

**Physics 270** UNIVERSITY OF MARYLAND, College Park **Fall 2016**  
**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 course score 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](mailto:blhu@umd.edu) Mailbox #425  
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Textbooks Required: Randall D. Knight, *Physics for scientists and engineers, 3<sup>rd</sup> 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* 9<sup>th</sup> edition (Thomson Books /Cole 2014). This would be my preference as textbook for this course. <https://faculty.psau.edu.sa/.../doc-3-pdf-67a5de9fa89738da0c6835ef457b5878-origin>

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](http://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](mailto:elms@umd.edu).

Homework: **No need to purchase *Mastering Physics***. To give some personal attention, your TA will grade your work. Details in how the scores for the HW problems are calculated will be announced. 12 sets of homework problems, together counting 150 points (out of 1000 pts maximum) are to be worked out and handed in on the due dates at the beginning of classes -- check the course webpage for any last minute changes. Solutions will be posted on the due dates, 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, **on lecture materials**, 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 20 (Thur)** and **Nov. 22 (Tue) during the lecture periods**. Each exam covers the material assigned since the previous one, and is likely to contain examples worked out in the lectures and 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 University duty-related reasons, as stipulated in the University Rules), *please notify me well in advance*, to discuss possible alternatives. Not after the fact. There will be **no make-up exams**.

The Final Exam, comprehensive, is worth 200 points of the course score. It is held on **Friday 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, only equations, on both sides. 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, 200 points from your final exam scores, and 250 points from the lab Phys 271, your course score has 1000 points maximum. This determines your course grade after "curving".

**PHYSICS 270                      CONTENTS and SCHEDULE                      Fall 2016                      Prof. B. L. Hu**

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

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1	8/30,9/1	Chap 32	Magnetic Field, Biot-Savart & Ampere's Law	#1	9/8	[32]
2	9/6, 8	<b>Q1</b> Chap 32	Magnetic Force on moving charge, Torque	#2	9/15	[32]
3	9/13,15	Chap 33	Induced Current, Faraday's Law, Lenz Law	#3	9/22	[33]
4	9/20,22	<b>Q2</b> Chap 33	Induction, Inductor, LR,LC, LCR Circuits	#4	9/29	[33]
5	9/27,29	Chap 35	Phasors AC Circuits, Impedance	#5	10/6	[35]
6	10/4,6	<b>Q3</b> Chap 34, 23	Maxwell Eqs, EM Waves, Reflec/Refrac-tion	#6	10/13	[34]
7	10/11,13	Chap 23, 24	Mirrors & Lens, Ray tracing, Optical Instruments			
8	10/18	Chap 22	Physical Optics: Interference, Diffraction	#7	10/27	[23,24]

***October 20 Thur Exam 1: Chap 32, 33, 35***

9	10/25,27	Chap 36	Special Theory of Relativity	#8	11/3	[22, 36]
10	11/1,3	Chap 36/37	Rel. Momentum and Energy, Q. Th. Radiation	#9	11/10	[36]
11	11/8,10	<b>Q4</b> (Ch36) Chap 38	Photoelectric Effect, Bohr Atom	#10	Tue 11/29	[37,38]
12	11/15,17	Chap 39	de Broglie Matter Wave, Uncertainty Principle, Wave Function			

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

14	11/29,12/1	Chap 40	Energy Levels, Potential Wells, Tunneling.	#11	Tue 12/6	[39/40]
15	12/6,8	<b>Q5</b> (Ch 38-39) Chap 41	Angular Momentum, Spin, Atomic Spectra	#12*	[41]	

(\*work out the problems, no need to submit)

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

\*\*\* *Happy Holidays!* \*\*\*