

# Minnesota State University Moorhead

## MATH 466: Differential Equations II

### A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: 3

Lab Hours/Week: 0

OJT Hours/Week: \*.\*

Prerequisites:

This course requires the following prerequisite

MATH 366 - Differential Equations

Corequisites: None

MnTC Goals: None

A continuation of MATH 366. The students will learn more advanced techniques for solving differential equations and modeling using differential equations. Students will also learn about partial differential equations and some basic solutions to them.

**B. COURSE EFFECTIVE DATES:** 02/01/2017 - Present

### C. OUTLINE OF MAJOR CONTENT AREAS

1. Linear Systems of Differential Equations, Phase Plane Analysis, Homogeneous Linear Systems, Variation of Parameters for Nonhomogeneous Linear Systems, Dynamical Systems, Poincare Maps and Chaos.
2. Series Solutions of Differential Equations, Analytic Coefficients, Cauchy-Euler Equations, Method of Frobenius.
3. Partial Differential Equations, Fourier Series and Integrals, the Heat Equation, the Wave Equation, and Laplace's Equation.
4. Modeling Real-World Problems with Differential Equations.
5. Additional Topics chosen from Matrix Methods for Linear Systems, Numerical Methods for Solving Differential Equations, Fourier Transforms.

### D. LEARNING OUTCOMES (General)

1. Apply higher-order problem-solving and modeling strategies.
2. Be able to discern qualitative information from systems of differential equations without finding a solution.
3. Classify differential equations.
4. Clearly express mathematical / logical ideas in writing.
5. Solve a variety of systems of differential equations and some basic partial differential equations.
6. Use a symbolic and numerical computing software to solve systems of differential equations and partial differential equations, graph their solutions, and use numerical methods to solve real-world problems.
7. Use power series to solve differential equations.

### E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

None

**F. LEARNER OUTCOMES ASSESSMENT**

As noted on course syllabus

**G. SPECIAL INFORMATION**

None noted