MIDDLESEX COUNTY COLLEGE
EDISON, NJ
MASTER SYLLABUS

Course ID and Name: MAT 233, Analytic Geometry & Calculus III

Department: Mathematics

Prerequisites: MAT 132, Analytic Geometry & Calculus II, or equivalent

Co-requisites: None

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.

General Education Status: GE MST

Credits: 4 **Lecture Hours**: 4 **Lab Hours**: 0

E-book and Other Course Materials:

E-book:

Author: Stewart, James
Title: Calculus, 8th Edition
Publisher: Cengage

Online Software: WebAssign

Core Learning Outcomes:
Upon successful completion of the course, the student will be able to:

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.
7. Translate quantifiable problems into mathematical terms and solve these problems using mathematical or statistical operations.
8. Construct graphs and charts, interpret them, and draw appropriate conclusions.

Content Strand	Students will be able to…
Vectors in the Plane, Vectors in Space, Dot Product and Cross Product (CLO 1, 2, 4, 7, 8)	• Compute arithmetical operations with vectors, as well as vector operations
Lines and Planes in Space, Surfaces in Space, Vector-Valued Functions, The Calculus of Vector-Valued Functions (CLO 1, 2, 3, 4, 5, 7, 8)	• Develop models and equations for figures in the three-dimensional plane. • Use calculus to graph and solve vector-valued functions
Motion in Space, Curvature, Tangent and Normal Vectors Parametric Surfaces (CLO 1, 2, 3, 4, 5, 7, 8)	• Apply calculus to physics problems • Use calculus to determine curvature • Use calculus to find the tangent and normal vectors • Develop models for parametric surfaces
Functions of Several Variables, Limits and Continuity, Partial Differentiation, Integration (CLO 1, 2, 3, 4, 5, 7, 8)	• Evaluate functions of several variables • Graph functions of several variables • Compute partial derivatives • Integrate functions of several variables
Tangent Planes and Linear Approximations, The Chain Rule, Gradient and Directional Derivatives, Extrema of Functions of Several Variables (CLO 1, 2, 3, 4, 5, 6, 7, 8)	• Use partial derivatives to find equations to tangent planes and linear approximations • Work with the Chain Rule for partial derivatives • Compute gradients and directional derivatives • Find extrema of functions of several variables
Lagrange Multipliers. Double Integrals, Area, Volume and Center of Mass, Double Integrals in Polar Coordinates (CLO 1, 2, 3, 4, 5, 7, 8)	• Optimize functions using Lagrange Multipliers • Compute double integrals • Use double integrals to find area, volume, and center of mass • Work with double integrals in polar coordinates
Triple Integrals, Cylindrical Coordinates, Spherical Coordinates, Change of Variables in Multiple Integrals (CLO 1, 2, 3, 4, 5, 7, 8)	• Compute triple integrals • Work with cylindrical and spherical coordinates • Compute multiple integrals using change of variables
Vector Fields, Line Integrals, Independence of Path and Conservative Vector Fields, Green's Theorem (CLO 1, 2, 3, 4, 5, 7, 8)	• Sketch vector fields and conservative vector fields • Compute line integrals • Utilize Green's Theorem as it pertains to line integrals
Curl and Divergence, Surface Integrals, The Divergence Theorem, Stokes Theorem (CLO 1, 2, 3, 4, 5, 7, 8)	• Determine curl • Use partial derivatives to find divergence • Compute surface integrals • Apply the Divergence Theorem and Stokes Theorem

Policies:

Disability Support

Students with disabilities, whether physical, learning or psychological, who believe that they may need accommodations in this class, are encouraged to contact Disability Services as soon as possible to ensure that the accommodations are implemented. Please meet with the Disability Services staff in Edison Hall, Room 100, (732) 906-2546.

Code of Student Conduct

To foster a productive learning environment, the College requires that all students adhere to the Code of Student Conduct which is published in the college catalog and website.