Montgomery County Community College
MAT 189
Calculus With a Review of Functions II
4-4-0

COURSE DESCRIPTION:
This course is a continuation of MAT 188. This course completes the coverage of Calculus I, MAT 190. MAT 189 covers limits, differentiation, integration curve sketching and applications for rational and radical functions. Also covered is an introduction to logarithms, exponential functions, and conic sections. The course concludes with a summary of Calculus I. A graphing calculator is required for class, homework, and testing. Classroom instruction and programs will be presented using a TI-84 Plus.

REQUISITES:
Previous Course Requirements
  – MAT 188 Calculus with a Review of Functions I with a minimum grade of "C"

Concurrent Course Requirements
None

LEARNING OUTCOMES Upon successful completion of this course, the student will be able to:	LEARNING ACTIVITIES	EVALUATION METHODS
1. Evaluate limits of rational and radical functions including one-sided limits, infinite limits and limits at infinity.	Lectures Group Work The Use of Technology	Tests Homework Quizzes
2. Demonstrate the concept of the limit.	Lectures Group Work The Use of Technology	Tests Homework Quizzes
3. Discuss the continuity and points of discontinuity of rational and radical functions.	Lectures Group Work The Use of Technology	Tests Homework Quizzes
4. Demonstrate the concept of the derivative.	Lectures Group Work The Use of Technology	Tests Homework Quizzes
5. Differentiate and integrate rational and radical functions.	Lectures Group Work The Use of Technology	Tests Homework Quizzes

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
6. Illustrate the Fundamental Theorem of Calculus.	Lectures Group Work The Use of Technology	Tests Homework Quizzes
7. Apply knowledge of integration to finding area.	Lectures Group Work The Use of Technology	Tests Homework Quizzes
8. Apply knowledge of differentiation to curve sketching and maximum-minimum problems involving rational and radical functions.	Lectures Group Work The Use of Technology	Tests Homework Quizzes
9. Use the knowledge of logarithmic and exponential definitions and properties to solve relevant applications.	Lectures Group Work The Use of Technology	Tests Homework Quizzes
10. Apply knowledge of differentiation to related rate problems.	Lectures Group Work The Use of Technology	Tests Homework Quizzes
11. Apply knowledge of differentiation and integration to solving rectilinear motion problems.	Lectures Group Work The Use of Technology	Tests Homework Quizzes
12. Illustrate the Mean Value Theorem, and the Fundamental Theorem of Calculus.	Lectures Group Work The Use of Technology	Tests Homework Quizzes
13. Demonstrate conic sections using algebra and differentiation.	Lectures Group Work The Use of Technology	Tests Homework Quizzes
14. Use the TI-84 plus graphing calculator in relevant Calculus I and Precalculus concepts.	Lectures Group Work The Use of Technology	Tests Homework Quizzes

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. Basic Rational Functions
2. Infinite Limits, Limits at Infinity
3. Derivatives of Rational Functions
4. Graphs of Rational Functions
5. Max Min Problems with Rational Function
6. Integration of Rational Functions
7. Basic Radical Functions
8. Limits of Radical Functions
9. Derivative of Radical Functions
10. Graphs of Radical Functions including Points of Nondifferentiability
11. Integration of Radical Functions
12. Exponential and Logarithmic Functions and Their Graphs
13. Properties of Logarithms
14. Exponential and Logarithmic Functions
15. Exponential and Logarithmic Models
16. Implicit Differentiation
17. Conic Sections
18. Linear Approximations and Differentials
19. The Mean Value Theorem
20. Related Rates
21. Rates of Change in the Natural and Social Sciences

LEARNING MATERIALS:
Textbook:
Larson & Edwards. (2012). *Calculus I with Precalculus* (3rd ed.). Brooks/Cole 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: Walter Hunter, 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: Marion Graziano   Date: 12/2/2012
Revised by: Marion Graziano   Date: 4/2/2013
VPAA/Provost or designee Compliance Verification:
               Victoria L. Bastecki-Perez, Ed.D.   Date: 4/18/2013

Revised by: Marion Graziano/James Muscatell   Date: 8/31/2017
VPAA/Provost or designee Compliance Verification: Date: 9/2017

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.