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Course Syllabus

Physics H7C:
Electromagnetic Waves, Optics, Relativity and Quantum Physics

Instructor

Professor Mina Aganagic,
Lecture: TuTh 9:30-11:00 AM, 2 LeConte)

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GSI

Zachary Fisher
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Prerequisites

H7A-B Math 1A-1B, Math 53, 54 (Math 54 must be taken concurrently, if it has not been completed).

Textbooks

OPTICS

- **Author:** HECHT
- **Publisher:** PEARSON
- **Edition:** 4TH 02
- **ISBN:** 9780805385663

SPECIAL RELATIVITY

- **Author:** FRENCH
- **Publisher:** NORTON
- **Edition:** 68
- **ISBN:** 9780393097931

INTRO.TO QUANTUM PHYSICS

- **Author:** FRENCH
- **Publisher:** NORTON
- **Edition:** 78
- **ISBN:** 9780393091069

LAB MANUAL (available for purchase in Copy Central on Bancroft)

Grades:

• Labs 5%
• Homework 10%
• First Midterm 25%
• Second Midterm 25%
• Final Exam 35%

Topics and HW Assignments

Week No.	Week Dates	Reading (*approximate* guide only)	Reading and Homework Assignments	Lab
1	Aug 26-28	Maxwell's Equations and Electromagnetic Waves	R: Hecht, Ch 2.1-2.8, 3.1 HW: Hecht, Ch 2: 13,19,21,31,36,37,38,40,42,43	No lab
2	Aug 31-Sep 4		R: Hecht, Ch 3.2, 3.3 (except 3.3.3), 3.6 HW: Hecht, Ch 3: 5,7,16,18, 30, 31 plus these three supplementary problems (https://bcourses.berkeley.edu/courses/1377305/files/60464194/download?wrap=1) (https://bcourses.berkeley.edu/courses/1377305/files/60464194/download?wrap=1)	No Lab

			(https://bcourses.berkeley.edu/courses/1377305/files/60464194/download?wrap=1)	
3	Sep 7-11 (Sep 7: Mon -Labor Day)	Electromagnetic Waves	R: Hecht, Ch 3.4, 3.5 Feynman, Vol 1, Ch 28, Ch 32 (available online (http://www.feynmanlectures.caltech.edu/I_toc.html)) HW, Ch 3: 38, 44, 46, 48, 49b, plus these two supplementary problems (https://bcourses.berkeley.edu/courses/1377305/files/60748364/download?wrap=1) (https://bcourses.berkeley.edu/courses/1377305/files/60748364/download?wrap=1) (https://bcourses.berkeley.edu/courses/1377305/files/60748364/download?wrap=1) .	No Lab
4	Sep 14-18	*Optics* *Interference and Diffraction*	R: Feynman Vol 2, Ch 33 (http://www.feynmanlectures.caltech.edu/II_33.html) (main) Hecht, Ch 4.1-4.4, 4.6-4.7 Hecht 5.1-2 HW, H. Ch 4: 26, 27, 42, 50, 57 plus the supplementary problem (https://bcourses.berkeley.edu/courses/1377305/files/60987134/download?wrap=1) (https://bcourses.berkeley.edu/courses/1377305/files/60987134/download?wrap=1) (https://bcourses.berkeley.edu/courses/1377305/files/60987134/download?wrap=1) .	Reflection & Refraction
5	Sep 21-25	Interference and Diffraction	R: Hecht Ch 5: 1, 2, 4, 7 Hecht Ch. 10: 1,2 Feynman, Vol 1, Ch 29, 30, 31 HW: H. Ch 5: 28, 40, plus these two supplementary problems (https://bcourses.berkeley.edu/courses/1377305/files/61384600/download?wrap=1) (https://bcourses.berkeley.edu/courses/1377305/files/61384600/download?wrap=1) (https://bcourses.berkeley.edu/courses/1377305/files/61384600/download?wrap=1)	Geometric Optics
6	Sep 28-Oct 2 Midterm 1, Sept 29, in class	Diffraction	R: Feynman, Vol 1, Ch 29, 30, 31 Hecht Ch. 10: 1,2,3,4 HW: these four problems (https://bcourses.berkeley.edu/courses/1377305/files/61540938/download?wrap=1) (https://bcourses.berkeley.edu/courses/1377305/files/61540938/download?wrap=1) (https://bcourses.berkeley.edu/courses/1377305/files/61540938/download?wrap=1)	No Lab
7	Oct 5-9	Special Relativity	R: French (Special Relativity), Ch 1-3 Einstein's 1905 paper (https://bcourses.berkeley.edu/courses/1377305/files/61741025/download?wrap=1) (https://bcourses.berkeley.edu/courses/1377305/files/61741025/download?wrap=1) (https://bcourses.berkeley.edu/courses/1377305/files/61741025/download?wrap=1) HW: these three problems (https://bcourses.berkeley.edu/courses/1377305/files/61741041/download?wrap=1) (https://bcourses.berkeley.edu/courses/1377305/files/61741041/download?wrap=1) (https://bcourses.berkeley.edu/courses/1377305/files/61741041/download?wrap=1)	Michelson Interferometer
8	Oct 12-16	Special Relativity	R: French (SR), Ch 4 HW **(due 10/27)**: French Problems 4-11, 4-16 and 4-18, and these four problems (https://bcourses.berkeley.edu/courses/1377305/files/62003111/download?wrap=1) (https://bcourses.berkeley.edu/courses/1377305/files/62003111/download?wrap=1) (https://bcourses.berkeley.edu/courses/1377305/files/62003111/download?wrap=1)	Diffraction & Interference
9	Oct 19-23	Special Relativity	R: French (SR), Ch 5,6 HW **(due 11/3)**: these three problems (problem 2 has been removed, just do problems 1,3,4) (https://bcourses.berkeley.edu/courses/1377305/files/62479080/download?wrap=1) (https://bcourses.berkeley.edu/courses/1377305/files/62479080/download?wrap=1) (https://bcourses.berkeley.edu/courses/1377305/files/62479080/download?wrap=1)	Polarization
10	Oct 26-30	Special Relativity		No Lab
11	Nov 2 - Nov 6 Midterm 2, Nov 3, In class	Quantum Mechanics		No Lab
12	Nov 9-13	Quantum Mechanics	R: Feynman, Vol II Ch 19; Feynman, Vol I Ch 6; Feynman, Vol III Ch 1 HW **(due 11/17):** these three problems (https://bcourses.berkeley.edu/courses/1377305/files/62890312/download?wrap=1) (https://bcourses.berkeley.edu/courses/1377305/files/62890312/download?wrap=1) (https://bcourses.berkeley.edu/courses/1377305/files/62890312/download?wrap=1)	No Lab
13	Nov 16-20	Quantum Mechanics	R: French (QM), Ch 3	Photoelectric effect
14	Nov 23-27 (Nov 24-25: Th/Fri Thanksgiving)	Quantum Mechanics		No Lab

15	Nov 30-Dec 4	Quantum Mechanics		Atomic Spectra
16	Dec 7- 11	RRR Week		
17	Dec 14-18	Final Exam Tue. Dec. 15, 3-6PM, Location TBA		

Homework Policy

Homework will be due at the beginning of lecture on Thursday. Late homework will not be accepted without prior permission from the instructor.

Missed Exam Policy

There are no make-up exams. If you need to miss an exam for a valid reason, you must notify the instructor and the GSI in writing, well before the start of the exam. If your absence is approved, the following exam will count for the missed one (for example, were you to miss midterm 1, midterm 2 will cont 50% of your grade. If you miss midterm 2, the final exam will weigh 60% of your grade.)

Missed Labs

For each lab you do not complete, the your letter grade for the course will drop a level (e.g. from A to A-). With prior approval from the GSI, you can miss a lab section and make it up with either in another section, or the next time there is a lab. One lab set-up will remain in the back of the lab room for make-ups the following week. The make-up can only be done during a lab section with a GSI present. (The last lab has no make-up.)

You must finish the pre-lab questions for a given experiment *before* the lab session. GSIs will be collecting the answers at the beginning of each lab session. The pre-lab problems for each experiment are located towards the beginning of that experiment's chapter in the lab manual. Pre-labs and during class lab work count for half the points! Lab write-ups are due by the end of the lab period. **Write neatly.**

Date	Details
	Homework 1 (https://bcourses.berkeley.edu/courses/1377305/assignments/6830157)
	Homework 2 (https://bcourses.berkeley.edu/courses/1377305/assignments/6830190)
	Homework 3 (https://bcourses.berkeley.edu/courses/1377305/assignments/6830193)
	Homework 4 (https://bcourses.berkeley.edu/courses/1377305/assignments/6885829)
	Homework 5 (https://bcourses.berkeley.edu/courses/1377305/assignments/6912172)
	Homework 6 (https://bcourses.berkeley.edu/courses/1377305/assignments/6941346)
	Homework 7 (https://bcourses.berkeley.edu/courses/1377305/assignments/6962188)
	Homework 8 (https://bcourses.berkeley.edu/courses/1377305/assignments/7015102)
	Homework 9 (https://bcourses.berkeley.edu/courses/1377305/assignments/7027220)
	Lab 1: Reflection and Refraction (https://bcourses.berkeley.edu/courses/1377305/assignments/6861544)
	Lab 2: Geometric Optics (https://bcourses.berkeley.edu/courses/1377305/assignments/6861547)
	Lab 3: Michelson Interferometer (https://bcourses.berkeley.edu/courses/1377305/assignments/6919211)
	Lab 4: Diffraction Gratings (https://bcourses.berkeley.edu/courses/1377305/assignments/6919212)
	Lab 5: Polarization (https://bcourses.berkeley.edu/courses/1377305/assignments/6919215)
	Midterm 1 (https://bcourses.berkeley.edu/courses/1377305/assignments/6901331)
	Midterm 2 (https://bcourses.berkeley.edu/courses/1377305/assignments/7019038)