

## Course Policy Statement

SP352 Spring 2013

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course webpage: <http://usna.edu/Users/physics/mungan/Courses/SP352.html>

### Course Objectives

To introduce advanced mathematical topics of special relevance to Quantum Mechanics, Electricity & Magnetism, and Statistical Mechanics.

### Syllabus

1. Vector Spaces (VS)
2. Fourier Series (FS)
3. Multipole Expansions (MP)
4. Laplace Equation (SL)
5. Dirac Delta (DD)
6. Fourier Transforms (IT)
7. Hermite Functions & Quantum Oscillators (Hn)
8. Operators (VSM)
9. Rotational Transformations (LT)
10. Probability & Statistics (CPS)
11. Exponential Integrals (DEI)

### Readings

The primary materials for this course are handouts (abbreviated “HO”) posted on the web. There is at least one HO per topic in the syllabus above, as listed in parentheses above. You are responsible for printing out and reading these materials as we come to them in class. Most of the handouts have a set of problems at the end of them, many of which will be assigned for homework.

### Homework

Assignments will be posted to the web regularly. These assignments are critical to learning the material being presented in class. You are encouraged to work with each other on these problems. However do not make a practice of copying someone else’s work, as you will be shortchanging your learning process. Your submissions should be neat, legible, and well organized. I strongly suggest you work on scrap paper before attempting to write up a final solution. (I always do this myself. Even when I think I have it all figured out, I still end up needing to rewrite it in a more organized fashion.) Solutions must include appropriate vector notation and units. The goal is to develop understanding, not just get some final answer. There will be deductions for late submissions. In particular, the maximum possible score is 50% after I have posted the solutions.

You are not permitted to use calculators on tests. Therefore you should not use calculators on homework. Some problems however use computer software—specifically we will use Excel and Mathematica (and occasionally the free web version of Mathematica known as WolframAlpha). Be sure you have Excel and can access <http://www.wolframalpha.com> from your room; installing Mathematica from <http://intranet.usna.edu/IRC/software/softwareList.htm> would also

be very helpful, but failing that it is available on the two Windows machines in the PI room. You are exhorted to develop your own mental insights and intuition rather than depending on electronic aids.

You are highly encouraged to come in for EI but please avoid trying to do the whole problem in my office. Tempting though it may seem to have me shepherd you through every step, in the long run you will be much better equipped if you form study groups, tolerate a bit of fumbling and frustration, and learn from your false starts and oversights. Do not expect to solve a tough problem in 5 minutes; chip away at it doggedly. My schedule is outside my office door and on the web. I prefer you to make an appointment to guarantee I will be in, but you should feel free to walk into my office anytime I am there. I will try to accomodate requests for EI on weekends or evenings, so if you want it, ask for it. Please come to EI prepared with specific questions.

### **Tests**

There will be 3 semester tests, in advance of the 6, 12, and 16 week marks, in addition to the final exam. No gouge sheets will be permitted and they will not be curved, as you are expected to memorize and master the core concepts needed for your concurrent and future physics courses.

### **Grades**

Homework Assignments: 1.5 points each

In-Class Tests: 10 points each

Final Exam: 20 points

Your grade at any time equals total points earned divided by maximum points available. Points earned on any item equals your fractional score on that item times the points that item is worth. You can get a bonus added to your grade of up to 6% at 16 weeks (2% at 6 weeks and 4% at 12 weeks) based on coming in for EI, participating in class, and otherwise demonstrating regular effort and engagement. I will call on individuals by name regularly and keep track of how you answer, so please engage in class; I also keep records of office visits, so please come by.

I anticipate assigning 13 HW sets, in which case your course grade will be 28% homework, 43% in-class tests, and 29% the final exam. If you do well on homework and it accurately represents your own understanding, you will do better on the tests and hence in the course; so concentrate your efforts on reading the handouts and on doing homework!

I use email and the course webpage to communicate with the class often. Please check them regularly and keep copies of messages as I do not tend to send reminders.