

Montgomery County Community College
 MAT 223
 Differential Equations
 4-4-0

COURSE DESCRIPTION:

A course primarily in differential equations and related topics. Topics include differential equations of the first order, linear differential equations of higher orders, systems of differential equations, LaPlace transforms, numerical methods, and applications. It can be taken concurrently with MAT 202 or MAT 220. A graphing calculator is required for class, homework, and testing. Classroom instruction and programs will be presented using a TI-86/TI92.

REQUISITES:*Previous Course Requirements*

- MAT 201 Calculus and Analytic Geometry II 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. Find exact and approximate solutions to a variety of differential equations including first order linear and higher order equations.	Lectures Small Group Discussions and/or Projects The Use of Technology Homework Quizzes Projects	Exams Quizzes Homework Projects
2. Find exact and approximate solutions to some systems of equations.	Lectures Small Group Discussions and/or Projects The Use of Technology Homework Quizzes Projects	Exams Quizzes Homework Projects
3. Solve exactly and approximately a variety of initial-value and boundary value problems.	Lectures Small Group Discussions and/or Projects The Use of Technology Homework Quizzes Projects	Exams Quizzes Homework Projects

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
4. Use appropriate technology in relevant differential equations concepts.	Lectures Small Group Discussions and/or Projects The Use of Technology Homework Quizzes Projects	Exams Quizzes Homework 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. Definitions and Terminology; Initial-Value Problems; Introduction to the Calculator
2. First-Order Equations; Separate Variables
3. Linear Equations, Mathematical Models
4. Number Methods
5. Linear Equations
6. Homogeneous Linear Equations with Constant Coefficients; Phase Portraits
7. Nonhomogeneous Linear Equations; Cauchy-Euler Equations
8. Initial-Value Problems
9. Systems of Differential Equations
10. Linear Systems; Homogeneous Linear Systems
11. The LaPlace Transform; Inverse Transform; Translation Theorems; Derivatives of a Transform
12. Transforms of Integrals; Periodic Functions
13. Review of Power Series
14. Solutions about Ordinary Points
15. Solutions about Singular Points

LEARNING MATERIALS:

Textbook:

A First Course in Differential Equations (11th ed.). Zill, Cengage 2018

Calculator:

A calculator is required for this course. Please see instructor.

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: Aileen Conway, Assoc. Professor of Mathematics	Date: 4/1998
Revised by: Aileen D. Conway, Assoc. Professor of Mathematics	Date: 1/2003
Revised by: Walter R. Hunter, Professor of Mathematics	Date: 10/2004
Revised by: Mark McFadden	Date: 2/1/2013
VPAA/Provost or designee Compliance Verification: Victoria L. Bastecki-Perez, Ed.D.	Date: 5/23/2013
Revised by: Marion Graziano/James Muscatell	Date: 8/31/2017
VPAA/Provost or designee Compliance Verification:	Date: 11/13/2017



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.