

- Required Text: Jackson, *CLASSICAL ELECTRODYNAMICS* (3rd Edition)

No other book is necessary. However, to aid your understanding you may occasionally wish to refer to another source. Wikipedia is pretty good. A few other textbooks are:

Undergraduate Level:

*ELECTROMAGNETIC FIELDS AND WAVES*, Lorrain & Corson  
*CLASSICAL ELECTROMAGNETIC RADIATION*, Marion  
*FOUNDATIONS OF ELECTROMAGNETIC THEORY*, Reitz, Milford & Christy

Graduate Level:

*CLASSICAL ELECTRICITY AND MAGNETISM*, Panofsky & Philips  
*CLASSICAL ELECTRODYNAMICS*, Greiner  
*THE CLASSICAL THEORY OF FIELDS*, Landau & Lifshitz (especially the theoretical ideas)

- Classical Electrodynamics is very central to all of physics.
  - (1) Electrodynamics phenomena dominate our lives (vision, the mechanical and chemical properties of matter, electronic devices, communication, power, etc.)
  - (2) Quantum Electrodynamics is based on Classical Electrodynamics.
  - (3) Electrodynamics is our model for all the other interaction fields, the basic foundation for the modern gauge theory understanding of interactions
  - (4) it provides instructive experience with mathematical techniques and physical principles.
- To be a Physicist you **must** be competent in this subject.
- To get an advanced physics degree you **should** master a certain amount of this material.

Consequently, this course aims to cover most of Jackson's book (Over 800 pages in one year requires about 9 pages per class hour — too much — so one must skip some material.) This course will cover, in considerable detail at least Ch 1 through Ch 6: Introduction, boundary value problems in electrostatics and magnetostatics, multipoles, macroscopic media, Maxwell equations, conservation laws. Then, as time permits, part of Ch 7 plus a discussion of units and an introduction to a few of the more advanced interesting theoretical topics in relativistic electrodynamics from Ch 11, 12, 14, 16 and from other sources.

- Note Jackson's Appendix on Units and Dimensions.
- Also note the useful reference material in Jackson:

Vector Formulas, Theorems from Vector Calculus

Where to find key material on Special Functions, Explicit Forms of Vector Operations  
 you may wish to keep a photocopy handy.

- Course announcements and **lecture notes** (of Prof HJ Yo, NCKU) will be posted on the web.  
**Please read the text and lecture notes before the class discussion.**

- The following evaluation plan is proposed (passing grade = 70 points):

homework / quizzes	40 points	
midterm exam	35 points	proposed date 04-23
final exam	45 points	scheduled date 2012-06-18

To master enough of this material you **must** put in a significant effort. According to past experience, students who attend class regularly and do their homework do well in the course—and *conversely*. You are encouraged to discuss, study and work together; learn by helping each other. After discussion, *please do your own* homework. Doing homework problems is the best aid to learning. Do not fear mistakes, they help you learn. Much better to make mistakes on the homework rather than on the exam. If you can do the homework problems the exams will not be difficult. (**Warning!** Some solutions to Jackson's problems which are in circulation are NOT correct.)

**Suggestions and questions are encouraged in the classroom and outside.**

You can send me a note via email: nester@phy.ncu.edu.tw

Best wishes! jmn 2012-02-20