

PHYS611 – Molecular Biophysics Lab, Spring 2015

Note: This syllabus is subject to change during the semester. This is the version 12/10/2014.

Location: MP412 Time: We, 10:30AM 12:45PM

Instructor: Dr. Daniel Fologea, DanielFologea@boisestate.edu, (208) 426 2664, MP312B

Office Hours: Mo: 8:00AM – 10:00AM, Fri: 8:00AM – 10:00AM, or by appointment

Goals: The experiments in this lab are designed to apply the principles derived during the class lectures for a better understanding of how basic physical interactions at the molecular level govern the assembly and the functionality of biological systems.

1. Ionic conductivity. 2p

Objectives: Demonstrate the linearity between concentration and conductivity for diluted solutions. Derive the unknown concentration of a solution from the calibration curve.

2. Fluorescence and self-quenching. 2p recommended for 4.3.

Objectives: Learn how to perform fluorescence measurements. Determine the self-quenching concentration of fluorescent molecules.

3. Total protein determination. 2p

Objectives: Utilize the Bradford method to quantify the total protein. Determine an unknown protein concentration from the calibration curve.

4. Liposomes. 6p

4.1. Prepare liposomes by extrusion. 2p

4.2 Load the liposomes with a drug simulator by using active and passive methods. 2p

4.3 Use fluorescence spectroscopy and microscopy to characterize the loaded liposomes. 2p

5. Planar Bilayer Lipid Membranes and pore-forming proteins. 6p

5.1 Production and physical characterization of planar lipid membranes. 2p

5.2 Channel insertion and simple characterization. 2p

5.3 Voltage-induced gating and ligand-induced gating. 2p

6. Others?

Notes:

a) Topics 4 and 5 are modular. You may not choose a superior index without prior performing of the lower ones. Nonetheless, you may stop at any inferior index.

b) Only one group may perform topic 2 and 4.3 at a time (technical limits).

c) For #6: Think about other topics that would be of interest for your specific research work!