



## University at Buffalo

Department of Mathematics

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### SAMPLE SYLLABUS

This document is published only as an indication of what is typically taught in this course.

Instructors have the responsibility of deciding on the topics to be omitted, additional topics to be included, and the emphasis, ordering, and pacing of presentation of topics.

# MTH 131: Mathematical Analysis for Management

Number of Course Credits: 4

## Course Description

For students in Management. Limits, continuity, differentiation of algebraic and exponential functions. Introduces integration. Applications of derivatives and integration.

## Required Text(s) & Materials

S. Waner and S. Costenoble, Applied Calculus, 8th edition.

## Prerequisites

Pre-Req: 70/100 or better on both Fundamentals & Algebra parts of the Math Readiness Assessment, or C or better in ULC148, MTH 108, MTH 113, MTH 114 MTH 115, a D or better in MTH 121, MTH 131, or MTH 141 or 3 on AP Calculus or 4 or 5 on AP Pre-Calculus.

## Notes

- MTH 131 is a one-semester terminal course for students of the School of Management. Instructors should emphasize business and economics examples and problems and bypass those involving life and physical sciences.
- This course is a controlled enrollment (impacted) course. Students who have previously attempted the course and received a grade other than W may repeat the course in the summer or winter; or only in the fall or spring semester with a petition to the College of Arts and Sciences Deans' Office.

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## Learning Outcomes

At the end of this course a student will be able to:	Method of Assessment
- recognize polynomial, rational, exponential and logarithmic functions, understand their basic properties and know how to evaluate them	HW #1, 2 Exam 1 Final Exam
- compute limits of algebraic functions graphically, numerically, and algebraically	HW #3 Exam 1 Final Exam
- interpret the derivative graphically and as a rate of change in business applications - demonstrate the understanding of the derivative in marginal function analysis by finding marginal cost, marginal revenue, and marginal profit at different levels of production	HW #4, 5 Exam 1 Final Exam
- compute the first and higher order derivatives of basic algebraic, exponential, and logarithmic functions using derivative rules, including the chain rule and implicit differentiation	HW #6, 7 Exam 1, 2 Final Exam
- use limits and derivatives to construct, analyze, and interpret the graph of a function	HW #8, 9 Exam 2 Final Exam
- use derivatives to analyze and solve applied optimization problems, for instance optimizing cost, revenue and profit in business applications	HW #10 Final Exam
- compute indefinite and definite integrals of functions using anti-derivative rules and the fundamental theorem of calculus - compute indefinite integrals using integration techniques including substitution, tables, and integration by parts - represent area as a definite integral and interpret the result in business applications	HW #11, 12 Final Exam
- Choose appropriate methods or models for a given problem, using information from observation or knowledge of the system being studied. - Employ quantitative methods, mathematical models, statistics, and/or logic to solve real-world problems beyond the level of basic algebra. - Identify common mistakes and/or limitations in a) empirical and/or deductive reasoning, and b) mathematical, quantitative, and/or logical problem solving. - Interpret mathematical models, formulas, graphs, and/or tables, to draw inferences from them, and explain these inferences.	HW #1-12 Exam 1 Exam 2 Final Exam

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## Course Schedule

Week	Sections	Topics	Exams
1	1.1, 1.2, 1.3, 2.1	Functions. Linear and quadratic functions.	
2	2.2, 2.3, 3.1, 3.2	Exponential and logarithmic functions. Limits (numerical, graphical, and algebraic viewpoints).	
3	3.3, 3.4, 3.5, 3.6	Limits and continuity. Average rate of change. The derivative (numerical and graphical viewpoints). The derivative (algebraic viewpoint).	
4	4.1, 4.2, 4.3	Derivatives of powers, sums, and constant multiples. L'Hospital's rule. Marginal analysis. The product and quotient rules.	
5	4.4, 4.5, 4.6	The chain rule. Derivatives of logarithmic and exponential functions. Implicit differentiation.	
6	4.6	Implicit differentiation. Review.	Exam 1
7	5.1, 5.2	Maxima and minima. Applications of maxima and minima.	
8	5.2, 5.3, 5.4	Applications of maxima and minima. Higher order derivatives. Analyzing graphs using calculus.	
9	5.6, 5.7	Related rates. Elasticity.	
10	6.1, 6.2	The indefinite integral. Integration by substitution.	
11	6.3, 6.4	The definite integral. The Fundamental Theorem of Calculus.	
12	6.4	The Fundamental Theorem of Calculus. Review.	Exam 2

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Week	Sections	Topics	Exams
13	7.1, 7.2	Integration by parts. Area between two curves and applications.	
14	7.3, 7.4	Averages and moving averages. Application of integration to business and economics.	
15		Cumulative final exam during final exams week	Final Exam

## Exam Schedule

Date	Subject
Week 6	Exam 1
Week 12	Exam 2
Week 15	Final Exam