

**Department of Mathematics**

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**SAMPLE SYLLABUS**

This document is published as an indication of what is typically taught in this course. Instructors have the responsibility of deciding on topics to be omitted, 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 14<sup>th</sup> edition.

Prerequisites: NYS Regents Course B, or ULC 148, or MTH 115.

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

*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		<b>Review and Midterm Exam I.</b>
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		<b>Review and Midterm Exam 2.</b>
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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This is an example of a schedule. It may not be the schedule of your section. For the schedule for your section, consult the syllabus for your section or ask your instructor.

## 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"> <li>- recognize linear, polynomial, rational, and power functions, understand their basic properties and know how to evaluate them</li> <li>- compute zeros of quadratic functions</li> </ul>	HW #1 Midterm 1 Final Exam
<ul style="list-style-type: none"> <li>- compute limits of algebraic functions graphically, numerically, and algebraically</li> <li>- interpret the derivative graphically the slope of the tangent to the graph of a function and algebraically as the limit of difference quotients</li> <li>- compute derivatives of basic algebraic functions</li> </ul>	HW #2, 3 Midterm 1 Final Exam
<ul style="list-style-type: none"> <li>- use limits and derivatives to construct, analyze, and interpret the graph of a function</li> <li>- use derivatives to analyze and solve applied optimization problems</li> </ul>	HW #4, 5 Midterm 2 Final Exam
<ul style="list-style-type: none"> <li>- compute the first and higher order derivatives using derivative rules, including the chain rule and implicit differentiation</li> </ul>	HW #6 Midterm 2 Final Exam
<ul style="list-style-type: none"> <li>- simplify algebraic expressions involving exponents and logarithms</li> <li>- compute differentials of exponential and logarithm functions</li> <li>- use exponential functions and logarithms in problems involving compound interest rates, and exponential growth and decay</li> </ul>	HW #7, 8, 9 Final Exam
<ul style="list-style-type: none"> <li>- compute indefinite and definite integrals of basic functions using anti-derivative rules and the fundamental theorem of calculus</li> <li>- represent area as a definite integral and interpret the result in applications</li> </ul>	HW #10 Final Exam
<ul style="list-style-type: none"> <li>- Choose appropriate methods or models for a given problem, using information from observed or deduced data and knowledge of the system being studied.</li> <li>- Employ quantitative methods, mathematical models, statistics, and/or logic to solve real-world problems beyond the level of basic algebra.</li> <li>- Identify common mistakes and/or limitations in empirical and deductive reasoning, and in mathematical, quantitative, and/or logical problem solving.</li> <li>- Interpret mathematical models, formulas, graphs, and/or tables, to draw inferences from them, and explain these inferences.</li> </ul>	HW #1-10,  Midterm 1  Midterm 2  Final Exam

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