For more information: Professor James McDonald, jmcdonald@hartford.edu (860) 768-4518

Course Description (from Undergraduate Bulletin, 2014-2015): PHY 121, 4 Credits
This is the sequel to PHY 120. The topics include wave motion, acoustics, optics, electricity, magnetism, physics of the atom, and physics of the nucleus. Prerequisite: PHY 120. Laboratory fee.

Text: College Physics, 1st Ed., by OpenStax College ISBN: 978-1-938168-00-0 You may obtain a free electronic copy or pay for a hardcover edition at http://openstaxcollege.org/textbooks/college-physics/get

Classroom Hours: Class meets for 12 3.25-hour lectures and 10 2.5-hour labs.

Laboratory Experiments: There will be eleven laboratory experiments performed during the course. Full lab reports will be collected and graded. The laboratory constitutes 25% of the course grade.

- Pendulum and Spring (SHM and conservation of energy)
- Waves on a String (standing waves)
- Sound Resonance in a Tube (measuring the speed of sound)
- Radioactivity (penetration depth of alpha, beta, and gamma and measuring half-life)
- Digital Multimeters (familiarizing students with meters)
- Resistors and Diodes (Ohm’s law and basic circuit elements)
- DC Circuits (Simple circuits and Kirkoff’s Rules)
- Magnetic Fields (using a compass to map a field)
- Geometric Optics (reflection and refraction)
- Lenses (Thin lens equation)
- Diffraction (single slits and measuring the width of a human hair)

Topics Covered in PHY 121

Chapter 16 Oscillations and Waves
Elasticity; Springs and Hooke’s Law
Oscillating Masses, Simple Harmonic Motion; Timekeeping
Energy and SHM; Damped and Driven Systems; Resonance
Wave Basics, Reflection, Transmission, Absorption
Strings, Sound Waves, Standing Waves, Resonance

Chapter 17 Sound Waves
Sound waves; Doppler shift; sonic booms; Big Bang

Chapter 18 Electric Charges
Electric charges; quantized charge; conductors and insulators
Coulomb’s Law and electrostatics
Fields and forces; gravitational fields (review);
electrical fields; non-uniform fields

continued on reverse side
Chapter 19  **Electric Potential and Fields**
Electric potential energy and potential difference
Capacitors and Dielectrics; capacitors in parallel and series

Chapter 20  **Electric Current and Resistance**
Current; resistance; resistance and temperature; Ohm’s Law
Electric power
Superconductivity

Chapter 21  **DC Circuits**
DC circuit diagrams; elements in parallel and series; Kirchoff’s Rules
RC circuits and timing circuits

Chapter 22  **Magnetism**
Electromagnetism; magnetic fields; magnetic forces
Force on a moving charge; force on a wire; Ampere’s Law

Chapter 25  **Geometric Optics**
Ray model of light; photon model of light; geometric optics
Reflection; images by reflection; Fermat’s Principle
Refraction; images by refraction

Chapter 26  **Vision and the Eye**
Describing Images; aberrations
Color and Color Vision

Chapter 27  **Wave Optics**
Electromagnetic waves; diffraction; Huygens’s Principle

Chapter 31  **Nuclear structure and Radioactivity**
Atomic nuclei; radioactivity; nuclear structure; strong and weak forces
Nuclear fusion; biological effects of ionizing radiation