Mathematical Methods of Physics
MA/PHY507
Spring 2018

Instructor   P. D. Hislop, Mathematics

Office: 753 POT
7-5637 or hislop@ms.uky.edu

Text: Arfken, Weber, and Harris: *Mathematical Methods for Physicists*
Elsevier, seventh edition (available free from Science Direct)

Class Meetings: MWF 12:00–12:50 CB 339

Course Web Page: $http://www.ms.uky.edu/ \sim hislop/$, find homework and comments there

Office Hours: M 4:00-5:00 and F 3:00-4:00 and by appointment

The purpose of this two semester course (506 and 507) is to develop a collection of mathematical methods useful in solving physical problems in fluids and mechanics, electricity and magnetism, and quantum mechanics. We will cover ordinary differential equations, linear algebra, partial differential equations, special functions, and complex variable theory. In MA/PHY 507, we'll begin by studying complex variable theory. The goal is the residue theorem. We'll then go to PDEs and study the three basic types: wave, heat, and Laplace's equations. We'll solve boundary value problems for Laplace's equation by separation of variables. This will lead us back to special function theory. We'll develop eigenfunction expansions, Green's functions, and Fourier transforms. If we have time, we will study some group theory.

Grading Policy There will be 10 homework sets collectively worth 33 1/3% of the course grade, one in-class hour exam worth 33 1/3 %, and an in-class final exam worth 33 1/3 %. Letter grades will be assigned on the standard scale: A: 90 and above; B 80–89; C: 70–79. You may discuss the homework problems, but each student is expected to write the solutions individually. Homework will be assigned at least one week before it is due.

Course Content

This course will have three units:

- Unit 1: Complex Variables, Chapter 11.

- Unit 2: Partial Differential Equations, Chapters 9 and 10.

- Unit 3: Special Functions, parts of Chapters 14, 15, and 18.

- Special Unit (time permitting): group theory, Chapter 17.

Special Dates for Spring 2018

15 January	M. L. King, Jr. Holiday-No classes
17 January	Last day to add a class
31 February	Last date to withdraw with no grade
5 March	Midterm of Spring 2018 Semester
7 March	Target date for Exam 1, in class
12–17 March	Spring Break
30 March	Last day to withdraw and receive a W grade
27 April	Last day of classes
30 April	Final Exam 8:00 AM – 10:00 AM in classroom