



University at Buffalo

Department of Mathematics

Office of Undergraduate Studies

233 Mathematics Building

E-mail: math-undergrad@buffalo.edu

Ph: (716) 645-8785

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 142: College Calculus II

Number of Course Credits: 4

Course Description

This is the second part of a 3-semester sequence in calculus for students of mathematics, natural sciences and engineering. MTH 142 covers Chapters 5-8 and 10-11 of the text.

Required Text(s) & Materials

Calculus: Early Transcendentals, Ninth Edition, James Stewart, Daniel Clegg, Saleem Watson.

Prerequisites

MTH 141 with recommended grade of C or higher.

MTH 121 is usually not adequate preparation for MTH 142.

Notes

The schedule of this course is more demanding than that of MTH 141. Keeping a good pace is of the essence.

Learning Outcomes

Outcome (Student will be able to...)	Method of Assessment
<ul style="list-style-type: none"> - Interpret the area enclosed between curves as a definite integral and compute its value - Interpret the volume of a solid of revolution as a definite integral and compute its value - Compute indefinite and definite integrals using integration by parts, by substitution (including trigonometric substitutions) and using decomposition of rational expressions into partial fractions - Determine convergence of improper integrals - Compute the length of a curve segment from its Cartesian representation 	HW 1, 2, 3 Exam 1 Final Exam
<ul style="list-style-type: none"> - Compute the length of a curve segment from its parametric representation - Describe curves and regions of the xy-plane in polar coordinates - Interpret the concept of a series as the sum of a sequence, and use the sequence of partial sums to determine convergence of a series - Determine whether an infinite series is convergent or divergent using appropriate series test(s). 	HW 4, 5, 6 Exam 2 Final Exam
<ul style="list-style-type: none"> - Interpret a converging power series as a function - Compute the derivatives and antiderivatives of a functions represented by power series - Manipulate Taylor series by substitution and (anti-)differentiation to obtain expansions for other functions 	HW 7, 8, 9 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. 	HW 1, HW 2, HW 3, HW 4, HW 5 HW 6, HW 7, HW 8, HW 9, Exam 1, Exam 2, Final Exam
<ul style="list-style-type: none"> - Employ quantitative methods, mathematical models, statistics, and/or logic to analyze data and solve real-world problems beyond the level of basic algebra. 	HW 1, HW 2, HW 3, HW 4, HW 5 HW 6, HW 7, HW 8, HW 9, Exam 1, Exam 2, Final Exam
<ul style="list-style-type: none"> - Identify common mistakes and/or limitations in a.) empirical and/or deductive reasoning, and b.) mathematical, quantitative, and/or logical problem solving. 	HW 1, HW 2, HW 3, HW 4, HW 5 HW 6, HW 7, HW 8, HW 9, Exam 1, Exam 2, Final Exam
<ul style="list-style-type: none"> - Interpret mathematical models, formulas, graphs, and/or tables, to draw inferences from them, and explain these inferences. 	HW 1, HW 2, HW 3, HW 4, HW 5 HW 6, HW 7, HW 8, HW 9, Exam 1, Exam 2, Final Exam

Course Schedule

Week	Sections	Topics	Exams
1	5.5, 6.1	The substitution rule. Areas between curves.	
2	6.2, 7.1	Volumes (Solids of revolution only). Integration by parts. Trigonometric substitution.	
3	7.2, 7.3	Trigonometric integrals. Trigonometric substitution.	
4	7.3, 7.4	Trigonometric substitution. Integration of Rational Function by Partial Fractions.	
5	7.4	Integration of Rational Function by Partial	
6	7.5, 7.8	Fractions. Strategy for integration. Improper Integrals.	
7	8.1	Arc length. Midterm Exam 1 (Chapters 5, 6, 7, 8)	Exam 1
8	10.1, 10.2, 10.3	Curves defined by parametric equations. Slope and arc length in parametric equations. Polar coordinates.	
9	10.3, 11.1	Polar coordinates (conclusion). Sequences.	
10	11.2, 11.3, 11.4	Series, The Integral Test. The Comparison Tests.	
11	11.4, 11.5, 11.6	The Comparison Tests (conclusion). Alternating series and absolute convergence.	
12	11.6, 11.7	The Ratio and Root tests. Strategy for testing series. Midterm Exam 2	Exam 2

Week	Sections	Topics	Exams
13	11.8, 11.9	Power series. Representation of functions as power series.	
14	11.9, 11.10, 11.11	Representation of functions as power series (conclusion). Taylor & Maclaurin series. Applications of Taylor polynomials.	
15	N/A	Cumulative final exam during final exams week	Final Exam

Exam Schedule

Date	Subject
Week 7	Exam 1
Week 12	Exam 2
Week 15	Final Exam