

MAT 118 – CALCULUS WITH APPLICATIONS TO BUSINESS AND ECONOMICS

Credit Hours/week: 3 hrs./wk. – 3 cr.

Date Updated: 8/2026
BEGINNING: FALL 2026

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 Applications –3rd edition (Pearson)

Supplementary Material: None

Calculators are often (not always) permitted for use in mathematics classes. A scientific calculator is the most advanced calculator that you will need for any of your courses. An excellent (and affordable) model is the Texas Instruments TI-30XIIS 2 Line Scientific Calculator.

Graphing calculators are sometimes permitted. However, the TI Nspire is not an acceptable graphing calculator. Only TI 84 models or below are acceptable. Calculators that can solve equations or perform other advanced operations are not allowed. Therefore, no Casio model calculators are allowed. There are also some models of Texas Instrument calculators as well as other brands that will not be allowed due to their capabilities.

Use of a calculator that is not permitted on an exam can lead to issues with academic integrity. If you have a question as to whether or not your calculator is acceptable, you need to ask your professor before your first exam

Syllabus:

Period	Text Section	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		Midterm Exam
19	2.1, 2.2	Exponential and logarithmic functions of the Natural Base, e, Derivatives of exponential (Base-e)
20	2.3, 2.6	Natural logarithmic functions, a^x and $\log_a x$
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

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 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.