Reading list

These days, there are quite a few good junior-level E&M books, which you may find helpful to consult when you want a different explanation or example related to a concept you find troublesome. Many other books, at levels both higher and lower, will also serve as useful references. Here are the books that will be on reserve in the Physics, Optics and Astronomy Library. The titles of required textbooks appear in ***bold italics***. They include most of my favorite E&M books; I have added brief descriptions of each to give an idea of what they're best at, and to encourage you to read them.

1. D.J. Griffiths, *Introduction to Electrodynamics* (third edition, 1999). This is the principal required textbook for the course. It is extremely well-written and easy to read, with good problems and lots of examples, and reaches a level of mathematical elegance that was rare in the textbooks used when I was an undergrad. This makes it especially good as preparation for a graduate E&M course that uses the book by Jackson (see below), except for its use of MKS units throughout instead of CGS. It lacks discussions of circuits and a couple of topics in radiation which I would not like to omit, which will be filled in by use of the other required textbook and lectures.

2,3. G.L. Pollack and D.R. Stump, *Electromagnetism* (2002); R.K. Wangsness, *Electromagnetic Fields* (second edition, 1986). Very similar in approach, content and style to Griffiths' book; these books should be your next recourse. They are also very well written and have good examples. They also use MKS units.

4. M.H. Nayfeh and M.K. Brussel, *Electricity and Magnetism* (1985). Their discussions of the principles are very brief and dry, compared to those in Griffiths, but they include a very large number of examples on every topic, including many not found in those other books. Also uses MKS units.

5. M.A. Heald and J.B. Marion, *Classical Electromagnetic Radiation* (third edition, 1995). A nice book which seems a little too heavy on electromagnetic radiation and too light on electrostatics and magnetostatics to use as a textbook for PHY 217, but will be a useful reference here and especially in PHY 218. It is also the only good junior-level textbook that uses CGS units.

6. J.D. Jackson, *Classical Electrodynamics* (second edition, 1975; third edition, 1999). You will become intimately familiar with this book if you go to graduate school in physics. It's the classic, definitive text for E&M, very well-written and reflecting a profound understanding of the subject. The relevant parts are sometimes helpful for you juniors, especially since you don't have to worry about solving the diabolically clever and extremely difficult problems at the ends of the chapters. CGS unit are used throughout the second edition, which is still widely preferred to the third edition; the appendix in either edition that tells you all you need to know about unit conversions is better than similar discussions in the other books.

7. E.M. Purcell, ***Electricity and Magnetism*** (second edition, 1985). Also known as Volume 2 of the Berkeley Physics Course, this book will serve as a supplementary text through most of Physics 217 and through the treatment of relativity in Physics 218. It will be the principal source of information on DC and AC circuits. Although it was originally intended as a freshman-level text, it has rarely performed that function, but it is used quite frequently in junior E&M because it is eminently readable, and has all of the physics of the more mathematically-advanced texts, presented succinctly and beautifully. The author was a very distinguished physicist; he won the Nobel Prize (1952) for his role in the development of nuclear magnetic resonance studies of atomic and molecular structure, and also has the co-discovery of interstellar neutral atomic hydrogen to his credit.

8. R.P. Feynman, R.B. Leighton, and M. Sands, *The Feynman Lectures On Physics*, volumes 1 and 2 (1963). You are probably already familiar with these lectures by one of the most famous and brilliant

scientists in history (Nobel Prize in Physics, 1965, for the invention of much of quantum electrodynamics). They are full of terrific insights into electrodynamics, as well as all other basic branches of physics, and are worth reading at every stage of your physics education.

