- **Course Number and Title:** MATH 2530G. Calculus III
- **Catalog Description:** Continuation of Calculus II including multivariate and vector calculus, level curves and surfaces, partial derivatives, gradient, directional derivatives, tangent planes, optimization, multiple integrals in Cartesian, cylindrical and spherical coordinate systems.
- **Credit Hours:** 3 Credits (3)
- **Prerequisite(s) / Corequisite(s)** Prerequisite(s): MATH 1521G or MATH 1521H
  Corequisite(s): None
- **Required:** Required for BSME and BSAE Degrees
- **Course Availability:** Fall and Spring Semesters (+ Summer)
- **Instructor (Usual):** Dr. Adaline De Chenne
- **Textbook:** Calculus: Early Transcendentals, 9th ed., Chapters 12-15, by Stewart, Clegg and Watson
- **Course Learning Objectives:**

  <u>After completing this course, a student should be able to:</u>

  1) Use vector notation correctly.
  2) Perform vector operations, including dot product, cross product, differentiation and integration, and demonstrate their geometric interpretations.
  3) Perform operations on vector valued functions and functions of a parameter.
  4) Identify and graph the equations of cylinders and quadratic surfaces in 3-dimensional space.
  5) Determine the domain of continuity of a vector valued function and of a function of multiple variables.
  6) Compute partial derivatives, generally and at a point, and sketch their graphical representation on a surface in space.
  7) Recognize when the chain rule is needed when differentiating functions of multiple variables, parametric equations and vector valued functions, and be able to use the chain rule in these situations.
  8) Compute curvature of a parameterized vector representation of a curve in 2- and 3-dimensional space and be able to explain its meaning.

  and many others.
- **Topics Covered:** Three-Dimensional Coordinate System, Vectors, Dot Product, Cross Product, Equations of Lines and Planes, Cylinders and Quadratic Surfaces, Vector Functions and Space Curves, Derivatives and Integrals of Vector Functions, Arclength and Curvature, Motion in Space, Functions of Several Variables, Limits and Continuity, Partial

Derivatives, Tangent Planes and Linear Approximations, Directional Derivatives and Gradients, Maximum and Minimum, Lagrange Multipliers, Double Integrals, Triple Integrals, Integrals in Spherical Coordinates