

Math 0290: Differential Equations, Fall 2025

Departmental Syllabus

Schedule and practice problems: The following is an approximate schedule for lectures and a full list of practice problems from the course textbook.

Week 1: August 25, 27, 29

Introduction to differential equations; Euler's Method

- 1.1 Number 1-11.
- 2.1 Number 3-6, 10-15, 21-28.
- 6.1 Number 1-9, 11.

Week 2: September 3, 5

Runge-Kutta Method; Numerical Error; Computer tools including Matlab

- 6.2 Number 1-9.
- 6.3 Number 1-6, 11-13.

Week 3: September 8, 10, 12

Separation of variables; Modeling; 1st Order Linear Equations

- 2.2 Number 1-29, 33-35.
- 2.3 Number 1-10.
- 2.4 Number 1-21, 29.

Week 4: September 15, 17, 19

Mixing problems; Electrical circuits; 2nd Order Linear Equations

- 2.5 Number 1-7, 9-10.
- 3.4 Number 1-19.
- 4.1 Number 1-20, 26-30.

Week 5: September 22, 24, 26

Homogeneous Equations; Harmonic motion; Inhomogeneous Equations: undetermined coefficients

- 4.3 Number 1-36.
- 4.4 Number 1-12, 14-16, 18.
- 4.5 Number 1-29.

Week 6: September 29, October 1, 3

Undetermined coefficients(continued); Inhomogeneous Equations: Variation of parameters; Forced harmonic motion

- 4.5 Number 1-29.
- 4.6 Number 1-10.
- 4.7 Number 3-11.

Week 7: October 6, 8

Midterm 1

Review for Midterm 1

Midterm 1 on Wednesday, October 8

Week 8: October 13, 15, 17

Laplace Transform

- 5.1 Number 1-29.
- 5.2 Number 1-41.
- 5.3 Number 1-36.

Week 9: October 20, 22, 24

Laplace Transform (cont.); Delta Function

- 5.4 Number 1-26.
- 5.5 Number 1-25.
- 5.6 Number 1-9.

Week 10: October 27, 29, 31

Convolutions; Systems of differential equations

- 5.7 Number 4-24.
- 8.1 Number 1-16.
- 8.2 Number 1-6, 13-16.

Week 11: November 3, 5, 7

System(continued); Qualitative Analysis; Planar systems

- 8.3 Number 1-6.
- 9.1 Number 1-8, 16-23.
- 9.2 Number 1-27, 58-61.

Week 12: November 10, 12, 14

Phase Plane Portraits; Nonlinear systems

- 9.3 Number 1-23.
- 10.1 Number 1-16.
- Review for Midterm 2

Week 13: November 17, 19, 21

Midterm 2; Fourier Series; Fourier Cosine and Sine Series

Midterm 2 on Monday, November 17

- 12.1 Number 1-22.
- 12.3 Number 1-32.

Weeks 14: December 1, 3, 5

Heat Equation; Separation of Variables

- 13.1 Number 1-9.
- 13.2 Number 1-18.

Review for the final on December 5

FINAL EXAM: TBA