

**115:313**  
**Introduction to Biochemistry Lab**  
**Spring 2017**

**Instructor:**

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**Teaching Assistants:**

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**Office hours are by appointment.**

**Laboratory Technician:** Lucy Hsu

**Course Overview**

This course is designed to introduce students to many of the important concepts, skills and techniques used in various biochemical analyses. The primary objective of this course is to increase students' understanding of biochemistry and the different analytical techniques and data evaluation methods used in this discipline. My overall goal is that you leave this course with a broad understanding and appreciation of biochemical analyses.

**Specific Learning Objectives**

Upon completion of this course, you will be able to:

- describe what a chromophore is, and identify chemical properties that allow a molecule to absorb light
- use a spectrophotometer
- identify and explain some of the many applications of spectrophotometry in biochemistry research
- use a pH meter, describe the basic concept of buffering, and use the Henderson-Hasselbalch equation to prepare a pH buffer
- generate a standard curve and determine concentration of a substance based on spectrophotometric data
- explain gel electrophoresis and how it is used for protein and nucleic acid analysis
- explain how the molecular weight (and, potentially, the identity) of a protein can be confirmed
- explain the concept of enzyme kinetics (including inhibition) and use Michaelis-Menten and Lineweaver-Burke plots to determine  $K_m$  and  $V_{max}$ .
- determine total mass of a solute, solute concentration (in molarity and % w/v), and apply dilution factors to determine initial and / or final concentration of a solution

**Course Policies**

*General*

Food and drink are not permitted in the lab. Lab coats and protective eyewear must be worn when working in the lab. Gloves are to be worn when handling potentially hazardous chemicals. Lab coats, eyewear and gloves must be removed every time you leave the lab. Open-toed and open-backed shoes, shorts and short skirts are prohibited. You will not be permitted to participate in the lab if you are not appropriately dressed.

*Communication*

If you need to email one of us, it is extremely important that you include 115:313 in the subject line in order to ensure that your email will be read.

### *Final Grade Determination*

Prelab quizzes (lowest grade dropped): 10%

Assignments: 65%

Midterm Quiz: 5%

Final exam (part written, part practical): 20%

Final grades:

≥90: A

87-89: B+

80-86: B

77-79: C+

70-76: C

60-70: D

<60: F

### *Attendance*

Attendance to class is required. There will be a prelab quiz at the beginning of each class meeting. We understand that during the Spring semester, many of you will be interviewing for jobs and graduate school: as soon as you are aware of a scheduling conflict, you need to contact Dr. Crane to see if accommodations can be made. In the event that you do completely miss lab, you will earn a "0" on the prelab quiz. In addition, you must get the relevant data from one of your labmates so that you can submit the assignment on time for a 20% deduction. The 0% quiz grade and the 20% assignment deduction apply regardless of your reason for missing lab.

### *Quizzes*

Prelab quizzes will be administered during the first ten minutes of lab. In order to prepare for the prelab quiz, you should read the relevant section in the lab manual and take notes on it. Prelab quizzes are always open-note, never open-book. If there is any math involved you should copy down the equation. I guarantee that there will be at least one math question on each quiz.

### *Lateness*

If you arrive to lab after the prelab quiz has started, you will be permitted to take the quiz, but you will not have extra time. If you arrive after the quiz has been collected and the prelab discussion has already started, you will earn a "0" on the prelab quiz. In addition, you may not be permitted to enter depending on how much of the prelab discussion you have missed. This will be at the Instructor's discretion. If you arrive and we are already working in the lab, you will not be permitted to enter. This policy applies regardless of your reason for being late.

### *iPads and Lab Archives*

At the beginning of the semester, each student will be assigned an iPad and paired keyboard to use during lab. All class notes will be documented using Lab Archives (we will give you a brief tutorial). We may also use the iPads to administer prelab quizzes.

### *Assignments*

Assignment submission instructions will be provided during class and / or online. Generally, assignments completed during class time will be submitted to Lab Archives and assignments completed outside class time will be submitted to Canvas. Your instructor or teaching assistant will provide instructions for the assignment and will set the due date and time.

**Late submissions are not accepted. No exceptions.**

**Submissions are not accepted via email. No exceptions.**

**If you do not submit an assignment by the due date and time, you will earn a "0" for that assignment.**

#### *General Lab Safety*

Here are the safety policies and rationale in a bit more detail. There are many risks in any laboratory setting, but in a biochemistry lab, there is the added risk of recombinant DNA and some intercalating agents. Before you start working in the lab, we will cover all aspects of safety with you including chemical, biological and fire safety. Here are some general guidelines for working in the lab:

- Food and drink are not permitted in the lab. This includes gum, candy and lozenges
- Personal protective equipment (lab coats and eyewear) must be worn at all times in the lab and must be removed prior to leaving the lab.
- Closed-toed shoes must be worn when in the lab.
- Do not wear any dangling jewelry while working in the lab.
- Loose hair and baggy clothing should be secured when in the lab.
- Know where the safety showers and eye wash areas are located.
- Locate the exits and fire extinguishers. The evacuation meeting place is behind the bus stop outside of Lipman Hall. In case of an emergency evacuation, this is where we will meet.

#### *Chemical Hygiene and Safety*

The use of personal protection equipment (PPE) is crucial to your safety in the laboratory. Lab coats are to be worn at all times in the lab. Gloves are to be worn when necessary. Here are some example situations in which gloves should and should not be worn:

When to wear gloves:

- During all experiments involving chemicals, hazardous or not.
- While using pipets
- While handling anything containing chemicals
- While using lab specific writing utensils
- When cleaning glassware

Do not wear gloves:

- When touching door handles
- When leaving the lab to go into the hallway or lecture area
- When using your personal cell phone or calculator
- When handling a writing utensil used outside of lab

The disposal of chemicals is also a concern for us during lab. We will be collecting waste for many of our experiments. We will always tell you what needs to be collected separately.

#### *Academic Integrity*

All members of the Rutgers community are expected to adhere to the Academic Integrity Policy which can be found [here](#). Rutgers policy requires me to report any suspected violation of this policy to the office of student conduct using a form found on their website <http://studentconduct.rutgers.edu/>. What happens after that depends on a number of factors, including the severity of the violation and whether or not is considered a first offense. [Here](#) is some more information on that. One of the most common offenses is plagiarism, either from an outside reference or from another student's work. Although you are encouraged to discuss the data and exercises with each other, the work you submit must

be your own. This includes any graphs of your data. When using information from outside sources, you must cite the original source of information. Detailed information about your sources must then be listed in a references section. All outside information must be paraphrased, i.e., conveyed using your own words.

I am required to report every suspected violation of the Rutgers Academic integrity Policy to the Office of Student Conduct. Every report is investigated, and if a student is determined to have violated the policy, there will be a sanction. Please familiarize yourself with the policy and with the possible consequences of a violation.

#### *Students with Differing Abilities*

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: <https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://ods.rutgers.edu/students/registration-form>.