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

Textbook(s) and Other Course Materials:

Textbook:

Author: Smith, Minton
Title: Multivariable Calculus, 4th Edition
Publisher: McGraw Hill

Student 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.

Course Content Areas:

1. Vectors in the Plane
2. Vectors in Space
3. Dot Product
4. Cross Product
5. Lines and Planes in Space
6. Surfaces in Space

7. Vector-Valued Functions
8. The Calculus of Vector-Valued Functions
9. Motion in Space
10. Curvature
11. Tangent and Normal Vectors
12. Parametric Surfaces
13. Functions of Several Variables
14. Limits and Continuity
15. Partial Derivatives
16. Tangent Planes and Linear Approximations
17. The Chain Rule
18. Gradient and Directional Derivatives
19. Extrema of Functions of Several Variables
20. Lagrange Multipliers
21. Double Integrals
22. Area, Volume and Center of Mass
23. Double Integrals in Polar Coordinates
24. Surface Area
25. Triple Integrals
26. Cylindrical Coordinates
27. Spherical Coordinates
28. Change of Variables in Multiple Integrals
29. Vector Fields
30. Line Integrals
31. Independence of Path and Conservative Vector Fields
32. Green's Theorem
33. Curl and Divergence
34. Surface Integrals
35. The Divergence Theorem
36. 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.