

Description: This 3 credits course is designed primarily for engineering students. The lectures will cover selected materials from the text on the fundamentals of modern physics, according to the schedule below.

Prerequisites: PHYS270 and PHYS271 (formerly: PHYS263) or PHYS273; and MATH246.

Lectures: Mondays and Wednesdays 4-5:15pm in Physics Building – Room 0405.

Lecturer: Prof. B. L. Hu Office: Z-4209, Phone: 301-405-6029, Email: blhu@umd.edu

Office hours: M,W 5:15-6pm or email me hubeilok@gmail.com for individual appointments.

TA: Mr. Lu, Zhixin. Office: Z-0220, Phone: 301-405-5969, Email: zhixinlu@umd.edu

Textbooks Required: “Modern Physics” by Serway, Moses and Moyer, 3rd Edition, Thomson, Brooks, Cole 2005. ISBN 0-534-49339-4. The book may be downloaded electronically from:

<http://www.cengagebrain.com/tl1/en/US/storefront/chapters?cmd=catProductDetail&ISBN=9780534493394>. (the first chapter is free)

Reading: The approximate progression of topics can be found in the Course Schedule for the planned topic(s) for each lecture. The schedule may lag or advance by one lecture if some topics take more or less time than expected. To enhance your comprehension of a particular subject to be covered, you *should try to read the material in the text before coming to the lecture*. This will enable you to ask questions about ideas you may not be able to grasp fully on the first reading and to gain a better overall perspective. Read it again after the lecture, study the examples and do the assigned problems. I encourage questions in class (to the extent time permitting) – this could stimulate thoughts and discussions.

Course webpage on the ELMS (Blackboard) system: Go to <http://elms.umd.edu> and log in with your username (your campus “Directory ID”) and password, you should see the course listed in the “My Courses” panel. Check this regularly for assignments, due dates and up-to-the minute announcements.

Homework: 9-10 sets of homework problems are planned, counting 20% towards your course grade.

Check webpage for updated assignments and due dates, revised schedule or problem sessions. They are to be worked out and handed in at the beginning of classes on the due dates. No late homework will be accepted. I encourage group discussions but stress strongly the importance of thinking through and working out the problems on your own. *Don't rely on others' help or just passively read the solutions*. It makes a real difference in your grasp of the subject matter and it shows in your examination performance.

Mid-Term Exams: Two 75-minute closed book mid-term exams are scheduled on **October 10 (Mon) and Nov. 14th (Mon) during the lecture periods**. Each exam covers the material assigned since the previous one, and is likely to contain one or more problems based on the assigned homework problems. Each exam counts 25% towards your course grade. If you cannot take an exam (only for certified medical and duty-related reasons, as stipulated in the University Rules), please notify me well in advance or at the earliest possible time. It is unlikely that I would prepare a different exam just for you to take on a different date.

The Final Exam, comprehensive, is worth 30% of the course grade. It is on **Wednesday, December 21, 2011, 1:30-3:30 pm**, in a room to be announced. You must take the final exam to receive a course grade.

Exams are meant to test your understanding and ability to apply concepts covered in the course, not how well you can memorize the materials. You may bring one 4x6” index card to the first exam, with equations written on it. Keep this card and prepare another one for the second exam. You are allowed a third card or a full sheet of paper (in lieu of the cards) to the final exam. The value of any constants will be provided. You will need a calculator with standard trigonometry functions, etc.

Academic dishonesty is a serious violation and will be dealt with strictly, according to University policy.

Course Grade: Your course grade is made up with the composition of 20% homework, 25% for each of the two mid-term exams, and 30% from your final exam scores.

PHYSICS 420 CONTENTS and SCHEDULE Fall 2011 Prof. B. L. Hu

Lectures: Week/Date	Readings: Chapters in <i>Serway, Moses and Moyer</i> , 3rd ed 2005	Topics: [<i>schedule subject to revision</i>]	Homework # Due date
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1,2	8/31, 9/7	Chap 1 Relativity, Lorentz Transformations, Spacetime	#1 9/12
3	9/12,14	Chap 2 Relativistic Energy and Momentum	#2 9/19
4	9/19,21	Chap 3 Quantum theory of light, blackbody radiation, Compton scattering, photoelectric effect	#3 9/26
5	9/26,28	Chap 4 Particles	#4 10/3
6	10/3	Chap. 5 Review of Wave Phenomena	10/5 Review for Midterm I

October 10 (Monday) Exam I: Chapters 1-4

	10/12	Chap. 5 : Wave-Particle duality	
8	10/17	Chap 5, 6 Quantum Mechanics in One Dimension	#5 10/24
	10/19	Chap 6 Quantum Oscillators, Particles in a Box	
9	10/24	Chap 6 Quantum Mechanics in One Dimension	#6 10/31
	10/26	Chap 7 Tunneling and Reflection	
10	10/31	Chap 7 Tunneling and Reflection	#7 11/7
	11/2	Chap 8 Two dimensional particle in a box	
11	11/7	Chap 8 Hydrogen Atom	11/9 Review for Midterm Exam II

November 14 (Monday) Midterm Exam II (Chap. 5-7)

	11/16	Chap 9 Atomic Structure	#8 11/21
13	11/21	Chap 9 Atomic Structure	#9 11/28
	11/23	Chap 10 Quantum Statistics I (<i>If you prefer not to hold this lecture to ease your Thanksgiving holiday travel, we can add 25min to the lectures of 11/21,28,30</i>)	
14	11/28	Chap 10 Quantum Statistics I	#10 12/5
	11/30	Chap 11 Molecular Physics	
15	12/5, 7	Chap 12 Solid State Physics	
16	12/12	Review for the Final Exam	

Final Exam–Comprehensive: **Dec 21 (Wed) 1:30-3:30** likely in Room 0405.