

# North Hennepin Community College

## MATH 2400: Differential Equations

### A. COURSE DESCRIPTION

Credits: 4

Lecture Hours/Week: \*.\*

Lab Hours/Week: \*.\*

OJT Hours/Week: \*.\*

Prerequisites:

This course requires the following prerequisite

MATH 1222 - Calculus II (Minimum grade: 1.67 GPA Equivalent)

Corequisites: None

MnTC Goals: Goal 04 - Mathematical/Logical Reasoning

The content of this course covers first and second ordinary differential equations with applications, higher order linear equations, constant coefficients, differential operators, variation of parameters, power series methods, Laplace transforms, and solving systems of differential equations. The student will also be introduced to numerical methods for solving differential equations.

**B. COURSE EFFECTIVE DATES:** 08/27/1997 - Present

### C. OUTLINE OF MAJOR CONTENT AREAS

1. See Course Description and Course Outcomes

### D. LEARNING OUTCOMES (General)

1. Recognize and work with first and second-order linear and nonlinear DE. (MnTC Goal 4: a, b, d; Goal 2: a, c), (NHCC ELO 1,2);
2. Model real-life situations using first-order differential equations. (MnTC Goal 4: a, b, d; Goal 2: a, c), (NHCC ELO 1,2, 4);
3. Find numerical solutions of ordinary Differential Equations including Euler's Method. (MnTC Goal 4: a, d; Goal 2: a, b, c, d), (NHCC ELO 1,2, 4);
4. Recognize and work with higher-order differential Equations. (MnTC Goal 4: a, d), (NHCC ELO 2);
5. Model real-life situations using higher-order differential equations. (MnTC Goal 4: a, b, d; Goal 2: a, c), (NHCC ELO 1,2, 4);
6. Solve problems using the Laplace Transform. (MnTC Goal 4: a, d; Goal 2: c, d), (NHCC ELO 1,2, 4);
7. Apply series solutions of linear differential equations. (MnTC Goal 4: a, d), (NHCC ELO 2);
8. Express a dynamical system as a mathematical model. (MnTC Goal 4: a, b, d; Goal 2: a, c), (NHCC ELO 1,2, 4);
9. Use direction fields to illustrate solutions of differential equations. (MnTC Goal 4: a, b, d; Goal 2: a, b, c, d), (NHCC ELO 1,2, 4);
10. 10. Solve systems of differential equations. (MnTC Goal 4: a, d), (NHCC ELO 2);
11. Apply Existence and Uniqueness Theorem. (MnTC Goal 4: a, d), (NHCC ELO 2);
12. Solve boundary/initial value problems. (MnTC Goal 4: a, b, d; Goal 2: a, b, c, d), (NHCC ELO 1,2, 4);

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

Goal 04 - Mathematical/Logical Reasoning

1. Illustrate historical and contemporary applications of mathematical/logical systems.
2. Clearly express mathematical/logical ideas in writing.
3. Explain what constitutes a valid mathematical/logical argument(proof).
4. Apply higher-order problem-solving and/or modeling strategies.

## **F. LEARNER OUTCOMES ASSESSMENT**

As noted on course syllabus

## **G. SPECIAL INFORMATION**

None noted