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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 142**

Course Title: **College Calculus II**

Credit Hours: **4**

Textbook: **J. Stewart, *Calculus, Early Transcendental,* 8th edition or J. Stewart, *Calculus, Early Transcendental MTH 141, 142,* 8th custom UB ed.**
8th custom UB edition consists of Chapters 1-11 of the standard 8th edition of J. Stewart, *Calculus: Early Transcendentals*. New custom editions are no longer being printed. If/when they run out students should get the standard edition.

Prerequisites: MTH 141 with recommended grade of C or higher.
MTH 121 is usually not adequate preparation for MTH 142.

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

Week	Sections	Topics
1	5.5, 7.1	The substitution rule. Integration by parts.
2	7.2, 7.3	Trigonometric integrals. Trigonometric substitution.
3	7.3, 7.4	Trigonometric substitution. Integration of Rational Function by Partial Fractions
4	7.5	Strategy for integration.
5	7.8	Improper Integrals **Midterm Exam 1 (Chapter 7)**
6	11.1, 11.2	Sequences. Series.
7	11.3, 11.4, 11.5	The integral test & Estimates of Sums. The comparison tests. Alternating series.
8	11.6, 11.7	Absolute convergence & the ratio and root tests. Strategy for testing series.
9	11.8, 11.9	Power series. Representation of functions as power series.
10	11.9, 11.10	Representation of functions as power series. Taylor & Maclaurin series.
11	11.11	Applications of Taylor polynomials.
12	8.1, *8.2*	**Midterm Exam 2 (Chapter 11)** Arc length. *Areas of a surface of revolution (option).*
13	6.1, 6.2	Areas between curves. (*examples which involve integrating with respect to x; other examples optional)*, volumes**.** (*Cylindrical shells optional.)*
14	10.1,10.2, 10.3	Curves defined by parametric equations, polar coordinates, Arc length in parametric equations (rest of section optional)
15	*10.4, 6.5, 8.5*	*Areas and lengths in polar coordinates (option). Average value of a function (option). Probability (option)*

The table below indicates to what extent this course reflects each of the learning objectives of the undergraduate mathematics program. A description of learning objectives is available online at http://www.buffalo.edu/cas/math/ug/undergraduate-programs.html.

Computational Skills:	**Analytical Skills:**	**Practical Problem Solving:**	**Research Skills:**	**Communication Skills:**
extensively	little or not at all	moderately	little or not at all	little or not at all

Student Learning Outcomes for MTH 142 College Calculus II

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

At the end of this course a student will be able to:	Assessment
– compute indefinite and definite integrals using integration by parts, by substitution (including trigonometric substitutions) and using decomposition of rational expressions into partial fractions	HW #1,2,3,4 Midterm 1 Final Exam
– determine convergence of improper integrals with discontinuities in their domain or with infinite limits of integration and compute their values	HW #5 Midterm 1 Final Exam
– use the concept of the limit at infinity to determine whether a sequence of real numbers is bounded and whether it converges or diverges – 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 – distinguish between conditional convergence and absolute convergence of infinite series and be aware of the consequences of reordering terms of a conditionally converging infinite series	HW #6,7,8 Midterm 2 Final Exam
– decide whether and to what value an infinite geometric series converges – use comparison, root, ratio, and integral test to investigate whether a given infinite series is convergent – decide whether an alternating series converges from the limit and monotonic decrease of the sequence of absolute values of its terms	HW #6,7,8 Midterm 2 Final Exam
– interpret a converging power series as a function – compute the derivatives and antiderivatives of a functions represented by power series – determine the Taylor series of the n^{th} order and determine an upper bound on its remainder. – manipulate Taylor series by substitution and (anti-)differentiation to obtain expansions for other functions	HW #9,10,11 Midterm 2 Final Exam
– 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	HW #13 Midterm 2 Final Exam
– compute the length of a curve segment from its Cartesian or parametric representation – describe curves and regions of the xy-plane in polar coordinates	HW #12,13,14 Final Exam
– 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