Tennessee Technological University
Mathematics Department
MATH 2120: Differential Equations

I. COURSE DESCRIPTION FROM CATALOG:

First order equations, linear equations of higher order, power series solutions, Laplace transforms, and other topics. **Lec. 3-3. Cr. 3-3.**

II. PREREQUISITE(S):

C or better in **MATH 1920**: Calculus sequence including differential and integral calculus, analytic geometry, exponential and logarithmic functions, and infinite series. It is recommended, but not required, that students take **Math 2010** before taking **Math 2120**.

III. COURSE OBJECTIVE(S):

This course is designed to provide instruction in techniques used in solving ordinary differential equations commonly encountered in mathematical physics and engineering.

IV. STUDENT LEARNING OUTCOMES:

Upon successful completion of the course students will understand basic terminology involving ordinary differential equations and how ordinary differential equations model many real-world phenomena; solve certain ordinary differential equations, including separable, exact, homogeneous, first-order linear, and Cauchy-Euler and associated initial-value problems; solve certain ordinary differential equations and associated initial- value problems using the techniques of auxiliary equations, Laplace transforms, and power series solutions; and understand the value of a fundamental solution set and particular solution when solving a nonhomogeneous linear ordinary differential equation, as well as using the methods of undetermined coefficients and variation of parameters to find particular solutions.

V. TOPICS TO BE COVERED:

- Introduction to Differential Equations and Terminology
- First Order Differential Equations
- Higher Order Homogeneous Linear Equations with Constant Coefficients
- Cauchy-Euler Equations
- The Laplace Transform method of solving Initial-Value Problems
- The series Solutions of Linear Equations
- Systems of Linear Differential Equations (optional)

VI. POSSIBLE TEXTS AND REFERENCES:

- Zill, D. G. (2024). *Differential equations with boundary-value problems* (10 ed.). Cengage.
- Zill, D. G. (2014). *Differential equations with boundary-value problems* (9 ed.). Cengage.
- Zill, D. G. (2001). *A first course in differential equations* (Classic 5th ed.). Brooks/Cole.
- Arnold, D., Boggess, A., & Polking, J. (2005). *Differential equations with boundary-value problems* (2 ed.). Wiley Plus.

VII. STUDENT ACADEMIC MISCONDUCT POLICY:

Maintaining high standards of academic integrity in every class at Tennessee Tech is critical to the reputation of Tennessee Tech, its students, alumni, and the employers of Tennessee Tech graduates. The Student Academic Misconduct Policy 217 describes the definitions of academic misconduct and policies and procedures for addressing Academic Misconduct at Tennessee Tech. Effective July 20, 2023, the university's student academic misconduct policy has been revised and is published at Policy Central. Students are expected to review and read this policy as part of their orientation to the syllabus and the course expectations.

VIII. DISABILITY ACCOMMODATION:

Students with a disability requiring accommodations should contact the accessible education center (AEC). An accommodation request (AR) should be completed as soon as possible, preferably by the end of the first week of the course. The AEC is located in the Roaden University Center, room 112; phone 931-372-6119. For details, view Tennessee Tech's policy 340 – services for students with disabilities at policy central.