65: Further Reading

General

- Classical Mechanics (2nd ed.) by Herbert Goldstein (Addison-Wesley, Reading, Mass., 1980). The standard graduate-level text on classical mechanics.
- The Feynman Lectures on Physics (Definitive Edition; 3 vol.) by Richard P. Feynman, Robert B. Leighton, and Matthew Sands (Addison-Wesley, Reading, Mass., 2006). This classic work is well known to all students of physics. These lectures were presented by Nobel laureate Richard Feynman to his physics class at the California Institute of Technology in the 1960s, and are considered a masterpiece of physics exposition by one if its greatest teachers. (The the audio for these lectures is also available on CD, in 20 volumes.)
- Thinking Physics (3rd ed.) by Lewis Carroll Epstein (Insight Press, San Francisco, 2009). A very nice collection of thought-provoking physics puzzles.

Numerical Analysis (Chapter 10)

- Numerical Recipes by Press, Teukolsky, Vetterling, and Flannery (Cambridge, 1987). Numerical analysis is a whole subject in itself, and quite a number of books have been written about it. This book is a good starting point. It includes not only computer codes for various methods, but also a good discussion of the motivation behind the methods.

Friction (Chapter 17)

- "Friction at the Atomic Scale" by Jacqueline Krim, Scientific American, October 1996, pp. 74-80.
- An excellent discussion of friction is available in Volume 1, Chapter 12, Section 12-2 of The Feynman Lectures on Physics (Definitive Edition) by Richard P. Feynman, Robert B. Leighton, and Matthew Sands (Addison-Wesley, Reading, Mass., 2006).
- A review article in the journal Reviews of Modern Physics examines friction in detail, at an advanced level. See Andrea Vanossi et al., Colloquium: Modeling friction: From nanoscale to mesoscale. Rev. Mod. Phys., 85, 529-552 (April-June 2013).

Energy (Chapter 23)

- Energy, the Subtle Concept by Jennifer Coopersmith (Oxford, 2010). An extended discussion of the concept of energy, with a number of biographical anecdotes and minimal mathematics.

Pendulums (Chapter 38)

- The Pendulum: A Case Study in Physics by G.L. Baker and J.A. Blackburn (Oxford, 2005). An entire book about pendulums, at roughly the level of this course.

The Gyroscope (Chapter 46)

- Volume 1, Chapter 20, Section 20-3 of The Feynman Lectures on Physics (Definitive Edition) by Richard P. Feynman, Robert B. Leighton, and Matthew Sands (Addison-Wesley, Reading, Mass., 2006).

Superfluids (Chapter 48 and 49)

- Liquid Helium II, the Superfluid (film), Alfred Leitner films, Michigan State University, 1963. (Available on YouTube.)

Gravity and General Relativity (Chapter 51)

- Black Holes and Time Warps: Einstein's Outrageous Legacy by Kip Thorne (Norton, 1995). A very readable introduction to black holes, for the general reader.
- It Must Be Beautiful: Great Equations of Modern Science by Graham Farmelo (ed.) (Granta Books, New York, 2002). The chapter “The Rediscovery of Gravity” by Roger Penrose gives a brief overview of general relativity at about the level of this course.
- A First Course in General Relativity (2nd ed.) by Bernard Schutz (Cambridge, 2009). This is an excellent first text on general relativity.
- Gravitation by Misner, Thorne, and Wheeler (Freeman, 1973). This huge tome (over 1200 pages) is the granddaddy of all general relativity texts. It’s excellent, and well known to all students of general relativity. This is probably the text you would use in a graduate school course.

Earth Rotation (Chapter 52)

- The Earth's Variable Rotation by Kurt Lambeck (Cambridge, 1980). An extended discussion of irregularities in the Earth's rotation, at a graduate-school level.

Geodesy (Chapter 53)

- The Measure of All Things: The Seven-Year Odyssey and Hidden Error That Transformed the World by Ken Alder (Free Press, 2003).

Celestial Mechanics (Chapter 54)

- Introduction to Celestial Mechanics by S.W. McCuskey (Addison-Wesley, Reading, Mass., 1963). A brief, excellent introduction to celestial mechanics.
- Astronomical Algorithms by Jean Meeus (Willmann-Bell, Richmond, 1991). Another excellent book, with 58 chapters of material covering how to do practical calculations of all sorts related to celestial mechanics.
- The Astronomical Almanac (U.S. Government Printing Office). This is published in a new edition each year, and is full of data related to celestial mechanics.
- Explanatory Supplement to the Astronomical Almanac by P.K. Seidelmann (ed.) (University Science Books, 1992). A gold mine of information related to celestial mechanics and the calculation of ephemerides. A very well-known and respected work, and very interesting to read.

Astrodynamics (Chapter 55)

- Fundamentals of Astrodynamics by Roger R. Bate, Donald D. Mueller, and Jerry E. White (Dover, Mineola, N.Y., 1971). A good introductory text on astrodynamics at about the level of this course.
- An Introduction to the Mathematics and Methods of Astrodynamics (revised ed.) by Richard H. Battin (AIAA, Reston, Va., 1999). An advanced text on astrodynamics, with emphasis on mathematical methods.
- Fundamentals of Astrodynamics and Applications (4th ed.) by David A. Vallado (Microcosm Press, 2013). One of the standard references on astrodynamics. An advanced text.

Special Relativity (Chapter 59)

- Spacetime Physics (2nd ed.) by E.F. Taylor and J.A. Wheeler (Freeman, 1992). An excellent introductory treatment of special relativity, at about the level of this course. The authors are very well known and highly respected in the field of relativity. The last chapter is a brief overview of general relativity.

Quantum Mechanics (Chapter 60)

There doesn't seem to be any one standard quantum mechanics text, but the ones listed below are some popular choices for undergraduate and graduate school courses in quantum mechanics.

- Quantum Mechanics (3rd ed.) by Leonard I. Schiff (McGraw-Hill, New York, 1968).
- Quantum Mechanics (2 vol.) by Cohen-Tannoudji, Diu, and Laloe (Wiley, New York, 1977).
- Principles of Quantum Mechanics (2nd ed.) by R. Shankar (Springer, New York, 1994).

Just for Fun

- Physics of the Impossible by Michio Kaku (Doubleday, 2008). A noted physicist discusses the possibility of time travel, force fields, invisibility cloaks, transporters, etc.
- The Disappearing Spoon by Sam Kean (Little, Brown \& Co., 2010). A very entertaining collection of stories surrounding the periodic table of the elements.
- Mr. Tompkins in Paperback by George Gamow (Cambridge, 1993). A famous Russian physicist wrote these stories of a world in which the speed of light is just \(30 \mathrm{mph}\) so relativistic effects are visible, and more stories of a world where Planck's constant is so large that quantum effects are visible. An updated version has also been written, The New World of Mr. Tompkins (Cambridge, 2001).
- Dragon's Egg by Robert L. Forward (Del Rey, 2000). Physicist Robert Forward wrote this novel about humans who discover a civilization of creatures living on the surface of a neutron star.