

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 122**

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

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.

Prerequisites: MTH 121 with recommended grade of C or higher.

Notes: Continuation of MTH 121. Second part of a two semester calculus sequence for students in social, biological, and management sciences.

Trigonometric functions are not usually covered in MTH 121 and are not part of this syllabus for MTH 122. Care should be taken in assigning problems in Chapters 9 and 10.

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	7.1-7.2	Examples of functions of several variables. Partial derivatives.
2	7.3-7.4	Maxima and minima of functions of several variables. Lagrange multipliers and constrained optimization.
3	7.5-7.6	The method of least squares. Double integrals.
4	9.1-9.2	Integration by substitution. Integration by parts.
5		Review and Midterm Exam I.
6	9.3-9.4	Evaluation of definite integrals. Approximation of definite integrals.
7	9.5-9.6	Some applications of the integral. Improper integrals.
8	10.1-10.2, 10.5 (omit 10.3, 10.4)	Solutions of differential equations. Separation of variables. Graphing solutions of differential equations.
9	10.6-10.7	Applications of differential equations. Numerical solution of differential equations
10		Review and Midterm Exam 2.
11	12.1-12.2	Discrete random variables. Continuous random variables.
12	12.3-12.4	Expected Value and Variance. Exponential and Normal Random Variables
13		Review.

Student Learning Outcomes for MTH 122 Survey of Calculus and Its Applications II

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"> - compute and interpret partial derivatives of functions of more than one variable - solve basic optimization for functions of two variables using the second derivative test - solve basic constrained optimization problems - solve least square problems 	HW #1, 2, 3 Midterm I Final Exam
<ul style="list-style-type: none"> - evaluate indefinite and definite integrals of basic functions using integration by parts and integration by substitution - approximate values of definite integrals using midpoint, trapezoid, and Simpson's rules - evaluate simple indefinite integrals 	HW # 4, 5, 6 Midterm I, Midterm II Final Exam
<ul style="list-style-type: none"> - understand the basic form of differential equations and applications of such equations in mathematical models - check if a given function satisfies a given differential equation - solve differential equations by separation of variables - approximate solutions of differential equations using Euler's method 	HW # 7, 8 Midterm II Final Exam
<ul style="list-style-type: none"> - understand the notions of sample space, discrete random variable, and probability - understand the notion of a continuous random variable and its density function - compute probabilities associated to continuous random variables using integrals - compute expected value, variance, and standard deviation of discrete and continuous random variables and interpret their values in applications - recognize exponential and normal random variables and understand some applications where such random variables appear - compute probabilities associated to a normal random variable with known mean and standard deviation using tables 	HW # 9, 10 Final Exam
<ul style="list-style-type: none"> - Choose appropriate methods or models for a given problem, using information from observed or deduced data and 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 empirical and deductive reasoning, and in 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 I Midterm 2 Final Exam