



Department of Mathematics and Computer & Information Science

CALCULUS & ANALYTIC GEOMETRY I MA2310

Departmental Syllabus

TEXTBOOK: Calculus: Single Variable, Early Transcendentals, 3rd Edition, 2019, by William Briggs, Lyle Cochran, Bernard Gillett, Eric Schulz, published by Pearson, ISBN-13: 978-0134765761

or

Calculus: Single Variable, Early Transcendentals - With Access, 3rd Edition, 2019, by William Briggs, Lyle Cochran, Bernard Gillett, Eric Schulz, published by Pearson, ISBN-13: 9780134996714

or

Single Variable Calculus: Early Transcendentals (Looseleaf) - With Access, 3rd Edition, 2019, by William Briggs, Lyle Cochran, Bernard Gillett, Eric Schulz, published by Pearson, ISBN-13: 9780134996103

Prerequisite: A grade of C or higher in Precalculus, MA2090

COURSE DESCRIPTION: Topics include functions and their graphs, limits and continuity, derivatives of polynomials, rational functions, algebraic functions, exponential & logarithmic functions, and trigonometric functions, applications of the derivative, definite and indefinite integrals, fundamental theorem of calculus.

COURSE OBJECTIVES: After successful completion of this course students should understand the meaning of limits, continuity, and derivatives and be able to use them to solve a variety of problems.

COURSE LEARNING OUTCOMES:

Students will demonstrate mathematical skills and quantitative reasoning, including the ability to

- interpret and draw inferences from appropriate mathematical models such as formulas, graphs, calculus results;
- represent mathematical information symbolically, visually, numerically, or verbally as appropriate; and

- employ quantitative methods in calculus which includes knowledge and ability in the areas of arithmetic, algebra, and geometry to solve problems.

COURSE EVALUATION & GRADING: Your grade will be based on exams, quizzes, class work, and homework. There will be in class cumulative final exam. The grading scale is as follows:

A = [94, 100] A [~] = [90, 93]	B ⁺ = [87, 89]	C ⁺ = [77, 79]	D ⁺ = [67, 69]	F = [0, 59]
	B = [84, 86]	C = [74, 76]	D = [64, 66]	
	B [~] = [80, 83]	C [~] = [70, 73]	D [~] = [60, 63]	

TUTORIAL: Drop-in tutorial is available in the Mathematics Learning Center during the Fall and Spring semesters.

ACCOMMODATIONS FOR STUDENTS WITH SPECIAL NEEDS: If you have or suspect you may have a physical, psychological, medical or learning disability that may impact your course work, please contact The Office of Services for Students with Disabilities (OSSD), Office NAB room 2064, Phone: 516-876-3009. All support services are free and all contacts with the OSSD are strictly confidential.

TOPICS TO BE COVERED

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2. Limits

- 2.1 The Idea of Limits
- 2.2 Definitions of Limits
- 2.3 Techniques for Computing Limits
- 2.4 Infinite Limits
- 2.5 Limits at Infinity
- 2.6 Continuity

3. Derivatives

- 3.1 Introducing the Derivative
- 3.2 The Derivative as a Function
- 3.3 Rules of Differentiation
- 3.4 The Product and Quotient Rules
- 3.5 Derivatives of Trigonometric Functions
- 3.6 Derivatives as Rates of Change
- 3.7 The Chain Rule
- 3.8 Implicit Differentiation
- 3.9 Derivatives of Logarithmic and Exponential Functions
- 3.10 Derivatives of Inverse Trigonometric Functions
- 3.11 Related Rates

4. Applications of the Derivative

- 4.1 Maxima and Minima
- 4.2 Mean Value Theorem
- 4.3 What Derivatives Tell Us
- 4.4 Graphing Functions
- 4.5 Optimization Problems
- 4.6 Linear Approximation and Differentials
- 4.7 L'Hôpital's Rule
- 4.9 Antiderivatives

5. Integration

- 5.1 Approximating Areas under Curves
- 5.2 Definite Integrals
- 5.3 Fundamental Theorem of Calculus
- 5.4 Working with Integrals
- 5.5 Substitution Rule