

**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 (including Frobenius method), Laplace transforms, other topics. It is recommended, but not required, that students take MATH 2100 before taking MATH 2120. Lec. 3. Cr. 3.

II. PREREQUISITE(S):

C or better in MATH 1920

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. TOPICS TO BE COVERED:

Chapter 1 Introduction to Differential Equations

- 1.1 Basic Definitions and Terminology
- 1.2 Some Mathematical Models

Chapter 2 First Order Differential Equations

- 2.1 Preliminary
- 2.2 Separable Variables
- 2.3 Homogeneous Equations
- 2.4 Exact Equations
- 2.5 Linear Equations
- 2.6 Equations of Bernoulli

Chapter 4 Linear Differential Equations of Higher-Order

- 4.1 Preliminary Theory
- 4.2 Constructing a Second Solution from a Known Solution
- 4.3 Homogeneous Linear Equations with Constant Coefficients
- 4.4 Undetermined Coefficients-Superposition Approach
- 4.7 Variation of Parameters

Chapter 7 Laplace Transform

- 7.1 Laplace Transform
- 7.2 Inverse Transform
- 7.3 Translation Theorems and Derivatives of a Transform
- 7.4 Transforms of Derivatives, Integrals, and Periodic Functions

Students with a disability requiring accommodations should contact the Office of Disability Services (ODS). 1
An Accommodation Request (AR) should be completed as soon as possible, preferably by the end of the first week of the course. The ODS is located in the Roaden University Center, Room 112; phone 372-6119.

- 7.5 Applications
- 7.6 Dirac Delta Function (Optional)

Chapter 6 Differential Equations with Variable Coefficients

- 6.1 Cauchy-Euler Equation
- 6.2 Review of Power Series; Power Series Solutions
- 6.3 Solutions about Ordinary Points
- 6.4 Solutions about Singular Points
- 6.5 Two Special Equations (Optional)

Chapter 8 Systems of Linear First-Order Differential Equations

Selected sections as time permits

V. POSSIBLE TEXTS AND REFERENCES:

Dennis G. Zill, *A First Course in Differential Equations, The Classic Fifth Edition*, Brooks/Cole, 2001.

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