

Biophysics Laboratory • BBMB 334

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Office Hours: M 10-12, T9-10,11-12; Th 11-12;
other good times are during Biophysics Labs (Wed & Thurs)

Class Meetings: Sci 376 TWTh(F)

Web Site: All materials will be posted on CLEo (<http://cleo.whitman.edu/>).

Purpose. In this lab you will:

1. Use experiments to explore and test biophysical theories.
2. Learn quantitative techniques in data analysis including error propagation and curve fitting.
3. Improve proficiency in general wet-lab techniques.
4. Improve laboratory writing skills.

Course structure:

All experiments and exercises will include a written description you should read before coming to lab. These will give a general outline of what is to be accomplished, but the details of the experimental procedure will be developed by you. Experiments will be done in lab groups of 2–3. Class periods will sometimes include a discussion at the beginning of class to address particulars of the experiment(s) being conducted that day.

Requirements:

1. Attend every lab session. Missing lab is permissible if you are on an outing sanctioned by the college, or on an interview for grad/med school and you tell me before you leave. We will then make arrangements to make up the lab. If you miss lab under circumstances other than these, you will not be able to make up the lab.
2. Bring eye protection. Wear long pants and closed-toe shoes.
3. Notebook. Each lab group must keep a notebook to keep notes and record data and observations.

4. Assessment:

- a. Lab Reports (80%) – The last three reports should be written as a small scientific paper, with abstract, introduction, materials and methods, and results and discussion. See the individual lab handouts for more information.
 - i. Lab 1: Error Propagation: Questions posed in lab handout.
 - ii. Lab 2: Brownian Motion: 1–2 pg summary and spreadsheet.
 - iii. Lab 3: Beer–Lambert Law and States of Hemoglobin: ~5 pgs.
 - iv. Lab 4: Protein Crystallization: ~5 pgs.
 - v. Lab 5: Protein Stability and Secondary Structure: 5–10 pgs.
- b. Experimental Technique (20%). This will be based mostly on individual preparedness and performance during the laboratory period and have a small component from the lab notebook.

Topics:

- Lab 1: Error Propagation (1 week)
- Lab 2: Brownian Motion (2 weeks)
- Lab 3: Beer's Law for Multiple Species (2 weeks)
 - Part A: Multicomponent Solutions
 - Part B: Oxygen Binding to Hemoglobin
- Lab 4: Protein Crystallization (3 weeks)
- Lab 5: Protein Structure and Stability (4 weeks)
 - Part A: Chemical Denaturation (2 wks)
 - Part B: Thermal Denaturation (1 wk)
 - Part C: Secondary Structure via Circular Dichroism (1 week)