

Syllabus for Physics 100B – Electromagnetism

Winter 2012, Physics Department, UCSD

INSTRUCTOR: Congjun Wu (5430 MH)

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Time/Place: 1:00p - 1:50p M W F, CENTR 222

Instructor Office hours: Friday: 2:00-3:00 pm

TA office hour: TBA; Problem session: TBA.

Text Books:

1. D. J. Griffiths, *Introduction to Electrodynamics*, Benjamin Cummings; 3 edition (January 9, 1999).

Reference Books

1. R. P. Feynman, *Feynman's lecture notes on Physics, Vol II*, Addison Wesley Longman (June 1970).
2. E. M. Purcell, *Berkeley Physics Course, Vol II*, McGraw-Hill (January 1, 1965).

Grade:

20% problem sets, 40% midterm, 40% final exam. There will be only one midterm in Physics 100B.

Homework Assignments:

Homework will be assigned every one or two weeks.

Class Schedule

1. Magnetostatics (4 classes)
 - Lecture 1: Lorentz force and Biot-Savart Law
 - Lecture 2: Divergence and Curl of B
 - Lecture 3: Vector potential
 - Lecture 4: Magnetic monopole, Dirac String
2. Magnetic field in matter (5 classes)
 - Lecture 4: Diamagnetism, paramagnetism, and ferromagnetism
 - Lecture 5: Field of a magnetized Object
 - Lecture 6: Magnetic field strength H
 - Lecture 7: Origin of magnetism in electron materials –spin
3. Electrodynamics (6-classes)
 - Lecture 8: electromotive force
 - Lecture 9: electromagnetic induction
 - Lecture 10: Maxwell's equation
 - Lecture 11: Maxwell's equation with magnetic monopole
4. Conservation laws (5-classes)
 - Lecture 12: Continuity equation and Poynting's theorem
 - Lecture 13: Momentum and angular momentum