

## QBIO 120b: Quantitative Biology Instrumentation Laboratory Spring 2008

**Instructor:** Zvonimir Dogic, Room 216; [zdogic@brandeis.edu](mailto: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](http://www.microscopyu.com) and [www.olympusmicro.com](http://www.olympusmicro.com)