Alexandria Technical and Community College

MATH 2200: Differential Equations and Linear Algebra

A. COURSE DESCRIPTION

Credits: 4
Lecture Hours/Week: 4
Lab Hours/Week: 0
OJT Hours/Week: *.*

Prerequisites:
This course requires the following prerequisite
   MATH 2232 - Calculus II (Number of Years Valid: 5)

Corequisites: None

MnTC Goals: Goal 04 - Mathematical/Logical Reasoning

This course covers differential equations, linear algebra, and the Laplace transformation. Differential equation topics include first-order differential equations, applications, and higher-order differential equations. Linear algebra topics include systems of equations, matrices, determinants, eigenvalues, eigenvectors, and vector spaces.

B. COURSE EFFECTIVE DATES: 05/02/2024 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Identify and verify solutions to differential equations.
2. Calculate and draw slope fields of differential equations.
3. Use separation of variables to solve differential equations.
5. Solve initial-value and boundary-value problems involving higher-order differential equations.
6. Solve applications with higher-order differential equations.
7. Perform matrix operations, including elementary operations, calculation of the inverse, and calculation the determinant.
8. Define the vector space Rn.
10. Define linear independence, calculate matrix rank, and investigate change of basis.
11. Define and determine eigenvalues and eigenvectors.
12. Define the Laplace transformation and use it to solve problems, including differential equations.

D. LEARNING OUTCOMES (General)

1. Categorize differential equations by order and linearity, and choose appropriate solution methods.
2. Use differential equations to solve applied problems.
3. Use matrices, properties of matrices, and matrix algebra to solve systems of equations.
4. Define and apply the Laplace transform for suitable functions.
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. Explain what constitutes a valid mathematical/logical argument (proof).
   3. Apply higher-order problem-solving and/or modeling strategies.

F. LEARNER OUTCOMES ASSESSMENT
   As noted on course syllabus

G. SPECIAL INFORMATION
   None noted