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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 241**

Course Title: **College Calculus III**

Credit Hours: **4**

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

Prerequisites: MTH 142 with recommended grade of C or higher.
MTH 121-122 are not an adequate preparation for MTH 241

Notes: This is the third part of a 3-semester sequence in calculus for students of mathematics, natural sciences and engineering. The schedule of this course is most demanding in the MTH 141-142-241 sequence. Keep brisk pace and leave enough time to cover the material of chapter 16 which is typically the most challenging part of the course.

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	12.1-12.4	Three-dimensional coordinate systems. Vectors. The dot product. The cross product.
2	12.5, 12.6, 13.1	Equations of lines and planes. Cylinders and quadric surfaces. Vector functions and space curves.
3	13.2-13.4	Derivatives and integrals of vector functions. Arc length and curvature. Motion in space: velocity and acceleration.
4	14.1-14.3	Functions of several variables. Limits and continuity. Partial derivatives
5	14.4	Tangent planes and linear approximations. **Midterm Exam 1**
6	14.5-14.6	The chain rule. Directional derivatives and the gradient vector.
7	14.7, 14.8, 15.1	Maximum and minimum values. Lagrange multipliers. Double integrals over rectangles.
8	15.2-15.3	Double integrals over general regions. Double integrals in polar coordinates.
9	15.4-15.6	Applications of double integrals. Surface area. Triple integrals.
10	15.7, 15.8, *15.9*	Triple integrals in cylindrical coordinates. Triple integrals in spherical coordinates. *Change of variables in multiple integrals (option)*.
11	16.1, 16.2	Vector fields. Line integrals. **Midterm Exam 2**
12	16.3-16.6	The fundamental theorem for line integrals. Green's theorem. Curl and divergence. Parametric surfaces and their areas.
13	16.7-16.9	Surface integrals. Stokes' theorem. The divergence theorem.

Student Learning Outcomes for
MTH 241 College Calculus III

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

At the end of this course a student will be able to:	Assessment
- understand vectors in two- and three-dimensional space and their geometric interpretation - add vectors and multiply vectors by scalars - compute dot product and cross product of two vectors and understand the properties of these operations	HW #1 Midterm 1 Final Exam
- write equations of lines and planes in the three-dimensional space - classify quadratic surfaces based on their equations	HW #2 Midterm 1 Final Exam
- compute derivatives and integrals of vector functions - compute arc length and curvature of a space curve described by a vector function - understand and compute velocity and acceleration of a particle moving in the three-dimensional space	HW #3 Midterm 1 Final Exam
- compute limit of a function of several variables at a point - verify continuity of functions of several variables - compute partial derivatives of a function of several variables - apply the chain rule to compute partial derivatives - compute directional derivatives and the gradient of a function and understand the meaning of these notions - write an equation of the tangent plane to the graph of a function of two variables and interpret it as a linear approximation of the function	HW #4, 5, 6 Midterm 1 Midterm 2 Final Exam
- compute critical points of a function of two variables - use the second derivative test to classify critical points of a function of two into local minima, local maxima, and saddle points and understand the geometrical interpretation of this classification - use the method of Lagrange multipliers to solve constrained optimization problems in two and three variables	HW #7 Midterm 2 Final Exam
- compute integrals of functions of two variables over regions of the xy-plane using cartesian and polar coordinates - apply double integrals to compute moments and centers of mass of lamina, and to compute surface areas	HW #8, 9 Midterm 2 Final Exam
- compute triple integrals using cartesian, cylindrical, and spherical coordinates	HW #10 Midterm 2 Final Exam
- compute line integrals directly, using the fundamental theorem for line integrals, and using Green's theorem - compute curl and divergence of a vector field - compute surface integrals, directly, using Stokes' theorem and using the divergence theorem	Final Exam

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