

P4820 Mathematical Physics II

Outline

Calendar Entry: covers topics on partial differential equations of Mathematical Physics and boundary value problems; Sturm-Liouville theory, introduction to the theory of distributions, Dirac delta function, Laplace and Fourier transforms, Green's functions, Bessel functions, Legendre functions, spherical harmonics, and other topics such as group theory.

Text: Mathematical Methods for Physicists: Arfken, Weber & Weber
Reference: Mathematics for Physicists: Susan M. Lea

- Laplace Transforms: Arfken chapters 15.8-15.12
 - Definition/properties
 - Solving differential equations
 - Convolution
 - General inversion
- Generalised Functions: Arfken chapters 1.15, 5.5, 15.1, 10.5
 - Delta function
 - Theory of distributions
- Sturm-Liouville Theory: Arfken chapters 10.1-2, 10.3?, 10.4-5
 - Spherical harmonics
 - Bessel functions
 - Orthogonal polynomials
 - Green's Function
- Fourier Series Applications: Arfken chapters 14.1-14.5
 - Fourier's Theorem
 - Coefficients
 - Sine and Cosine Series
 - Solving Differential Equations
 - Convergence

Physics 4820

Mathematical Physics II

Winter 2019

Dr. Len Zedel, room C-4066

Evaluation Scheme

NO SUPPLEMENTAL EXAM!

Assignments (FOUR)	40%
Mid-Term Exams (TWO)	25%
Class Presentation	5%
Final Exam (2 Hour)	30%

Tentative Schedule

Assignment 1, assigned January 16, Due January 28
Mid-term Exam 1: February 4
Assignment 2, assigned February 6, Due February 13
Mid-term Break: No classes Feb. 18 to Feb. 22
Assignment 3, assigned March 1, Due March 8
Mid-term Exam 2: March 13
Class Presentation, March 15
Assignment 4, assigned March 22, Due March 29
Last Lecture: April 3

Class Presentation: provide a 5-10 minute presentation to the class reporting on an interview with some industry/government researcher using math for physical applications.