Physics 212 **Classical and Modern Physics** **Spring 2025**

Lecture Schedule and Reading Assignments

Reading assignments by default refer to your text *Essential University Physics*, by Wolfson. For example, "20.2" refers to Section 20.2 in Wolfson. When Section 1 is assigned, start at the beginning of the chapter. "Supplementary Reading" refers to the Physics 212 *Supplementary Reading* book. "Ex" refers to Example problems given in sections of the text and"CEx" refers to Conceptual Example problems in sections of the text. "Eq" refers to Equations, and "Fig" refers to Figures.

Unit 1: Electricity and Magnetism

- January 21, Tuesday

  Lecture 1: Electric Charges, Forces, and Fields
  Read: Chapter 20, through most of page 378 (up until "Continuous Charge Distributions")
  Study: Eqs 20.1, 20.2a, 20.2b, 20.3; Exs 20.2, 20.4, and 20.5

- January 23, Thursday

  Lecture 2: Electric Fields and Electric Flux
  Read: The rest of 20.4, 20.5 (stop at "Dipoles in Electric Fields" on p. 381), 21.1–21.3
  Study: Eq 20.7; Ex 20.7; Eqs 21.1, 21.2 and 21.3
  Skim: "Dipoles in Electric Fields" in Section 20.5

- January 28, Tuesday

  Lecture 3: Gauss's Law and the Electric Potential
  Read: 21.4–21.6, 22.1–22.2 through "Finding Potential Differences Using Superposition" (p. 421)
  Study: "Problem Solving Strategy 21.1" starting on p. 396, Exs 21.1, 21.3, 21.4, and 21.6; Eqs 22.1a, 22.1b, 22.3, 22.5; Exs 22.1, 22.5

- January 30, Thursday

  Lecture 4: Electric Current and Magnetic Forces
  Read: 24.1, 24.3–24.5, 26.1–26.4
  Study: Eqs 24.5, 24.7; Ex 24.4; Eqs 26.1, 26.5; Ex 26.1, CEx 26.1
  Ignore: "The Hall Effect" discussion in Sec. 26.4

- February 4, Tuesday

  Lecture 5: Motion in Magnetic Fields and the B-Field
  Read: 26.5–26.6
  Study: Eqs 26.7, 26.15, Exs 26.3, 26.4

- February 6, Thursday

  Lecture 6: Ampere's Law
  Read: 26.8
  Study: Eq 26.17; Exs 26.6, 26.7, 26.8; Fig 26.34

- February 11, Tuesday **Lecture 7: E&M Summary and Applications**
  No new reading.

- February 13, Thursday **TEST 1**

Unit 2: Induction, Waves, and Light

- February 18, Tuesday **Lecture 8: Faraday's Law of Induction**
  Read: 27.1–27.3, 27.6 (through p. 537)
  Study: Eqs 27.1a, 27.1b, 27.2; Exs 27.3, 27.5, 27.10
  Ignore: "Diamagnetism" in Section 27.6 (p. 538).

- February 20, Thursday **Lecture 9: Traveling Waves and Electromagnetic Waves**
  Read: 14.1–14.2 up to "The Wave Equation" (p. 254), 29.1–29.4 (through p. 569), 29.5–29.7
  Study: Eqs 14.1–14.3; Figs 29.7, 29.10
  Skim: The rest of 29.4

- February 25, Tuesday **Lecture 10: Phasors and Standing Waves**
  Read: 14.7–14.8; Supplementary Reading Ch 1.1–1.2
  Study: Ex 14.6; Supp Fig 1.4
  Ignore: Eq 14.13 (it's not wrong – just too specialized to be useful)

- February 27, Thursday **Lecture 11: Interference**
  Read: 14.6, 32.1–32.2; Supplementary Reading Ch 1.3
  Study: Exs 14.5; Supp Exs 1-3, 1-4

- March 4, Tuesday **Lecture 12: Diffraction and Diffraction Gratings**
  Read: 32.6; Supplementary Reading Ch 1.4–1.7
  Study: Figs 32.24, 32.26; Supp Exs 1-5, 1-6, 1-7

- March 6, Thursday **Lecture 13: Beyond Classical Physics: Photons and Wave-Particle Duality**
  Read: Supplementary Reading Ch 2

- March 11 & 13 **SPRING BREAK**

- March 18, Tuesday **Lecture 14: Induction, Waves and Photons: Summary and Applications**
  No new reading.

- March 20, Thursday **TEST 2**

Unit 3: Quantum Mechanics

- March 25, Tuesday — **Lecture 15: Waves, Probability and Uncertainty**
  Read: Supplementary Reading Ch 3
- March 27, Thursday — **Lecture 16: Quantized energies and spectra**
  Read: Supplementary Reading Ch 4
- April 1, Tuesday — **Lecture 17: Quantum States and Spin**
  Read: Supplementary Reading Ch 5
- April 3, Thursday — **Lecture 18: Quantum Statistics and Applications**
  Read: Supplementary Reading Ch 6
- April 8, Tuesday — **Lecture 19: Three-Dimensional Wavefunction and Semiconductors**
  Read: Supplementary Reading Ch 7
  Skim: Section 7.5.1
- April 10, Thursday — **Lecture 20: Quantum Entanglement**
  Read: Supplementary Reading Ch 8
- April 15, Tuesday — **Lecture 21: Quantum Mechanics Summary**
  No new reading.
- April 17, Thursday — **TEST 3**

Unit 4: Particle Physics and Cosmology

- April 22, Tuesday — **Lecture 22: Elementary Particles and Conservation Laws**
  Read: Supplementary Reading Ch 9
- April 24, Thursday — **Lecture 23: Fundamental Forces and Interactions**
  Read: Supplementary Reading Ch 10
- April 29, Tuesday — **Lecture 24: Diagrams, Decays, and Lifetimes**
  Read: Supplementary Reading Ch 11
- May 1, Thursday — **Lecture 25: Cosmology**
  Read: Supplementary Reading Ch 12
- May 9, 3:30-6:30 pm — **FINAL EXAM**