

# University of California, Berkeley - Department of Physics Physics H7B Spring 2015 Course Information

## **Subject Matter:**

Thermodynamics (~4 weeks) and Electricity & Magnetism (~10 weeks)

Lectures: Tuesday and Thursday at 9:30-11:00 am in 3 Le Conte

Final Exam Group: 10: Wednesday, May 13th, 2015, 11:30am-02:30pm

## **Instructor:**

Lukman Winoto, PhD

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## Office Hours:

Monday 2:00-4:00pm, Wednesday 12:00-2:00pm, Thursday 2:00-3:00pm, or by appointment.

## **GSI:**

Jason Koeller

Email: [jkoeller@berkeley.edu](mailto:jkoeller@berkeley.edu)

Office: tbd

Office Hour: Tuesday 5:00-7:00pm, or by appointment.

7B/H7B GSI Office: Birge 409B

7B/H7B Course Center: 107 Le Conte

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

2. Blundell and Blundell, Concepts in Thermal Physics, 2nd. (available at the physics library).
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/1298333>

My website is:

<http://www.lukmanwinoto.com> (Links to an external site.)

**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.

**Laboratory session weeks:**

Week of

(1) Feb 9th, (2) March 9th, (3) March 30th, (4) April 13th, and (5) April 27th.

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

**Exams:**

**Midterm 1:** tentative date: on week 6: the week of Feb 23rd, in class: covering: thermodynamics

**Midterm 2:** tentative date: on week 11: the week of April 6th, in class: 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: 10

**Grade:**

Homeworks: 35%

Midterms: 15% each

Final Exam: 30%

Lab works: 5%

**Tentative Course or Lecture Schedule:**

(will post a more definite and detailed schedule during the second week of the class)

**Week 1&2:**

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

**Week 3&4:**

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

**Week 5:**

- Begin lectures on electrostatic: Coulomb's law. Chapters 1-4 of Purcell.

**Week 6-8:**

- Electrostatics: Electric Field, Gauss' Law, Electric Potential, Laplace Equation, Conductors, Capacitors, and Currents etc. Chapters 1-4 of Purcell.

**Week 9-12:**

- Relativity and Fields of Moving Charges, Magnetic Field, Electromagnetic Induction, AC Circuits etc. Chapter 5-8 of Purcell.

**Week 13-14:**

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

**Week 15:**

- RRR

**Week 16:**

Final Exam