

QBIO 120b: Quantitative Biology Instrumentation Laboratory Spring 2008

Instructor: Zvonimir Dogic, Room 216; zdogic@brandeis.edu

Office hours: 11-1 MW or by appointment

Meeting time and place: Physics Building Room 335, MW 1-4

Grading procedure :

70% - lab reports. 30% - lab participation.

Course description :

This course aims to provide an understanding of modern instruments used in biological research with special emphasis on optics, spectroscopy and microscopy. The course consists of six two-week long experiments. Upon the course completion the students will know how to use a research grade optical microscope and characterize its imaging capabilities for different objectives and illumination settings. In the course, students with complimentary experiences will be paired together such as a biochemistry student familiar with biological sample preparation and physics students familiar with optics. This cross-disciplinary interactions between students with various backgrounds will significantly contribute to the education of each student.

Course outline

1. Basic experiments (two weeks long)
 - absorption spectroscopy
 - fluorescence spectroscopy
 - geometrical optics
 - fourier optics
 - brightfield and phase contrast microscopy
 - fluorescence microscopy

Suggested reading

1. Sears and Zemansky, (chapters on geometrical optics and diffraction), University Physics (Addison-Wesley)
2. Eugene Hecht, *Optics* (Addison-Wesley, 2001)
3. Shinya Inoue and Kenneth R. Spring, *Video Microscopy*, (Plenum Press, 1997)
4. websites dedicated to microscopy education such as www.microscopyu.com and www.olympusmicro.com