

Class schedule: Math 2080 (honors), Spring 2019

Week 1: 1/7–1/11. Monday: Clemson 44, Alabama 16. Course overview, and three in-class lectures covering all of *Section 1: Introduction to Differential equations*. (YouTube Lectures 1.1–1.3.)

Week 2: 1/14–1/18. Three in-class lectures and one video covering *Section 2: First Order Differential Equations*, p.1–14: YouTube Lectures 2.1–2.4, Lecture 2.5 (0:00–30:24). HW 1 due Tuesday, HW 2 due Friday.

For Thursday: Watch *Lecture 2.3: Newton's 2nd law of motion* (19:35–27:22), and *Lecture 2.4: Solving 1st order inhomogeneous ODEs* (0:00–35:52). Quiz 1. Work on HW 2, HW 3 in class.

Week 3: 1/21–1/25. No class Monday (MLK Day). Two in-class lectures and one video covering *Section 2: First order Differential Equation*, p. 14–21: YouTube Lectures 2.5 (30:24–44:46), 2.6–2.8. HW 3 due Tuesday.

For Thursday: Watch *Lecture 2.7: Advanced mixing problems* (48 min). Quiz 2. Work on HW 4 in class.

Week 4: 1/28–2/1. Three in-class lectures covering *Section 3: Second Order Differential Equations*, p.1–11: YouTube Lectures 3.1–3.3. HW 4 due Monday, HW 5 due Friday.

For Thursday: Watch *Lecture 3.3: The method of undetermined coefficients* (0:00–38:26). Quiz 3. Work on HW 5, HW 6 in class.

Week 5: 2/4–2/8. Three in-class lectures covering *Section 3: Second Order Differential Equations*, p.11–21: YouTube Lectures 3.3 (38:26–54:39), 3.4, 3.5, 3.7. HW 6 due Tuesday, HW 7 due Friday.

For Thursday: Watch *Lecture 3.6: Variation of parameters* (41 min; not in lecture notes). Quiz 4. Work on HW 6, HW 7 in class.

Week 6: 2/11–2/15. MIDTERM 1 Thursday, covering sections 3.1–3.5 (i.e., HW 1–7). Two in-class lectures covering *Section 3: Second Order Differential Equations*, p.20–25: YouTube Lectures 3.8, 3.9 (0:00–8:45). HW 8 due Tuesday.

Friday: Class canceled. Instead, watch *Lecture 3.9: The method of Frobenius* (8:45–44:52).

Week 7: 2/18–2/22. Three in-class lectures covering *Section 4: Systems of Differential Equations*, p.5–13: YouTube Lectures 4.1–4.3, 4.4 (0:00–7:16). HW 9 due Tuesday, HW 10 due Friday.

For Thursday: Watch *Lecture 4.2: Eigenvalues and eigenvectors* (38 min). Quiz 5. Work on HW 10, HW 11 in class.

Week 8: 2/25–3/1. Three in-class lectures covering *Section 4: Systems of Differential Equations*, p.13–24. YouTube Lectures 4.4 (7:16–39:27), 4.5–4.7. HW 11 due Tuesday, HW 12 due Friday.

For Thursday: Watch *Lecture 4.6: Phase portraits with complex eigenvalues* (17:09–47:10). Quiz 6. Work on HW 12, HW 13 in class.

Week 9: 3/4–3/8. HW 13 due Tuesday. Three in-class lectures covering *Section 4: Systems of Differential Equations*, p.24–29 and supplemental material, and *Section 5: Laplace Transforms*,

p.1–7: YouTube Lectures 4.8–4.9 (coming soon), 5.1, 5.2 (0:00–32:38).

For Thursday: Watch *Lecture 5.1: What is a Laplace transform?* (3:00–28:10). Quiz 7 (Friday). Work on HW 14 in class.

Week 10: 3/11–3/15. HW 14 due Tuesday, HW 15 due Friday. Three in-class lectures covering *Section 5: Laplace Transforms*, p.7–17: YouTube Lectures 5.2 (32:38–57:52), 5.3–5.5.

For Thursday: Watch *Lecture 5.4: Periodic forcing terms* (40 min). Work on HW 15, HW 16 in class. Quiz 8.

SPRING BREAK: 3/18–3/22

Week 11: 3/25–3/29. HW 16 due Tuesday, HW 17 due Friday. Three in-class lectures covering *Section 5: Laplace Transforms*, p.18–21, and *Section 6: Fourier Series*, p.1-8, supplemental material. YouTube Lectures 5.6, 6.1, 6.2, 6.3 (0:00–20:22), 6.5 (14:42–24:45).

For Thursday: Watch *Lecture 6.2: Computing Fourier series* (27 min).

Friday: Work on HW 17, HW 18 in class. Quiz 9.

Week 12: 4/1–4/5. MIDTERM 2 Thursday, covering (i) power series solutions (approx. 20%), (ii) systems of ODEs (approx. 40%), and (iii) Laplace transforms (approx. 40%). HW 18 due Tuesday. Two in-class lectures covering *Section 6: Fourier Series*, 8-13, YouTube Lectures 6.3 (20:22–47:49), 6.4.

Friday: Class canceled. Instead, watch *Lecture 6.6: Boundary value problems* (39 min).

Week 13: 4/8–4/12. HW 19 due Tuesday, HW 20 due Friday. Three in-class lectures covering *Section 7: Partial differential equations*, p.1–14. YouTube Lectures 7.1–7.4, 7.5 (0:00–19:02).

For Thursday: Watch *Lecture 7.2: Different boundary conditions* (0:00–19:04), and *Lecture 7.3: The transport equation* (24 min). Work on HW 20 in class. Quiz 10.

Week 14: 4/15–4/19. HW 21 due Tuesday (extended to Friday), HW 22 due Friday. Three in-class lectures covering *Section 7: Partial differential equations*, p.14–23. YouTube Lectures 7.5 (19:02–24:35), 7.6, 7.7, and *Section 8: Systems of nonlinear differential equations*, p.3-6. YouTube Lecture 8.1 (16:47–30:03), 8.2 (0:00–18:57).

For Thursday: Watch *Lecture 7.7: The 2D wave equation* (26 min). Work on HW 21, 22 in class. Quiz 11.

Week 15: 4/22–4/26. HW 23 due Tuesday (extended to Friday), HW 24 due Friday. Four in-class lectures covering *Section 8: Systems of nonlinear differential equations*, p.1-2, 6-14. YouTube Lectures 8.1 (0:00–16:47), 8.2 (18:57–55:12), 8.3. Finished with 15 minutes to spare.