Physics 270   UNIVERSITY OF MARYLAND, College Park   **Fall 2015**
General Physics: Electrodynamics, Light, Relativity and Modern Physics

Description: Third semester of a three-semester calculus-based general physics course. Electrodynamics: Maxwell's equations and electromagnetic waves: Geometrical and physical optics: interference, diffraction. Special theory of relativity and modern physics. 3 credits: DSNL (if taken with PHYS271)
Prerequisite: PHYS261, MATH241, and PHYS260. Co-requisite: PHYS271. Credit only granted for: (PHYS270 and PHYS271) or PHYS273.   //   PHYS270 and **PHYS271** (**Lab**) *must be taken in the same semester*. The grade for the lab part counts 25% toward this course, namely 250 points out of 1000 points total. To pass, students must complete passing work in both PHYS270 and PHYS271.

Lectures: Tues and Thurs **5:00-6:15pm** in **PHY 1410**. .
Lecturer: **Prof. B. L. Hu**   Office: PSC3153, Phone: 301-405-6029, Email: blhu@umd.edu Mailbox #425
Office hours: Tu Th 4-4:45pm except certain days of department colloquia or faculty meetings, whence by appointment upon request. Email hubeilok@gmail.com for individual appointments.
TAs: Office: PHY 0220 Tel: 301.405.5969 **Arber Masati** Cell**:** (443) 854-8209 Physics Mail Box # 423
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Textbooks Required: Randall D. Knight, *Physics for scientists and engineers, 3rd edition Volumes 3, 4, 5* (Addison-Wesley/Pearson 2013). This textbook is also available as a single-volume hardcover.
Recommended: R. A. Serway and J. W. Jewett, *Physics for Scientists and Engineers with Modern Physics* 9th edition (Thomson Books /Cole 2014)
https://faculty.psau.edu.sa/filedownload/doc-3-pdf-67a5de9fa89738da0c6835ef457b5878-original.pdf

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) and in the sessions – this could stimulate your thoughts and engage in discussions.

Course webpage Check regularly for announcements, homework assignments and due dates in the course website at ELMS/CANVAS system: www.elms.umd.edu/page/student-support where you will also be able to access your exam grades. For questions call the Help Desk at 301.405.1500 or email elms@umd.edu.

Homework: 12 sets of homework problems are planned, together counting 150 points towards your course score of 1000 maximum. They are to be worked out and handed in at the beginning of classes on the due dates -- check the course webpage for last minute changes. Details in how the scores are assigned will be announced on the first due date. Solutions will be posted soon after thus *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 which shows clearly in your examination performance.

Quizzes**:** 5 quizzes, 20min each, are given in the Discussion Sessions conducted by your TA, in the weeks specified in the Course Schedule. 4 of the best quizzes together count 100 points towards your course score. Your TA's input in your *participation and performance in the Discussion sessions* can become an important factor, if you are in a borderline situation, in deciding your course grade.

Mid-Term Exams: Two 75-minute closed book mid-term exams are scheduled on **October 22 (Thur) and Nov. 24 (Tue) 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 150 points towards your course score. 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, at the earliest possible time, to discuss alternatives. There will be **no make-up exams**.

The Final Exam, comprehensive, is worth 200 points of the course score. It is held on **Wed Dec 16, 6:30-8:30** pm in the classroom. 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 each mid-term exam, with equations written on it. Keep these two cards and prepare another one for the final exam, where you are allowed a total of three formula cards. The values of constants and some integrals will be provided. Only a non-programmable calculator with standard trigonometry function is allowed, no smart phones, I-Pads etc. **Academic dishonesty is a serious violation,** and will be dealt with strictly according to University policy.

Course Grade: With 150 points for the homework, 100 points for the quizzes, 300 points total for the two mid-term exams, and 200 points from your final exam scores, adding to it 250 points from Phys 271 your lab score, this sums up to 1000 points maximum toward your total course score, from which your course grade is determined.

PHYSICS 270   CONTENTS and SCHEDULE   Fall 2015   Prof. B. L. Hu

Lectures: **Quiz**	**Readings:** Chapters in R. Knight,	**Topics:**	**Homework**
Week/Date Q1-5	*Physics for scientists and engineers*, 3 ed	[Updated Oct 27]	**# Due Thur** [Ch]

1 9/1, 3   Chap **32** Magnetic Field, Biot-Savart & Ampere's Law   **#1** 9/10 [32]
2 9/8, 10 **Q1** Chap **32** Magnetic Force on moving charge, Torque   **#2** 9/17 [32]
3 9/15,17   Chap **33** Induced Current, Faraday's Law, Lenz Law   **#3** 9/24 [33]
4 9/22,24 **Q2** Chap **33** Induction, Inductor, LR,LC, LCR Circuits   **#4** 10/1 [33]
5 9/29, 10/1   Chap **35** Phasors AC Circuits, Impedance   **#5** 10/8 [35]
6 10/6, 8 **Q3** Chap **34, 23** Maxwell Eqs, EM Waves, Reflec/Refrac-tion **#6** 10/15 [34]
7 10/13,15   Chap **23, 24** Mirrors & Lens, Ray tracing, Optical Instruments
8 10/20   Chap **22**   Physical Optics: Interference, Diffraction   **#7** 10/29 [23,24]

October 22 Thur   Exam 1: Chap 32, 33, 35

9 10/27, 29 Chap **36** Special Theory of Relativity   **#8** 11/5   Ch 22, 36
10 11/3,5   Chap **36** Relativistic Momentum and Energy   **#9** 11/12 Ch 36

11 11/10,12 **Q4** Chap **37/38** Quantum Theory Radiation, Photoelectric Effect **#10** 11/19
12 11/17, 19 Chap **38/ 39** Bohr Atom, Matter Wave, Uncertainty Principle **#11** 12/3

13 **11/24 *Tuesday Exam 2: Chap 34,22-24,36*** | 11/26 **No class** *Happy Thanksgiving!*

14 12/1, 3 Chap **40** Energy Levels, Wave Function, Potential Wells, **#12** 12/10 [39/40]
15 12/8,10 **Q5** Chap **40, 41** Tunneling. Angular Momentum, Spin, Atomic Spectra

Final Exam: Dec 16 (Wed) 6:30-8:30pm in Physics Lecture Halls 1410-1412
(Comprehensive: more from Chap 37-41)

*** *Happy Holidays*! ***