

Physics 500: Mathematical Methods of Physics
Math 594: Advanced Methods in Applied Mathematics

Topics to be covered

1. Vector Spaces
2. Linear Algebra
3. Computation of Eigenvalues and Eigenvectors
4. Partial Differential Equations of Physics and Engineering
5. Boundary Value Problems
6. Sturm-Liouville and Spectral Theory
7. Differential Operators and Green's Functions
8. Orthogonal Functions
9. Generating Functions
10. Contour Integration
11. Fourier and Laplace Transforms
12. Asymptotic Expansions of Integrals and Special Functions
13. Introduction to the Representation Theory of $SO(3)$
14. Tensors and Vectors

Prerequisites: Math 241 or Instructor's Permission

Text: "Mathematical Methods for Scientists and Engineers", by McQuarrie Recommended: "Fourier Series", by G.P. Tolstov and "Complex Variables" by S.D. Fisher, "Mathematical Methods for Physicists", by George Arfken, and "Mathematical Methods of Physics", by Jon Mathews and Robert Walker.

Homework & Exams: Homework will be assigned weekly and will be due the following week. There will be one midterm and a final exam.

Grading Policy Your final score for the course is out of 100 points. The weekly homework assignments are worth 50 points, the midterm is worth 20 points and the final exam is worth all the remaining points. That is, if you get 40 points on the homework and 15 points on the midterm, your final exam will be worth 45 points. Because of this grading policy, **homework will not be accepted late** and will be due **before** class starts. There will be roughly 10 homework sets.