Texts for Consultation
Modern Physics – Fall 2019

As you start to take more advanced Physics courses, it is quite likely you will want to go to sources beyond your textbook, instructor, and classmates to help you out. Getting help from the internet has become ubiquitous, but – as you probably are aware – using internet sources for help has its own dangers and pitfalls. In an effort to help you find reliable sources for information, I am giving you this handout of other texts that may aid your learning experience. Although typing something into google is often easier than walking to the library, these sources have the advantage of being known, reliable resources.

Just as a reminder, your official text for the course is:

Tipler, P.A. and R.A. Llewellyn (2008). *Modern Physics* (5th Ed.) W.H. Freeman.

I have taught this course a number of times and have used quite a few different textbooks (including two different editions of this book, the book by Krane, and the book by Taylor *et al.*). To be honest, I'm not 100% on board with any of the existing textbooks out there, but this one seems to be least objectionable to most people and relatively commonly used. There is a 6th edition out there, but I have heard there are lots of errors in it (both in the main text and in the problems) so you might be better off sticking with the 5th edition. A lot of the critical reviews of this textbook online complain about the problems in the book; the good news is that I write my own problems, so that shouldn't be a major concern for you working out of this text.

Below, please find other resources you may find helpful. (This is, of course, only a partial list. There are many, many modern physics texts out there; I've just compiled this for your use/reference. There's probably some really good ones I don't know about yet.)

- Blanchard, C.H., C.R. Burnett, R.G. Stoner, and R.L. Weber (1969). *Introduction to Modern Physics* (2nd Ed.) Prentice-Hall. (An interesting text. This book gives a bit more introductory review of PHYS 111/112 content than most modern texts, but then talks immediately about atomic structure and electromagnetic radiation before moving into Quantum Mechanics. There is little (if any) special relativity discussed in this book.)
- Brown, T.B. (1940). *Foundations of Modern Physics.* Wiley. (Mostly a curiousity these days. It is interesting to go back and see what "Modern Physics" texts included only a couple decades after the discoveries in this class were made. This text is structured in a way that today we would consider rather curious. Different topics are grouped together, and many of the chapters here are not something we would typically spend a lot of time studying today. Probably not an overly useful text to help you get through this class, but something that might be interesting to browse through for historical context).
- Eisberg, R.M. (1961). *Fundamentals of Modern Physics.* Wiley. (I love this text. It isn't quite as "gentle" as the other texts in this list, but the writing is – in my opinion – a paragon of clarity. I'm sure that I will be using this text fairly extensively when putting together your lectures. If you can get your hands on a copy, I'd highly recommend checking this out. I would have loved to use this as your textbook for the course, but it is too hard to find copies to force you to find them.)

- Eisberg, R.M. and R. Resnick (1985). *Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles*. Wiley. (This is a good introductory Quantum text. Since I've misplaced my own copy, I can't speak in particulars.)
- Feynman, R.P., R.B. Leighton, and M. Sands (1963). *The Feynman Lectures on Physics* (3 vols). Addison-Wesley. (If you aren't familiar with these books, you should be. Officially used as the basis for a two-year introductory Physics undergrad sequence at CalTech, these are summaries of Richard Feynman's basic lectures and give an amazing conceptual treatment of most of introductory Physics. Some of the material is a bit dated, but these books are still well worth your time. These books are sometimes called "The Feynman Red Books", because the most familiar edition has a red cover. Most – but not all – of the material relevant to modern physics is in volume 3.)
- French, A.P. (1968). *Special Relativity*. CRC Press. (A great introductory text devoted to Special Relativity. Pretty friendly, but not patronizing.)
- Harris, R. (2008). *Modern Physics* (2nd Ed.). Addison-Wesley. (I don't know much about this text. The reviews on-line are good, but many of them are written by Dr. Harris' own students. The organization of the book looks pretty standard. Might be a good resource.)
- Krane, K. (2012). *Modern Physics* (3rd Ed.) Wiley. (I used this text when I taught this class in Fall 2015. I quickly regretted it. It is an ok text I guess, but I really disliked it while I was teaching out of it.)
- Pauli, W. (1958). *Theory of Relativity*, Dover. (Not for the feint of heart. If you are bored by our treatment in class and know a *lot* more math than an average undergraduate Sophomore, check this out.)
- Rohlf, J.W. (1994). *Modern Physics from α to Z°*. Wiley. (An interesting text. The main reason that I didn't seriously consider it as the main text is that it uses a nonstandard list of topics and presents them in a nonstandard order. This doesn't mean that it won't work extremely well, but it won't work in parallel with our own structure as well as – say – the Tipler or the Taylor. I've also read that there are a number of typos in the text, but have not used it extensively myself to be able to say for sure.)
- Taylor, J.R., C.D. Zafiratos, and M.A. Dubson (2014). *Modern Physics for Scientists and Engineers* (2nd Ed.) University Science Books. (I've used this text a couple of times and thought about using it again. I love Taylor's upper-level undergraduate Mechanics text, but this text wasn't very well liked by students. That being said, this isn't a bad supplement to your main text.)
- Thornton, S.T. and A. Rex (2005). *Modern Physics for Scientists and Engineers*, (3rd Ed.) Brooks Cole. (I kind of like this book. It is arranged in a manner similar to the text we will be using this semester, and the explanations seem pretty clear. However, the treatment is a bit verbose in the subjects we plan to cover, so I opted not to go with it.)
- White, H.E. (1940). *Classical and Modern Physics*, D. Van Nostrand Co. (See the entry under the Brown book. In particular, this may be interesting to astrophysicists since there is a chapter near the end on cutting-edge astrophysics as understood in 1940.)

It is also sometimes worth looking back to your PHYS 111/112 text to get another big-picture view of this stuff. Those introductory texts can be helpful more often than you might expect.