

**General features:**

- The official book is “*Advanced Engineering Mathematics*” by E. Kreyszig, (Wiley, a special custom USC edition). The book “*Mathematics of Physics and Engineering*” by Edward K. Blum and Sergey V. Lototsky, World Scientific, 2006, can also work and is strongly recommended.
- 11 homeworks (due on most Tuesdays) 15% total.
- 10 quizzes (on most Thursdays): 15% total.
- Two computer projects (due Friday, October 23 and Wednesday, December 2): 10% each.
- 1 midterm (WEDNESDAY, OCTOBER 14): 15%.
- 1 comprehensive final exam (FRIDAY, DECEMBER 11): 35%.

AUGUST 24. Vectors.

AUGUST 25. Vectors.

AUGUST 26. Curves.

AUGUST 27. Vectors and curves.

AUGUST 28. Applications to mechanics.

AUGUST 31. Differentiation of functions of several variables.

**September 1.** Differentiation of functions of several variables. HW1 due.

SEPTEMBER 2. Integration of functions of several variables.

**September 3.** Integration of functions of several variables. QUIZ 1.

SEPTEMBER 4. The three theorems.

**September 7.** *Labor Day, no class.*

**September 8.** Integration of functions of several variables. HW2 due.

SEPTEMBER 9. Examples.

**September 10.** Examples. QUIZ 2.

SEPTEMBER 11. Curvilinear coordinate systems.

SEPTEMBER 14. Algebra of complex numbers.

**September 15.** Complex numbers. HW3 due.

SEPTEMBER 16. Functions of a complex variable.

**September 17.** Functions of a complex variable.. QUIZ 3.

SEPTEMBER 18. Two theorems of Cauchy.

SEPTEMBER 21. Conformal mappings.

**September 22.** Conformal mappings. HW4 due.

SEPTEMBER 23. Series of complex numbers.

**September 24.** Series of complex numbers. QUIZ 4.

SEPTEMBER 25. Taylor and Laurent expansions.

SEPTEMBER 28. Residue integration: theory.

**September 29.** Computing residues. HW5 due.

SEPTEMBER 30. Residue integration: examples.

**October 1.** Residue integration: examples. QUIZ 5.

OCTOBER 2. Series solution of ordinary differential equations.

OCTOBER 5. Different ways a series of functions can converge.

**October 6.** Different ways a series of functions can converge. HW6 due.

**October 7.** Fourier series.

**October 8.** Fourier series. QUIZ 6.

OCTOBER 9. Computing the Fourier series.

OCTOBER 12. Midterm review.

**October 13.** Midterm review. HW7 due.

**October 14.** Midterm Exam. Covers what we did so far.

OCTOBER 15. Discuss the midterm exam and the first project.

OCTOBER 16. Discuss the midterm exam and the first project.

OCTOBER 19. Fourier transform.

OCTOBER 20. Fourier transform.

OCTOBER 21. Computing the Fourier transform.

OCTOBER 22. Computing the Fourier transform.

**October 23.** Discrete Fourier transform. Project 1 is due.

OCTOBER 26. Laplace transform and  $z$  transform.

**October 27.** Examples. HW8 due.

OCTOBER 28. Classification of PDEs.

**October 29.** Classification of PDEs. QUIZ 7.

**October 30.** The transport and heat equations on the line.

NOVEMBER 2. The heat equation on the interval.

**November 3.** The heat equation on the interval. HW9 due.

NOVEMBER 4. Separation of variables and variation of parameters.

**November 5.** Examples. QUIZ 8.

NOVEMBER 6. Wave equation on the line and on the interval.

NOVEMBER 9. Wave equation in 2 and 3 dimensions.

**November 10.** wave equation. HW10 due.

NOVEMBER 11. Laplace's and Poisson's equations.

**November 12.** Laplace's and Poisson's equation. QUIZ 9.

NOVEMBER 13. A planar membrane. DROP DAY.

NOVEMBER 16. Bessel's functions.

**November 17.** Bessel's functions. HW11 due.

NOVEMBER 18. Numerics for the heat equation.

**November 19.** Numerics for the heat equation. QUIZ 10.

NOVEMBER 20. Numerics for the wave equation.

NOVEMBER 23. Numerics for the Laplace equation.

NOVEMBER 24. Numerics.

NOVEMBER 25. The telegraph equation.

*November 26, 27. Thanksgiving, no classes.*

NOVEMBER 30. Maxwell's equations.

DECEMBER 1. Maxwell's equations.

**December 2.** Schrodinger's equation. Project 2 is due.

DECEMBER 3. Schrodinger's equation/Final review.

DECEMBER 4. Final review.

**Monday, December 14.** Final Exam, 11am–1 pm.

Covers everything we studied. Contributes 35 percent to the final grade.