Reading list

Here are the books that will be on reserve in the Physics, Optics and Astronomy Library. The titles of required and recommended textbooks appear in ***bold italics***. The brief descriptions of each give an idea of what they're best at, so as 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 high level of mathematical elegance. 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 some topics in radiation that Dan would not like to omit, which will be filled in by use of the other 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 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 the 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 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 undergrads, especially since you don't have to worry about solving the diabolically clever and extremely difficult problems at the ends of the chapters. CGS units 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 the treatment of relativity in Physics 218. Although it was originally intended as a freshman-level text, it has rarely performed that function, but it is used 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. Dave Griffiths, the author of our main textbook, was Purcell's graduate student.

8. F.S. Crawford, ***Waves*** (1968). The third volume of the Berkeley Physics Course is not used as widely as the second, but it is full of insight into how electromagnetic waves work, useful mechanical analogies, and clever uses of mathematics that one might consider too advanced for the anticipated sophomore audience. Dan hopes that the latest printing still includes the "optics kit" that came with his copy.

9. E. Hecht, ***Optics*** (fourth edition, 2002). This is one of the two optics books that seem to be on every physicist's bookshelf: an excellent introduction to geometrical and physical optics, very thorough, complete, well-written, and fairly modern. We won't use it very much in PHY 218 – only for the short section on diffraction – but those of you who plan to take AST 203 should probably buy it anyway, as it is the main text for that course. (The other optics book you need for your collection is the famous *Principles of Optics,* by Max Born and Emil Wolf, but you don't need it yet.)

10. 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.

