Math 252
Introduction to Differential Equations

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Textbook

Dennis G. Zill, A First Course in Differential Equations with Modeling Applications, 7th
Edition, Brooks/Cole, 2001.

Evaluation

· Four tests: 50%
· Comprehensive final exam: 50%

Tentative Schedule

Test 1 October 20th Test 2 November 3rd
Test 3 November 17th Test 4 December 1st
Final exams are held from December 13 - 17. You must be available at the scheduled time.

The following percentage conversion to letter grade will be used:

Percentage	0–49	50–59	60–64	65–69	70–74	75–79	80–84	85–89	90–94	95–100
Letter grade	F	D	C	C+	B-	B	B+	A-	A	A+

Course Outline

1. Introduction to Differential Equations
· Definitions and Terminology (section 1.1)
· Initial-Value Problems (section 1.2)
2. First-Order Differential Equations
· Separable Variables (section 2.2)
· Linear Equations (section 2.3)
· Exact Equations (section 2.4)
· Solutions by Substitutions (section 2.5)
3. Differential Equations of Higher-Order
· Preliminary Theory: Linear Equations (section 4.1)
· Reduction of Order (section 4.2)
· Homogeneous Linear Equations with Constant Coefficients (section 4.3)
· Undetermined Coefficients — Superposition Approach (section 4.4)
· Variation of Parameters (section 4.6)
· Cauchy-Euler Equations (section 4.7)
4. Modeling with Higher-Order Differential Equations
· Linear Equations: Initial-Value Problems (section 5.1)
- Spring/Mass Systems: Free Undamped Motion (5.1.1)
- Spring/Mass Systems: Damped Motion (5.1.2)
- Spring/Mass Systems: Driven Motion (5.1.3)
- Series Circuit Analogue (5.1.4)
5. Series Solutions of Linear Equations

· Solutions About Ordinary Points (section 6.1)
· Solutions about Singular Points (section 6.2)
6. Laplace Transforms
· Definition of the Laplace Transform (section 7.1)
· Inverse Transform and Transform of Derivatives (section 7.2)
· Translation Theorems (section 7.3)
· Additional Operational Properties (section 7.4)
· Dirac Delta (section 7.5)
7. Systems of Linear First-Order Differential Equations
· Preliminary Theory (section 8.1)
· Homogeneous Linear Systems with Constant Coefficients (section 8.2)
· Variation of Parameters (section 8.3)
· Matrix Exponential (section 8.4)
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