Instructor: Zhi-Feng Huang, 356 Physics Building
Tel: (313) 577 2791; Email: huang@physics.wayne.edu
Office hours: Mon & Wed 4:00pm – 5:00pm, or by appointment

Lecture time and location: M W 1:55pm – 3:45pm, 245 Physics Building

Prerequisite: PHY 2130/2140 or PHY 2170/2180; MAT 2020; PHY 3700


Additional text/References:
“Introduction to Physics in Modern Medicine”, by S. A. Kane, Taylor & Francis;
“Physics”, by Giambattista, Richardson, and Richardson, McGraw-Hill.

Homework: Posted in Blackboard; Due 1 week after assigned;
Late solutions will NOT be accepted; The lowest homework score will be dropped.

Exams: Two midterm exams: to be announced more than one week in advance;
Final exam (Cumulative): April 29 (Wednesday), 1:20pm – 3:50pm.

Grading: 1st exam: 20%
2nd exam: 20%
Final exam: 30%
Quiz (in class): 10%
Homework and class attendance: 20%

Course content
This course covers basic and applied physics concepts used in biology and modern medicine, including:
- Thermodynamics: Temperature and heat, ideal gas, entropy, free energy, microscopic systems, and Boltzmann distribution.
- Diffusion, random walks, osmosis, and the related biological applications including cell membranes and biological organisms.
- Fluid mechanics in biological systems.
- Modern physics and introduction to quantum mechanics: Photoelectric effect, blackbody radiation, atoms, molecules, energy levels and spectra, the Schrödinger equation (1D).
- Medical applications: Radioactivity, radiation therapy, medical diagnostics (X-ray, CT/CAT, emission tomography, PET).
- Nuclear magnetic resonance (NMR) and magnetic resonance imaging (MRI).