

SAMPLE SYLLABUS

This document is published as an indication of the core content of the course. Instructors have responsibility of deciding on additional topics to be included, and the emphasis, ordering, and pacing of presentation.

Course Number: **MTH 131**

Course Title: **Mathematical Analysis for Management**

Credit Hours: **4**

Textbook: **S. Waner and S. Costenoble, *Applied Calculus, 7th edition.***

Prerequisites: Score of 70/100 or better on both the Fundamentals and the Algebra portions of the Math Readiness Assessment, or a C or better in ULCI48, MTH 115, MTH 121, MTH 131, or MTH 141 or a score of 4 or 5 on AP 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.

Week	Sections	Topics
1	1.1, 1.2, 1.3, 2.1	Functions. Linear and quadratic functions. Polynomial and rational functions.
2	2.2, 2.3, 3.1, 3.2	Exponential and logarithmic functions. Limits and continuity.
3	3.3, 3.4, 3.5, 3.6	Limits and continuity (algebraic viewpoint), 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 for derivatives.
5	4.4, 4.5, 4.6	The chain rule for derivatives. Derivatives of logarithmic and exponential functions. Implicit differentiation.
6	4.6	Implicit differentiation. Midterm 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	5.5, 5.6	Related rates. Elasticity.
10	6.1, 6.2	Indefinite integrals. Integration by substitution.
11	6.3, 6.4	Definite integrals (numerical and graphical viewpoints). The fundamental theorem of calculus.
12	6.4	The fundamental theorem of calculus. Midterm Exam 2
13	7.1, 7.2	Integration by parts. Area between two curves and applications.
14	7.3, 7.4, 7.6	Averages and moving averages. Application of integration to business and economics. <i>Differential equations and applications (option).</i>

Student Learning Outcomes for MTH 131 Mathematical Analysis for Management

Assessment measures: weekly homework assignments, 2 midterm exams, final exam.

At the end of this course a student will be able to:	Assessment
recognize polynomial, rational, exponential and logarithmic functions, understand their basic properties and know how to evaluate them	HW #1, 2 Midterm 1 Final Exam
compute limits of algebraic functions graphically, numerically, and algebraically	HW #3 Midterm 1 Final Exam
<ul style="list-style-type: none"> - 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 Midterm 1 Final Exam
<ul style="list-style-type: none"> - 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 #5, 6, 7 Midterm 2 Final Exam
<ul style="list-style-type: none"> - use limits and derivatives to construct, analyze, and interpret the graph of a function 	HW #9 Midterm 2 Final Exam
<ul style="list-style-type: none"> - use derivatives to analyze and solve applied optimization problems, for instance optimizing cost, revenue and profit in business applications 	HW #8,9,10 Midterm 2 Final Exam
<ul style="list-style-type: none"> - 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
<ul style="list-style-type: none"> - 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, Midterm 1 Midterm 2 Final Exam

This course satisfies the UB Curriculum's Math and Quantitative Reasoning requirement.