Montgomery County Community College
MAT 202
Calculus and Analytic Geometry III
4-4-0

COURSE DESCRIPTION:
This is a third course in the calculus sequence. It is designed primarily for students who will major in mathematics, science, engineering, or business. Topics include vector analysis, solid analytic geometry, partial derivatives and multiple integrals with applications. A TI 84 Plus Graphing Calculator is required for the course.

PREREQUISITE(S):
MAT 201 - Calculus and Analytic Geometry II, with a minimum grade of "C"

CO-REQUISITE(S):
None

Upon successful completion of this course, the student will be able to:

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHOD
1. Model motion in three dimensions with vectors.	Lecture, Group work Homework, Projects, Quizzes	Homework, Quizzes, Tests, Projects
2. Integrate and differentiate vector functions in order to study two and three dimensional curves and surfaces.	Lecture, Group work Homework, Projects, Quizzes	Homework, Quizzes, Tests, Projects
3. Extend the ideas of functions of one-variable to functions of two or more variables – including partial differentiation and multiple integration.	Lecture, Group work Homework, Projects, Quizzes	Homework, Quizzes, Tests, Projects
4. Apply principles of single and multivariable calculus to vector fields and parametric surfaces.	Lecture, Group work Homework, Projects, Quizzes	Homework, Quizzes, Tests, Projects
6. Use the graphing calculator in relevant Calculus III concepts.	Lecture, Group work Homework, Projects, Quizzes	Homework, Quizzes, Tests, Projects

At the conclusion of each semester/session, assessment of the learning outcomes will be completed by course faculty using the listed evaluation method(s). Aggregated results will be submitted to the Associate Vice President of Academic Affairs. The benchmark for each learning outcome is that *70% of students will meet or exceed outcome criteria*.

SEQUENCE OF TOPICS:
1. Vectors in the Plane
2. Space Coordinates and Vectors in Space
3. The Dot Product of Two Vectors
4. The Cross Product of Two Vectors in Space
5. Lines and Planes in Space
6. Surfaces in Space
7. Cylindrical and Spherical Coordinates
8. Vector-Valued Functions
9. Differentiation and Integration of Vector-Valued Functions
10. Velocity and Acceleration
11. Tangent Vectors and Normal Curves
12. Arc Length and Curvature
13. Introduction to Functions of Several Variables
14. Limits and Continuity
15. Partial Derivatives
16. Differentials
17. Chain Rules for Functions of Several Variables
18. Directional Derivatives and Gradients
19. Tangent Planes and Normal Lines
20. Extrema of Functions of Two Variables
21. Lagrange Multipliers
22. Iterated Integrals and Area in the Plane
23. Double Integrals and Volume
24. Change of Variables: Polar Coordinates
25. Triple Integrals and Applications
26. Vector Fields
27. Line Integrals
28. Green's Theorem
29. Surface Integrals
30. Divergence and Curl
31. Stokes Theorem

LEARNING MATERIALS:
<u>Textbook</u>:
Larson & Edwards. (2014). Calculus (10th ed.) Brooks Cole Cengage Learning

Other learning materials may be required and made available directly to the student and/or via the College's Libraries and/or course management system.

COURSE APPROVAL:

Prepared by:	Roger Willig, Professor of Mathematics	Date:	4/1998
Revised by:	Roger Willig, Professor of Mathematics	Date:	12/2000
Revised by:	Walter R. Hunter, Professor of Mathematics	Date:	9/2004
Revised by:	Walter R. Hunter, Professor of Mathematics	Date:	9/2006

Revised by: Mark McFadden   Date: 2/1/2013
VPAA/Provost or designee Compliance Verification:
    Dr. Victoria Bastecki-Perez   Date: 2/4/2013

Revised by: Walter Hunter   Date: 9/21/2016
VPAA/Provost or designee Compliance Verification: Date: 9/21/2016

This course is consistent with Montgomery County Community College's mission. It was developed, approved and will be delivered in full compliance with the policies and procedures established by the College.