

Montgomery County Community College
 MAT 190
 Calculus and Analytic Geometry I
 4-4-0

COURSE DESCRIPTION:

A course designed primarily for students who will major in mathematics, science, engineering, or business. Topics include concepts from analytic geometry, limits, differentiation and integration of algebraic and transcendental functions, curve sketching and applications. A TI 84 Plus Graphing Calculator is required for the course.

REQUISITE(S):*Previous Course Requirements*

- MAT 162 Precalculus II or MAT 170 Algebra and Trigonometry with a minimum grade of "C"

Concurrent Course Requirements

None

COURSE COMMENTS

- Quantitative Reasoning, Algebra, and Statistics Accuplacer Test Score of 251 or higher or an Advanced Algebra and Functions Accuplacer Test Score of 276 or higher.

LEARNING OUTCOMES Upon successful completion of this course, the student will be able to:	LEARNING ACTIVITIES	EVALUATION METHODS
1. Verify the limit of a linear function by using the $\varepsilon - \sigma$ definition of limit.	Lecture Group work Homework Projects Quizzes	Homework Quizzes Tests Projects
2. Evaluate limits of many algebraic and transcendental functions, including one-sided and infinite limits, and limits at infinity.	Lecture Group work Homework Projects Quizzes	Homework Quizzes Tests Projects
3. Discuss the continuity and points of discontinuity of many algebraic and transcendental functions.	Lecture Group work Homework Projects Quizzes	Homework Quizzes Tests Projects

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
4. Differentiate and integrate many algebraic and transcendental functions.	Lecture Group work Homework Quizzes	Homework Quizzes Tests Projects
5. Apply knowledge of differentiation to curve sketching and to solving maximum-minimum problems and related rates problems.	Lecture Group work Homework Projects Quizzes	Homework Quizzes Tests* Projects
6. Apply knowledge of integration to finding area.	Lecture Group work Homework Projects Quizzes	Homework Quizzes Tests Projects
7. Apply knowledge of differentiation and integration to solving rectilinear motion problems.	Lecture Group work Homework Projects Quizzes	Homework Quizzes Tests Projects
8. State and explain or illustrate some theorems, including the Mean Value Theorem and the Fundamental Theorem of Calculus.	Lecture Group work Homework Projects Quizzes	Homework Quizzes Tests Projects
9. Use the TI-84 Plus graphing calculator in relevant Calculus I concepts.	Lecture Group work Homework Projects Quizzes	Homework Quizzes Tests Projects
10. Students will be able to locate and access information from various sources, synthesize the information in order to analysis mathematical models	Lecture Group work Homework Projects Quizzes	Homework Quizzes Tests Projects

At the conclusion of each semester/session, assessment of the learning outcomes will be complete 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 of *70% of students will meet or exceed outcome criteria.*

LEARNING ACTIVITIES: *Learning activities for Core Competency assessment

1. Lecture
2. Labs
3. Group Problem-Solving Activities
4. Exams

SEQUENCE OF TOPICS:

1. A Preview of Calculus; Limits
2. Limits; Continuity; One Sided Limits
3. Infinite Limits
4. Derivatives; Tangent Line Problem; Rates of Change
5. Derivative Formulas; Chain Rule; Logarithmic Differentiation; Inverse Functions
6. Implicit Differentiation. Related Rates
7. Extrema on an Interval; Rolle's Theorem; Mean Value Theorem
8. Increasing, decreasing functions; First Derivative Test; Concavity; Second Derivative Test; Limits at Infinity
9. Curve Sketching; Optimization Problems
10. Differentials
11. Indeterminate Forms and L'Hopital's Rule
12. Antiderivatives and Indefinite Integration; Area; Riemann Sums
13. Definite Integrals; the Fundamental Theorem of Calculus

LEARNING MATERIALS:

Textbook:

Larson & Edwards. (2014). Calculus (10th ed.) Brooks Cole Cengage Learning
James Stewart , Calculus Early Transcendentals ,8th edition, Cengage Learning

Calculator:

TI-84 Plus Graphing Calculator. If a student has a TI-83+, they do not need to buy a TI-84+.

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: Edwina K. Smith, Professor of Mathematics	Date: 9/1995
Revised by: Thomas Moyer, Professor of Mathematics	Date: 6/1998
Revised by: Roger Willig, Professor of Mathematics	Date: 11/1999
Revised by: Thomas Moyer, Professor of Mathematics	Date: 5/2002
Revised by: Walter R. Hunter, Professor of Mathematics	Date: 10/2004
Revised by: Walter R. Hunter, Professor of Mathematics	Date: 5/2005
Revised by: Marion Graziano	Date: 12/2/2012
VPAA/Provost or designee Compliance Verification: Victoria L. Bastecki-Perez, Ed.D.	Date: 2/18/2013

Revised by: Walter Hunter
VPAA/Provost or designee Compliance Verification:
Victoria L. Bastecki-Perez, Ed.D.

Date: 9/21/2016

Date: 9/21/2016

Revised by: Marion Graziano/Debbie Dalrymple
VPAA/Provost or designee Compliance Verification:

Date: 8/2/2017

Date: 8/24/2017



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.