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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 142**

Course Title: **College Calculus II**

Credit Hours: **4.0**

Textbook: **J. Stewart, *Calculus, Early Transcendentals 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*.

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.

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	6.1, 6.2	Areas between curves. Volumes.
2	6.3, *6.4*, 6.5	Volumes by cylindrical shells. *Work (option)*. Average value of a function.
3	7.1, 7.2	Integration by parts. Trigonometric integrals.
4	7.3, 7.4	Trigonometric substitution. Integration of rational functions by partial fractions *(omit Case IV)*.
5	7.5, 7.6	Strategy for integration. Integration using tables and computer algebra systems. **Midterm Exam 1**
6	7.7, 7.8	Approximate integration. Improper integrals.
7	8.1, 8.2, *8.3*, *8.4*	Arc length. Area of a surface of revolution. *Applications to physics and engineering (option)*. *Applications to economics and biology (option)*.
8	8.5, 10.1, 10.2	Probability. Curves defined by parametric equations. Calculus with parametric curves.
9	10.3, 10.4	Polar coordinates. Areas and lengths in polar coordinates.
10	*10.5*, *10.6*	*Conic sections (option)*. *Conic sections in polar coordinates(option)*. **Midterm Exam 2**
11	11.1-11.4	Sequences. Series. The integral test and estimates of sums. The comparison tests.
12	11.5-11.8	Alternating series. Absolute convergence and the ratio and root tests. Strategy for testing series. Power series.
13	11.9-11.11	Representations of functions as power series. Taylor and Maclaurin Series. Applications of Taylor polynomials *(omit applications to physics)*.

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
– interpret the area enclosed between curves as a definite integral and compute its value – express the area of a surface of revolution as a Riemann sum of rings, convert it to a definite integral form and compute its value.	HW #1, 2 Midterm 1 Final Exam
– compute indefinite and definite integrals using integration by parts, by substitution (including trigonometric substitutions) and using decomposition of rational expressions into partial fractions	HW #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 #6 Midterm 2 Final Exam
– approximate values of definite integrals numerically using the midpoint rule, the trapezoidal rule, and Simpson's rule; compute errors bounds for these approximations	HW #6 Midterm 2 Final Exam
– compute the length of a curve segment from its parametric representation – describe curves and regions of the xy-plane in polar coordinates and use this description to compute lengths and areas	HW #7, 8, 9 Midterm 2 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 #11, 12 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 #11, 12 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	Final Exam

This course satisfies UB's Mathematics General Education requirement. By achieving its learning outcomes students are also achieving the learning outcomes of the SUNY Mathematics General Education requirement (http://www.suny.edu/provost/academic_affairs/LearningOutcomes.cfm).

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.math.buffalo.edu/undergraduate/undergrad_programs.shtml.

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