

University of California, Berkeley - Department of Physics

Physics H7B Fall 2015 Course Information

Physics H7B calendar:

https://www.google.com/calendar/embed?src=lukman.winoto%40berkeley.edu&ctz=America/Los_Angeles (Links to an external site.)

Subject Matter:

Thermodynamics (~4/5 weeks) and Electricity & Magnetism (~10/11 weeks)

Lectures: Monday, Wednesday and Friday at 9:00-10:00 am in 3 Le Conte

Final Exam Group: 16: Thursday, December 17th, 2015, 7:00pm-10:00pm

Instructor:

Lukman Winoto, PhD

Office: 388 Le Conte Hall

Email: lukman.winoto@berkeley.edu

Email: lukman.winoto@gmail.com (beyond Fall 2015)

Phone: 510-289-3397 (mobile)

Office Hours:

Tuesday 2:00-3:00pm, Wednesday 10:00-11:00am, Wednesday 3:00-4:00pm, Friday 10:00-11:00am or by appointment.

(either in 388 LC or 395 LC)

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Discussion/Laboratory Sections:

Tuesday 1:00pm - 2:00pm in 122 Latimer

Wednesday 4:00pm - 6:00pm in 245 Le Conte: with the following schedule for the non-lab weeks:

roughly for the 1st 4/5 weeks: review of vector calculus for E&M

for the 2nd 4 weeks: review or short tutorial on Special Relativity

Textbooks:

1. Giancoli, "Physics for Scientists and Engineers with Modern Physics", 4th edition, Vol. 2, Chapter 17-20
2. E. Purcell, "Electricity and Magnetism", Berkeley Physics Course, 3rd edition
3. H7B Lab Manual from Copy Central at 2560 Bancroft

Purcell's Electricity and Magnetism is a wonderful and elegantly written textbook, and I suggest that you study it very carefully, and you may eventually want to keep it in your library.

Optional/Recommended Books:

1. Feynman Lectures on Physics Vol.1 (contains chapters on thermodynamics and statistical mechanics: Ch.39-46) and Vol.2 (mostly electricity and magnetism):

- now available for free online, all 3 volumes: <http://feynmanlectures.caltech.edu/> ([Links to an external site.](#))
- highly recommended that you go through these lectures at some point

2. Schroeder, An Introduction to Thermal Physics, (available at the physics library: on reserve asap).

3. Schey, Div, Grad, Curl and All That: An Informal Text on Vector Calculus (available on reserve at the physics library)

Websites:

The bcourse website for the class is:

<https://bcourses.berkeley.edu/courses/1365563>

Reading Assignment:

I will suggest a weekly reading assignment from the textbooks (one week in advance) that you should ideally read before each lecture, and that you must in theory read anyway at some point during the semester.

Homework:

One problem set per week. They will be posted in the course website every Wednesday, and they will be due on Friday the following week. The homework is to be one week behind the lecture, so as to allow you to digest the material in a timely manner.

Discussing homework (or for that matter, discussing physics and math from the lectures and the textbooks) and working together (but not during class) are highly encouraged, but not copying, absolutely! The work you submit must be your own, and shows your understanding of the problem, the math and the physics at hand.

You are allowed to miss two homework sets during the semester.

Course Center for study group:

7B/H7B Course Center: 107 Le Conte

Laboratory session weeks:

On the following Wednesdays:

(1) September 16th, (2) October 14th, (3) October 28th, (4) November 18th, and (5) December 2nd.

The laboratory is a required part of the course. A grade will not be assigned until all lab works are completed satisfactorily.

Exams: (you must be able to make these times to enroll in the class)

Midterm 1: tentative date: on week 6: Wednesday 09/30, 5pm to 7pm: covering: thermodynamics

Midterm 2: tentative date: on week 11: Wednesday 11/04, 5pm to 7pm: covering: Purcell Ch. 1-4/5

Final Exam is comprehensive, covering the whole course, thermodynamics, electrostatics, magnetostatics, Maxwell's equations and the rest, with somewhat an emphasis on materials not covered in the mid-terms.

Final Exam Group: 16

Grade:

Homeworks: 30%

Midterms: 17.5% each

Final Exam: 30%

Lab works: 5%

Approximate Course or Lecture Schedule:**Week 1-3:**

- Thermodynamics: First Law, Ideal Gas, Kinetic Theory of Gases.

Week 4-5:

- Thermodynamics: First Law and Second Law. Free Energy.

Week 6-7:

- Begin lectures on electrostatic: Coulomb's law, Electric Field, Gauss' Law, Electric Potential. Chapters 1-2 of Purcell.

Week 8-9:

- Electrostatics: Electric Potential, Laplace Equation, Conductors, Capacitors, and Currents etc. Chapters 3-4 of Purcell.

Week 10:

- Relativity and Fields of Moving Charges. Chapter 5 of Purcell.

Week 11-13/14:

- Magnetic Field, Electromagnetic Induction, AC Circuits etc. Chapter 6-8 of Purcell.

Week 14-15:

- Maxwell's Equations, E&M waves, and if time permits, Electric Fields and Magnetic Fields in Matter. Chapter 9-10/11 of Purcell.

Week 16:

- RRR

Week 17:

Final Exam