

**Physics 270 – Mathematical Methods – Spring 2006**  
**Course Information**

**Instructor:** John Caraher  
**Office:** 234 Julian  
**Office Hours:** M 1-2, 3:15-5, W 11-12, 3:15-5, F 1-2  
(and by appointment and anytime my office door is open!)  
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**Required Text:**

Mary L. Boas, **Mathematical Methods in the Physical Sciences**, 3rd Edition, Wiley, 2006 ISBN: 0-471-19826-9

**Additional Texts:**

Sadri Hassani, **Mathematical Methods for Students of Physics and Related Fields**, Springer, 2000, # ISBN: 0387989587

Very similar in scope and level to Boas. A nice alternative presentation of the same material (in a different order). If you enjoy reading historical asides you definitely ought to check this out. One copy will be on reserve at the Prevo Science Library.

George B. Arfken, Hans J. Weber, **Mathematical Methods for Physicists**. Academic Press; 5 edition, 2000, ISBN: 0120598256

A fairly standard, more advanced treatment. This is the level at which you'll be expected to operate if you become a physics graduate student. Fairly encyclopedic; some students find it difficult to learn from but a fine reference.

**Course Overview and Objectives:**

I intend to cover virtually all of chapters 2-8 this semester. Not all chapters are created equal; the linear algebra and differential equations chapters will be the most time-consuming during the course.

While mathematical rigor is important in its own right, my emphasis will be less on proofs and justifying the techniques than on developing familiarity with *how* to apply the material. Consequently, if you are a math major you may find my presentation dissatisfying – full of unjustified leaps, glossing over details, etc. If so, you should look at the number of full courses offered in mathematics corresponding to various chapters we shall cover and recognize that something has to give way! I therefore make no apology for teaching this as a physicist and not as a mathematician.

By the end of this course, you should be comfortable manipulating complex numbers expressed in a variety of forms, conversant in basic techniques of linear algebra, fluent in the language of multivariable calculus including partial derivatives and multiple integrals, familiar with vector analysis, knowledgeable about the principles of Fourier analysis and well-acquainted with commonly-used techniques for solving ordinary differential equations.

### **Homework:**

Homework will be collected regularly, at least once a week, possibly every class meeting. This will be your chief learning opportunity, and it will be important to keep up. Each problem will be worth ten points, and late homework will generally receive zero credit. In determining your final homework grade, I will drop your lowest scores in a quantity equivalent to one week's worth of problems. Your overall homework grade will count as 25% of your course grade.

I encourage collaborative work on all your assignments, provided you are intellectually engaged in the solution of **each** problem. You may **not** simply copy someone else's solution, which means you may not work in a group by subcontracting a different problem to each group member. You will not learn effectively by copying answers – you lose the opportunity not only to think for yourself but also to obtain my feedback on your thinking. Moreover, presenting someone else's work, even on a homework problem, as your own constitutes *academic dishonesty*. I am obliged to follow up on any suspicions of such according to the procedure outlined in the *Academic Handbook*.

### **Exams:**

I plan to give two exams during the semester in addition to the final exam. The first exam will follow completion of Chapter 3 and the second exam will follow Chapter 6. The exact dates will be determined later, but I expect them to be around March 6 and April 10, respectively. You'll have at least one week of advance notice. The final exam will not be cumulative; it will simply cover material since the second exam. Each exam, including the final, will be worth 25% of your final course grade.

Please provide me advance notice if you anticipate a problem taking an exam at the scheduled time and place. Make-up exams will not be given except in extraordinary circumstances, and at my sole discretion.

### **Final Exam: Tuesday, May 16, 8:30-11:30 AM**

### **Grading:**

Your course grade will be determined by the percentage of total possible points, weighted by category. The letter grade earned by your weighted percentage will be:

A	>93%	A-	>90%	B+	>88%	B	>83%
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B-	>80%	C	>73%	D+	>68%	D-	>60%
C+	>77%	C-	>70%	D	>63%	F	>0%

I *may* award grades higher than the ones listed. My **only** guarantee to you is that you will not receive a grade lower than the ones listed above for a given percentage. ***I will not change final grades unless I have made a clerical or arithmetic error in determining your final score. I will NOT reconsider a decision to award grades on the basis of the scale given above.***