Montgomery County Community College
MAT 201
Calculus and Analytic Geometry II
4-4-0

COURSE DESCRIPTION:
This is the second course in the calculus sequence. It is designed primarily for students who will major in mathematics, science, engineering, or business. Topics include integration techniques, improper integrals, sequences, series, Taylor's formula, parametric and polar curves, and applications. Instruction and course assignments will include the use of calculators and computers as appropriate to the topic.

PREREQUISITE(S):
MAT 189 *Calculus with Review of Functions II* or MAT 190 *Calculus and Analytic Geometry I*, with a minimum grade of "C" or equivalent.

CO-REQUISITE(S):
None

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

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
1. Apply knowledge of integrals to finding volumes of solids of revolution.	Lecture, Group work Homework, Projects, Quizzes	Homework, Quizzes, Tests, Projects
2. Use a number of integration techniques including integration by parts, integration by partial fractions, and integration by trigonometric substitution.	Lecture, Group work Homework, Projects, Quizzes	Homework, Quizzes, Tests, Projects
3. Determine the convergence or divergence of series, including power series.	Lecture, Group work Homework, Projects, Quizzes	Homework, Quizzes, Tests, Projects
4. Find a Taylor series and to use Taylor's Formula with Remainder.	Lecture, Group work Homework, Projects, Quizzes	Homework, Quizzes, Tests, Projects
5. Develop, discover, and apply principles of	Lecture, Group work	Homework, Quizzes,

calculus to solving applied and theoretical problems using parametric equations	Homework, Projects, Quizzes	Tests, Projects
6. Develop, discover and apply principles of calculus to solving applied and theoretical problems using polar equations	Lecture, Group work Homework, Projects, Quizzes	Homework, Quizzes, Tests, Projects
7. Use a graphing calculator or scientific computing software in relevant Calculus II concepts.	Lecture, Group work Homework, Projects, Quizzes	Homework, Quizzes, Tests, Projects

SEQUENCE OF TOPICS:

1. Integration by Substitution
2. Area between curves
3. Find volume by disk and shell method.
4. Find arc length and area of a surface of revolution.
5. Use a number of integration techniques including integration by parts, integration by partial fractions, integration of trig functions and integration by trigonometric substitution and use these techniques in application problems.
6. Evaluate improper integrals.
7. Find the sum of a finite geometric series and use the appropriate formula in an application problem.
8. Find the sum of a convergent infinite geometric or telescoping series. Determine the convergence or divergence of infinite series using the divergence test, integral test, ratio, root, direct and limit comparison tests and the alternating series test.
9. Identify whether an infinite series is absolutely or conditionally convergent.
10. Find Taylor polynomial and Taylor and Maclaurin series for a given function and determine its radius and interval of convergence.
11. Conics and Calculus
12. Plane Curves and Parametric Equations
13. Parametric Equations and Calculus
14. Polar Coordinates and Polar Graphs
15. Areas and Arc Length in Polar Coordinates

LEARNING MATERIALS:

Textbook*: "Calculus Early Transcendentals"* by James Stewart, 9th edition, Brooks-Cole or similar textbook. Alternate textbook options include open-source texts.

A calculator or the use of scientific computing software may be required for this course, contact instructor for more information.

COURSE APPROVAL:

Prepared by:	Guy P. Vuotto	Date: 4/1998
Revised by:	Aileen Conway, Assoc. Professor of Mathematics	Date: 9/1999
Revised by:	Aileen Conway, Assoc. Professor of Mathematics	Date: 12/2002
Revised by:	Walter R. Hunter, Professor of Mathematics	Date: 10/2004
Revised by:	Walter R. Hunter, Professor of Mathematics	Date: 5/2005
Revised by:	Aileen Conway, Assoc. Professor of Mathematics	Date: 1/2006

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

Revised by: Walter Hunter Date: 9/21/2016
VPAA/Provost or designee Compliance Verification:
Dr. Victoria Bastecki-Perez Date: 9/21/2016

Revised by: Brandon Dougherty Date: 4/13/2017
VPAA/Provost or designee Compliance Verification:
Victoria Bastecki-Perez, Ed.D. Date: 4/14/2017

Revised by: Scott Vaughen Date: 9/2025
VPAA or designee Compliance Verification: Date: 11/25/2025

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.