

MATH 242 Differential Equations I

1. Catalog Description

MATH 242 Differential Equations I

4 units

Prerequisite: MATH 206 and MATH 241.

Ordinary differential equations: first-order linear equations, separable equations, exact equations, second-order linear equations, nonhomogeneous equations, systems of first-order linear equations, systems of nonlinear equations, modeling and applications. Not open to students with credit in MATH 244. 4 lectures.

2. Required Background or Experience

Math 206 and Math 241.

3. Learning Objectives

The student should:

- a. Be able to recognize, classify and solve various types of ordinary differential equations.
- b. Be familiar with terminology such as constant coefficients, linear operators, auxiliary polynomials, particular and complementary solutions.
- c. Understand the relationship of differential equations and initial conditions to physical problems in engineering, physics and other applied areas.
- d. Be able to formulate, solve and analyze the results of mathematical models of elementary physical problems.
- e. Be able to solve and analyze systems of linear first order differential equations and use them in selected applications.

4. Text and References

To be chosen by instructor. Suggested texts include:

- Boyce, William E. and Richard C. DiPrima, Elementary Differential Equations and Boundary Value Problems
- Brannan, James R. and William E. Boyce, Differential Equations: An Introduction to Modern Methods and Applications
- Conrad, Bruce P., Differential Equations: A Systems Approach
- Kohler, Werner, and Lee W. Johnson, Elementary Differential Equations
- Polking, John, et al, Differential Equations with Boundary Value Problems

5. Minimum Student Materials

Paper, pencils, and notebook.

6. Minimum University Facilities

Classroom with ample chalkboard space for class use.

7. Content and Method

Topic

a. First Order Equations

1. Linear Equations
2. Nonlinear Differential Equations
3. Systems of Differential Equations

b. Linear Differential Equations

1. Systems of Linear Differential Equations
2. Second-Order Equations

8. Methods of Assessment

The primary methods of assessment are: essay examinations, quizzes and homework. Typically, there will be one or more hour-long examinations during the quarter, and a required comprehensive final examination. Students are required to show their work and are graded not only on the correctness of their answers, but also on their understanding of the concepts and techniques.