

Physics-050: Modern Physics ... Spring 2015

Instructor: Dr. Klaus Bartschat
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Office Hours: MWF 10 a.m. – 11 a.m., Friday 3:30 p.m. – 5:00 p.m.

Time: MWF 11:00 a.m. – 12:10 p.m.

Text: "Modern Physics", R.A. Serway, C.J. Moses and C.A. Moyer; 3rd edition
Cengage Learning (2005)

ISBN: 978-0-534-49339-4

1) Contents: (Subject to revision; we may select among the later topics)

Ch. 1+2	Review: Relativity Theory (see PHY-005)
Ch. 3	The Quantum Theory of Light
Ch. 4	The Particle Nature of Matter
Ch. 5	Matter Waves
Ch. 6	Quantum Mechanics in One Dimension
Ch. 7	Tunneling Phenomena
Ch. 8	Quantum Mechanics in Three Dimensions
Ch. 9	Atomic Physics
Ch. 10	Statistical Physics
Ch. 11	Molecular Structure
Ch. 12	The Solid State
Ch. 13	Nuclear Physics
Ch. 14	Nuclear Physics Applications
Ch. 15	Elementary Particles
Ch. 16	Cosmology (see PHY-005)

2) Desired Outcomes: The principal objective of this course is to finish your first run (at university level, calculus-based) through the basic topics of physics. As usual in classes for physics majors, the development of problem solving skills (using both paper and a computer) will be emphasized.

3) Study Tips: As a full-time student, one may expect you to spend 40 hours a week on being just that (a full-time student). If you signed up for 16 credit hours of courses and put the same amount of effort into each, it will only take $16 \times 50 \text{ (min)} / 60 \text{ (min)} = 13 \text{ hrs} + 20 \text{ mins}$ per week to attend all your classes. In other words, *you could (and should!) spend twice as much time outside the classroom on a course as you do inside the classroom.* Given that this particular course may be one of the more difficult ones you take this semester, you might want to make adjustments (probably upwards). *So: Please read ahead, come prepared to class, and do problems, problems, and problems, ... Also, please ask if you need clarification or help!*

4) Class Tests:

There will be two tests during the term and one final exam. The dates for the tests are:

Test 1: Friday, March 13, 2015

Test 2: Friday, May 1, 2015

Final Exam: Tuesday, May 12, 2013, 9:30 a.m. – 11:20 a.m.

Exams will be graded on a relative scale, i.e., the percentages required for a particular grade will depend on the level of difficulty.

NOTE: There will be no make-up exams! If you miss a class a test, a grade of F will be assigned, except if you can provide a medical certificate showing your inability to take the test at the scheduled time. In that case, the test will be replaced by an **oral examination**.

5) Homework: It has become very easy to obtain the solutions from the internet. I will generally recommend problems for the individual chapters that you should try to solve on your own and let me know if you have trouble. Some of these problems will also be discussed during class time, and I might ask you to show what you did and how far you got. I may also hand out problems that are not in the book as well as computer projects. A few problems and projects will have deadlines. If a due date for those assignments is missed, every day late will result in subtracting 20% of the maximum possible number of points. For example, if your work is worth 42 points out of a maximum of 50 points but handed in two days late, you will only be credited 22 points (namely $42 - 40\% \text{ of } 50 = 42 - 20 = 22$).

6) Overall grading: The total grade for the course will consist of:

<u>item</u>	<u>relative weight</u>
two term tests	25% each
final exam	35%
homework, computer projects	15%

For each individual item, you will receive grades including (+) and (-), and the final grade will be calculated as the weighted average of the individual performances. It will then be rounded off to the nearest full grade.

NOTE:

a) Homework and computer grades cannot lead to a better final grade than your best test grade! For example, if your homework and computer projects are all A's, but all your tests are D's, you will get a D rather than a C in this course.

b) Purely mathematical schemes like the one outlined above will generally yield a good estimate of the final grade. Nevertheless, there may be exceptions, such as having a very good or very bad day on an exam. The final result may deviate from the above estimate by a grade (up or down) if special circumstances seem to warrant it.

7) Academic Dishonesty:

Any incidence of academic dishonesty will result in a failing grade. Furthermore, any such incident will be reported to the dean of the student's college, for possible further penalties.