

Mathematical Methods of Physics  
MA/PHY507  
Spring 2016

Instructor	P. D. Hislop, Mathematics
Office:	753 POT 7-5637 or hislop@ms.uky.edu
Text:	Arfken, Weber, and Harris: <i>Mathematical Methods for Physicists</i> Elsevier, seventh edition (available free from Science Direct)
Class Meetings:	MWF 12:00–12:50 CB 306
Course Web Page:	<a href="http://www.ms.uky.edu/~hislop/">http://www.ms.uky.edu/~hislop/</a> , find homework and comments there
Office Hours:	MW 3:00-4:00

The purpose of this two semester course 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 and Green's functions. 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 2016**

18 January	M. L. King, Jr. Holiday-No classes
20 January	Last day to add a class
3 February	Last date to withdraw with no grade
9 March	Target date for Exam 1, in class
7 March	Midterm of Spring 2016 Semester
13–19 March	Spring Break
1 April	Last day to withdraw and receive a W grade
29 April	Last day of classes
4 May	Final Exam 1:00 PM – 3:00 PM in classroom