

MAT 118 – CALCULUS WITH APPLICATIONS TO BUSINESS AND ECONOMICS

3 hrs./wk. – 3 cr.

9/2020

BEGINNING FALL 2020

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 (Cumulative)

Students are expected to adhere to the policies of the County College of Morris. These can be accessed at www.ccm.edu/academics/academic-policies/

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, economic lot size, and elasticity, 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.