Physics 101 Spring 2015
Final Exam Topics List

The exam will take place on Friday May 22, from 8AM-10:30AM in Science 201. It will be closed book and closed notes. Any equations or constants needed will be provided on the test. You may bring a calculator that is not part of a cell phone. This list of topics is not exhaustive, but should instead serve as a guide to the main points from each chapter. In addition to understanding the concepts and definitions listed, you should also be able to solve problems at the same mathematical level as those found on the homework (the end of some chapters have sections of “plug-and-chug” problems as well as slightly more difficult exercises that you can work for practice, and the end of each section in the textbook has a practice multiple-choice test with answers given in an appendix).

I’ve included topics from chapters covered since the third midterm here. For topics from earlier chapters, please see the topics lists for the three midterms.

You will need to bring a Scantron form 882-E (teal green half-sheet) and a #2 pencil. It is highly recommended that you bring extras, and a good eraser. Remember to be on time: if you arrive after late, you will not be allowed any extra time to complete the exam.

Chapter 27: Color

• Selective reflection
• Selective transmission

Chapter 28: Reflection and Refraction

• Law of Reflection
• Refraction
• Index of refraction
• Converging Lenses
• Diverging Lenses

Chapters 29-30: Light Waves and Spectra

• Huygens’ Principle
• Diffraction
• Constructive and Destructive Interference
• Thin film interference
• Light emission by atoms & the Bohr model of the atom
  o Excitation
  o De-excitation
  o Ionization
• Types of spectra
  o Emission spectra
  o Absorption spectra
  o Continuous spectra
Chapters 31-32: Quantum Physics

• Planck’s quanta of light \( E = hf \)
• Photoelectric effect
• Wave-particle duality
• De Broglie Wavelengths & Electron Diffraction \( \lambda = h/mv \)
• Uncertainty Principle
• Complementarity
• Bohr model of the atom
• Quantization of matter and electric charge
• Quantization of atomic energy levels

Chapters 33-34: Nuclear Physics

• Radioactivity
• Radioactive decay
• Half-life
• Radiometric (Carbon) dating
• Nuclear fission
  o Applications
• Nuclear fusion
  o Applications
  o Stars
• Mass-Energy Equivalence \( E = mc^2 \)

Chapters 35-36: Relativity

• Special Relativity Postulates
• Simultaneity
• Length contraction
• Time dilation
  o The twin trip
• Correspondence principle
• Principle of Equivalence
• Gravitational redshift

Note: You will not be tested on polarization, holography, radiation detectors, lasers, gravitational waves, or any of the topics listed as not covered on the midterms.