

**Math 2320 “Differential Equations”  
Course Syllabus  
Fundamentals of Differential Equations by:  
Nagle, Saff, and Snider (Sixth Edition)**

**Introduction:**

- 1) Show that certain functions solve same differential equation
- 2) Direction Fields

**Study of First-Order Differential Equations**

- 1) Separable Equations
- 2) Linear Equations
- 3) Exact Equations
- 4) Integrating Factors
- 5) Substitution and Transformations

**Study of Linear Second-Order Equations**

- 1) Homogeneous Linear Equations: The General Solution
- 2) Auxiliary Equations
- 3) Nonhomogeneous Equations
  - a) Undetermined Coefficients
  - b) Variation of Parameters

**Study of Higher-Order Linear Differential Equations**

- 1) Basic Theory
- 2) Homogeneous Equations with Constant Coefficients
- 3) Method of Undetermined Coefficients
- 4) The Annihilator Method
- 5) Method of Variation of Parameters

**La Place Transforms**

- 1) Definition of the La Place Transform
- 2) Properties
- 3) The Inverse La Place Transform
- 4) Solving Initial Value Problems
- 5) Transforms of Discontinuous and Periodic Functions
- 6) Convolution

**Series Solutions of Differential Equations**

- 1) Power Series and Analytic Functions
- 2) Power Series Solutions of Differential Equations
- 3) Equations with Analytic Coefficients
- 4) The Cauchy-Euler Equation
- 5) Find a Second Independent Solution

## **Linear Systems of Differential Equations**

- 1) Linear Systems in Normal Form**
- 2) Homogeneous Linear Systems with Constant Coefficients**
- 3) Complex Eigenvalue**
- 4) Non-homogeneous Linear Systems**
- 5) The Matrix Exponential Function**