

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 121**

Course Title: **Survey of Calculus and Its Applications I**

Credit Hours: **4**

Textbook: **L. Goldstein, D. Schneider, D. Lay, and N. Asmar, *Calculus and Its Applications*, 5th custom UB edition.**

5th custom UB edition consists of chapters 1-10 and 12 of the standard 14th edition, so the standard 14th edition can also be used..

The text is available in hardcopy and eBook, both with and without Pearson MyLab Math.

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 ULC148, MTH 115, MTH 121, MTH 131, or MTH 141 or a score of 4 or 5 on AP Calculus.

Notes: This is the first course in a 2-semester sequence of calculus for students of social, biological, and management sciences.

Student Learning Outcomes for MTH 121 Survey of Calculus and Its Applications I

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

At the end of this course a student will be able to:	Assessment
<ul style="list-style-type: none"> - recognize linear, polynomial, rational, and power functions, understand their basic properties and know how to evaluate them - compute zeros of quadratic functions 	HW #1 Midterm 1 Final Exam
<ul style="list-style-type: none"> - compute limits of algebraic functions graphically, numerically, and algebraically - interpret the derivative graphically as the slope of the tangent to the graph of a function and algebraically as the limit of difference quotients - compute derivatives of basic algebraic functions 	HW #2, 3 Midterm 1 Final Exam
<ul style="list-style-type: none"> - use limits and derivatives to construct, analyze, and interpret the graph of a function - use derivatives to analyze and solve applied optimization problems 	HW #4, 5 Midterm 2 Final Exam
<ul style="list-style-type: none"> - compute the first and higher order derivatives using derivative rules, including the chain rule and implicit differentiation 	HW #6 Midterm 2 Final Exam
<ul style="list-style-type: none"> - simplify algebraic expressions involving exponents and logarithms - compute derivatives of exponential and logarithm functions - use exponential functions and logarithms in problems involving compound interest rates, and exponential growth and decay 	HW #7, 8, 9 Final Exam
<ul style="list-style-type: none"> - compute indefinite and definite integrals of basic functions using anti-derivative rules and the fundamental theorem of calculus - represent area as a definite integral and interpret the result in applications 	HW #10 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 #1-10, Midterm 1 Midterm 2 Final Exam

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Keep in mind that this is a sample syllabus. Your section will cover the same required topics, but may not cover them on this precise schedule or in this precise order. It might have more or fewer midterms and/or homework assignments. It might make use of quizzes or other grading instruments not used in this sample, etc. Consult the syllabus for your section or your instructor for the details pertaining to your section.

This schedule is written for 13 weeks of instruction. In a typical semester there are 14 teaching weeks, thus some flexibility is built in.

Week	Sections	Topics
1	0.1-0.5, 0.6	Functions. Some important functions. Algebra of functions. Zeros - the quadratic formula and factoring. Exponents and power Functions. <i>Functions and Graphs in Applications(optional)</i> .
2	1.1-1.5	Slope of a straight line. Slope of a curve at a point. Limits and the derivative. Differentiability and continuity.
3	1.6 -1.8	Some rules for differentiation. More about derivatives. The derivative as a rate of change.
4		Review and Midterm Exam I.
5	2.1 -2.3	Describing graphs of functions. First and second derivative rules. Curve sketching (introduction).
6	2.4-2.6	Curve sketching (conclusion). Optimization problems.
7	2.7, 3.1-3.3	Applications of calculus to business and economics. Product and quotient rules. Chain and general power rules. Implicit differentiation and related rates.
8		Review and Midterm Exam 2.
9	4.1-4.3	Exponential functions. The exponential functions e^x . Differentiation of exponential functions
10	4.4-4.6	The natural logarithm. The derivative of $\ln x$. Properties of the natural logarithm function.
11	5.1-5.4	Applications of the Exponential and Natural Logarithm Functions
12	6.1-6.3	Antidifferentiation. The definite integral and area under a graph.
13	6.4-6.5	Areas in the xy -plane. Application of definite integrals.

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