** application problems from business and economics involving area, consumer's surplus and producer's surplus.
- **Find** first and second order partial derivatives for algebraic, exponential and logarithmic functions.
- **Solve** maximization and minimization problems using partial derivatives.