39	7.5	Homogeneous Linear Systems w/ Constant Coeff.
40	7.6	Complex Eigenval ues
41	10.1	Two-Point Boundary Value Problems
42-43	10.2	Fourier Series
44	10.4	Even and Odd Functions
45		Exam 4
		Final Exam

*MATLAB is a mathematical software program that is used throughout the science and engineering curricula. One MATLAB assignment will be given. The assignment has been designed to help students learn how to use the software in order to visualize many of the concepts discussed in class.

DISABILITY SERVICES OFFICE:

If you are registered with the Disability Services Office and will require accommodations to allow you to have a fair chance to be successful in this course, please see me during office hours as soon as possible. I encourage every student to see me during office hours if you are having any problems with the course or have any questions. My office hours are for you. Please see the College's Disability Services page at http://www.ccm.edu/disability.

ACADEMIC INTEGRITY:

This course will operate according to the County College of Morris Conduct Policy and the Academic Integrity Policy. See the Academic Policies page at http://www.ccm.edu/academics/policies.aspx. Cases of plagiarism or cheating will be handled according to the guidelines specified in this policy. Students with questions should consult me or the College's Academic Policies page. Ignorance of the nature of plagiarism or the plagiarism policy will not excuse violations.

- Apply differential equations to find orthogonal and oblique trajectories, as well as solve rate, force, motion, and electrical circuit problems.
- Solve differential equations using power series.
- Write and modify MATLAB code to solve differential equations numerically.
- Classify and solve systems of differential equations.
- Define and use a Laplace Transform to solve differential equations.
- Find Fourier Series representations of functions and find coefficients

STATEMENT OF RELATION TO CURRICULUM(S):

An introductory course in solving ordinary differential equations is taken by all mathematics majors. The course is appropriate for students looking to major in mathematics, physics, or engineering after transitioning to a 4-year institution.

TENTATIVE SCHEDULE

Period	Text	Topics
1	1.1 1.3	Some Basic Mathematical Models; Direction Fields Classification of Differential Equations
2	2.2	Separable Equations
3	2.1	Linear Equations, Integrating Factors
4-5	notes	Exact Equations, Bernoulli Equations
6-7	2.3	Applications- Modeling with First Order Equations
8	2.7	Euler's Method
9		Exam I
		MATLAB Project 1
10	3.1	Homogeneous Eq uations with Constant Coefficients
11	3.2	Solutions to Linear Homogeneous Equations, Wronskian
12	3.3	Complex Roots of the Characteristic Equation
13	3.4	Repeated Roots
14	3.4	Reduction of Order
15-16	3.5	Nonhomogeneous Equations, Undetermined Coeff.
17	3.6	Variation of Parameters
18-20	3.7	Applications: Damped/Undamped , Forced Behavior
21		Exam 2
22-23	5. 1	Review of Power Series
24	5.2	Solutions to Second Order Linear Equations w/ Variable Coeff.
25	5.4	Euler's Equation
26	6.1	Definition of Laplace Transform
27-28	6.2	Solutions oflnitial Value Problems (IVPs)
29-30	6.3	Step Functions
31	6.4	ODEs with Discontinuous Forcing Functions
32	6.5	Impulse Functions
33	6.6	The Convolution Integral
34		Exam 3
35-36	7.1-7.2	Intro & Review of Matrices
37-38	7.3	Linear Algebraic Equations, Eigenvalues/Eigenvectors

ORDINARY DEFFERENTIAL EQUATIONS

COURSE: MAT-244 (4 HOURS/WK. – 4 CR.)

PREREQUISITE: MAT 132 (Grade of "C" or better)

SEMESTER: SPRING 2019

TEXT: *Elementary Differential Equations and boundary Value Problems,* W. Boyce and R. DiPrima, 10th ed, Wiley

SUPPLEMENTAL MATERIAL: *MATLAB

This course will be held in a computer lab periodically throughout the semester to utilize MATLAB.

COURSE DESCRIPTION:

A course in methods for solving ordinary differential equations. Introduction to classical equations and their solutions, physical applications, Laplace Transforms, numerical solutions, and Fourier Series.

COURSE CONTENT:

Topics

- Introduction
- Separable and homogeneous equations, exact equations and integrating factors, linear equations, Bernoulli equations, Riccati equations, and Clairaut's equation
- Trajectories, applications, rate problems, linear equations, homogeneous equations with constant coefficients, undetermined coefficients, variation of parameters, Cauchy-Euler equation
- Applications: undamped, damped, and forced behavior, resonance, power series, Frobenius method, Legendre equation, Bessel functions and differential equations
- Operator method, applications, normal form, homogeneous systems
- Graphical and power series methods, Picard iterations, numerical methods, Euler's method Laplace Transforms
- Fourier Series and orthogonal functions. Two-Point boundary value problems. Even and Odd Functions.

Course Objectives:

- Students will translate quantifiable problems into mathematical terms and solve these problems using mathematical operations.
- Students obtain their knowledge and skills by utilizing MATLAB and completing application problems.
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Learning Outcomes:

- Define, recognize, and classify differential equations.
- Identify and solve separable, homogeneous, exact, linear, Bernoulli, Riccati, and Clairaut's differential equations.
- Apply integrating factor when necessary.
- Demonstrate an understanding of the role of initial value problems.