

# PHYSICS 5401 Mathematical Methods in Physics I ( and PHYSICS 5425, Mathematical Physics)



Fall Semester 2004  
4 Credit Hours

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[Assignments](#)

[Reading](#)

[Class Notes](#)

[Calendar](#)

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*Schedule:* 7:00pm-8:45pm, Tuesdays and Thursdays

*Location:* SETB 1.350 and video

*Instructor:* [Richard Price](#)

*E-mail:* [rprice@phys.utb.edu](mailto:rprice@phys.utb.edu)

*Office:* SETB 1.354

*Phone:* (956) 882-6648

*Office Hours* 4:30pm-7:00pm T and Th

*Assistant at UTD:* Doug Vanesko

*Phone:* (214) 738-8864

*E-mail:* [vanesko@student.utdallas.edu](mailto:vanesko@student.utdallas.edu)

*Office:* FO1.426

*Office Hours* Tuesday 5-6 pm; Thursday 5-6:30 pm

*Assistant at UTB:* Rajesh Nayak

*Phone:* (956) 882-6762

*E-mail:* [rajesh@phys.utb.edu](mailto:rajesh@phys.utb.edu)

*Office:* SETB 3.202

*Text:* "Mathematical Methods for Physicists" by Arfken and Weber. The 6th edition is preferred, but the 5th edition is acceptable.

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## **Pedagogical Approach**

The goal is to give you the ability to use advanced mathematics to solve problems. There will be little in the way of theorems and proofs. There will be a lot in the way of examples and problem solving. I do not intend to read the book to you, i.e., to repeat material that is presented in the book and is explained sufficiently clearly. This is why there is so much emphasis (see below) on the importance of reading the book. I will discuss material in the book that I judge to be unclear, but you may be a better judge of this than I am. You should therefore ask questions and ask for clarification. You can do this in class, or you can do it by email. By email you could point out that some section is confusing, and you could suggest that I discuss it in class. To give you a deeper and broader understanding of the material, I will also present another view of some subject, or add a small amount of material.

## **Communications**

struggle with your question on your own for a while, but there is no point in wasting a large amount of time with the struggle. Electronic mail makes it possible for you to get rapid answers to your questions. I am rarely away from email, and I will give high priority to answering student questions. But you *must* make the question clear. If I am not sure of what you are asking I won't give an answer. An answer to a misunderstood question can create complete confusion. If I do not understand your question, therefore, I will tell you that I don't understand it, or I am not sufficiently sure of what you are asking. It might be useful for the whole class to know of your question, and of the answer. I will assume that you do not object to sharing your question and the answer with everyone, via email. If you prefer to remain anonymous I will honor that.

A second way of communicating is through the course website. The website will contain homework assignments and solutions. Notification (e.g., an error in an assignment) will be done through email and, where appropriate, through the course website. *You will be responsible for checking your email frequently and the course website for assignments and announcements.*

### **Curriculum Coverage and Reading**

The material covered will be that which is traditional for Physics 5401, the material in Chaps. 1 through 7 in the text. We will not cover every section, and we will not give equal emphasis to the sections covered. Due to the special nature of the course, and to the fact that it is a graduate course, I will not assign the whole semester's reading at the outset. On the reading webpage you will see a good guide to the topics to be covered, and the approximate pace at which they will be covered. You will also see the reading assignment for the next few classes, along with some "advice" (e.g., read quickly -or- read carefully). I will continue to use this style of reading assignment so that we can maintain a tight integration of the reading and the classes. You *must* read the assigned reading before class. The lectures are based on the assumption that you have done the reading. If you have not done the reading, then you may have a hard time following the lectures. The style of "just in time" reading assignments, discussed in the last paragraph, is meant to make the reading efficient. Please be sure to do the reading!

### **Homework**

Homework is probably the most important element in this course (and in many other courses). The homework sets will consist of problems of very different difficulty, and of very different length. A different number of points will be assigned to problems to reflect the different amount of effort required. On the homework, as on the exams, the grading philosophy will be based on how much progress is made toward a correct solution. Simply rewriting the problem is zero progress. Also, a great deal of work on a fundamentally incorrect solution is zero progress; there will be no points for the sheer bulk of your work. Another element of the grading philosophy is clarity. If we can't read it, you can't get any points for it. One way to improve the clarity of your solutions is to use words. A homework solution must not consist only of mathematical expressions; you *must* explain what you are doing. Some problems require more explanation than others. You will be the judge of how much explanation is needed. (We, of course, will be the judges of how successful you have been.)

Some of the homework problems will ask you to prove something, or to "show" something. In such problems you should be especially careful about explaining what you are doing. You are not prohibited from working with other students on homework. Quite to the contrary, students are encouraged to work together. But the work you hand in must be your own work, not a

for the solution from another student, but not the words and symbols. The following criterion can help you distinguish between acceptable and unacceptable collaboration on the homework: In an oral exam, could you explain and defend your solution? Homework will be due on Thursdays, except for the last assignment. There will be no homework due on the Thursdays of exams. Homework is due at the *begining* of class on the due date. For homework that is late by one class, the grade is reduced to 70% of what it would have been. No homework is accepted later than one class after the due date. A new rule, added Sept 16: Starting with assignment 5, each student is limited to 2 late homeworks. Once a student has turned in 2 assignments after the due date, no further late assignments will be accepted.

### **Basis for Grade**

The special logisitical nature of this course means that certain details must be tentative. The *tentative* basis for your grade will be: Homework -30%; Midterm exams - 20% for each of two; Final exam -30%. There is a possibility that this will be slightly altered. A few points may be taken from each of the previous elements of grading and an additional element may be added: quizzes to help motivate you to keep up with the reading. We shall see. Note added in September: Quizzes will indeed count for 10% which means (yes, I know) that you will have 110% of a grade. The first midterm will include an oral component. At the end of the semester a final "index" will be constructed for each student based on the weighting announced. Your grade will then be mapped into a final letter grade for the course. That mapping will be partly based on absolute standards for mastery of the material, and partly on a student's performance relative to the class.

### **Information for UTB Students with Disabilities**

Students with disabilities, including learning disabilities, who wish to request accommodations in this class, should notify the Disability Services Office early in the semester so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodations must provide documentation of his/her disability to the Disability Services counselor. For more information visit Disability Services in the Lightner Center, call 956-882-7374 or e-mail [DisabilityServices@utb.edu](mailto:DisabilityServices@utb.edu)