



University at Buffalo

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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 122: Survey of Calculus and Its Applications II

Number of Course Credits: 4

Course Description

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

Required Text(s) & Materials

L. Goldstein, D. Lay, D. Schneider, and N. Asmar, Calculus and Its Applications, 15th edition.

Prerequisites

MTH 121 or MTH 141 or MTH 136 and MTH 137.

Notes

- 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.

Learning Outcomes

At the end of this course a student will be able to:	Method of 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 Exam 1 Final Exam
<ul style="list-style-type: none"> - evaluate indefinite and definite integrals of elementary functions using integration by parts and integration by substitution - approximate values of definite integrals using midpoint, trapezoid, and Simpson's rules - evaluate an improper integral if it is convergent 	HW #4, 5, 6 Exam 1 Exam 2 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, 9 Exam 2 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 #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 Exam 1 Exam 2 Final Exam

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Course Schedule

Week	Sections	Topics	Exams
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 1.	Exam 1
6	9.3-9.4	Evaluation of definite integrals. Approximation of definite integrals.	
7	9.5-9.6	Applications of the integral in business and economics. Improper integrals.	
8	10.1-10.2	Solutions of differential equations. Separation of variables.	
9	10.5	Graphing solutions of differential equations.	
10	10.6-10.7	Applications of differential equations. Numerical solution of differential equations.	
11		Review and Midterm Exam 2.	Exam 2
12	12.1-12.2	Discrete random variables. Continuous random variables.	

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Week	Sections	Topics	Exams
13	12.3-12.4	Expected Value and Variance. Exponential and Normal Random Variables.	
14		Review.	
15		Cumulative final exam during final exams week.	Final Exam

Exam Schedule

Date	Subject
Week 5	Exam 1
Week 11	Exam 2
Week 15	Final Exam