MIDDLESEX COUNTY COLLEGE

Course Title: Analytic Geometry & Calculus III **Course No.** MAT 233

Class Hours: 4 **Laboratory Hours:** 0 **Credit Hours:** 4

Department Head Approval: _____ **Date:** 2007-2008
Maria DeLucia, Ph.D.

Dean Approval: _____
Reginald Luke, Ph.D.

Prerequisite:

MAT 132 (Analytic Geometry & Calculus II) or equivalent

Textbook of Course:

Title	Calculus Multivariable 8th Edition
Author	Howard Anton Irl Bivens Stephen Davis
Publisher	Wiley

Catalog Course Description:

Emphasis is on the study of analytic geometry and calculus in three dimensions. Topics include solid analytic geometry, partial derivatives, multiple integrals, and topics in vector analysis such as Green's theorem, the divergence theorem, surface integrals and Stokes theorem.

Recommended for students majoring in engineering, mathematics, computer science, social science and the science related areas of chemistry and physics.

Objectives of Course:

1. Deal with abstract symbols, comprehend their use, and manipulate them in a variety of situations.
2. Develop strong conceptual foundation.
3. Analyze mathematical situations with ideas and problem solving techniques.
4. Develop ability to make decisions about complex problems.
5. Establish underlying mathematical models for conceptual understanding.
6. To understand and analyze data intelligently in a technological society.

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Course Outline MAT-233

Chapters	Topics	Approximate Number of Class in Weeks
12	Rectangular coordinates in 3–Space; Sphere; Cylindrical Surfaces. Vectors. Dot Product; Projections. Cross Product. Parametric Equations of Lines. Planes in 3–Space. Quadric Surfaces. Review Polar Coordinates Cylindrical and Spherical Coordinates.	3
13	Introduction to Vector–Valued Functions. Calculus of Vector–Valued Functions. Change of Parameter; Arc Length. Unit Tangent, Normal, and Binormal vectors. Curvature. Motion Along a Curve.	3
14	Functions of 2 or more variables. Limits and Continuity. Partial Derivatives. Differentiability, Local Linearity, and Differentials The Chain Rule Directional Derivatives and Gradients. Tangent Planes and Normal Vectors Maxima and Minima of Functions of 2 variables. Lagrange Multipliers.	4
15	Double Integrals. Double Integrals over Nonrectangular regions. Double Integrals in Polar Coordinates. Parametric Surfaces; Surface Area. Triple Integrals. Centroid, Center of Gravity, Theorem of Pappus. Triple Integrals in Cylindrical & Spherical Coordinates. Change of Variables in Multiple Integrals; Jacobian.	3
16	Vector Fields. Line Integrals. Independence of Path; Conservative Vector Fields. Green's Theorem. Surface Integrals. Application of Surface Integrals; Flux. The divergence Theorem. Stokes' Theorem.	1