BIOL/PHYS 280

Course Number: Biol 280 / Phys 280
Title: Introduction to Biophysics
Short Title: Introduction to Biophysics
Credit Weight: 0.5

Description, term of offering, notes:
An introduction to the physical principles that underlie the dynamics of life from the macro to molecular scale. The course is intended for 2nd year science and engineering students and will cover a broad spectrum of topics including aspects of biotechnology, bioengineering, nanotechnology, and biomedical physics. [Offered: W]
Meet type - LEC,
Requisites: Second-year standing in an Honours plan (Cross-listed with PHYS 280)

Rationale:
An understanding of biophysical processes provides a strong foundation for upper-year courses in physiology, biotechnology and medical physics. With the recent appointment of a biophysicist, the expertise to teach this fundamental course is now available. The course is designed to be a general introduction to the area as well as the pre-requisite for a forthcoming upper-year biophysics course.

Part A:
Systemic Biophysics

- Biomechanics
- Biophysics and Fluid Flow
- Biophysics and Gas Transport
- Physics of Audition
- Physics of Vision

Part B:
Cellular-Molecular Biophysics

- Cells: content
- Physics of Biomolecules
- Physics of Bio-membranes
- Thermodynamics: Bio-systems
- Bioenergetics
- Neurobiophysics

Part C: Physical Methods in Biology and Medicine
1. X-Ray diffraction;
2. Isotope labelling;
3. Photodynamic therapy;
4. Fluorescence Resonance Energy Transfer
5. Dynamic light scattering;
6. CD and VCD;
7. Quantum dots imaging
8. Raman Scattering
10. Electrophoresis
11. Magnetic Resonance Imaging
12. Tomography
13. Mass spectrometry;
14. Transmission electron microscopy
15. Langmuir-Blodgett monolayer technique,
16. Surface plasmon resonance (SPR)
17. Nuclear Magnetic Resonance
18. Fluorescence and UV-vis light spectroscopy
19. Scanning probe microscopy
20. Quartz Crystal Microbalances,

Textbook:
Elementary Biophysics: An Introduction, by P. K. Srivastava
Other Recommended books:
Physics For the Biological Sciences, by Hallett et al.