

Experimental Biochemistry 11:115:413 Fall 2016

	Meeting days and times	Meeting locations	Section number
lecture	M 2:30 - 3:25 PM	CDL-110	All sections
laboratory	T 12:35 - 5:15 PM	LH 206	Section 1 11:115:413:01
laboratory	W 9:15 AM - 1:55 PM	LH 206	Section 2 11:115:413:02
laboratory	TH 9:15 AM - 1:55 PM	LH 206	Section 3 11:115:413:03
laboratory	W 2:15 PM - 6:55 PM	LH 206	Section 4 11:115:413:04

CONTACT INFORMATION:

Instructor: Natalya Voloshchuk, PhD
Office: 129 LH
Lab: 206 LH
Email: nv158@rci.rutgers.edu
Office hours: by appointment

Instructor: Diana Balzer, PhD
Office: 129 LH
Lab: 206 LH
Email: diana.balzer@rutgers.edu
Office hours: Wed 1-2 pm

Teaching Assistants

Jie Liu	jie.liu.2013@rutgers.edu
Kate Annunziato	kate.annunziato@gsbs.rutgers.edu
Gina Moreno	gmm145@scarletmail.rutgers.edu
Norambuena, Javiera	javiera.norambuenamoraes@rutgers.edu

COURSE WEBSITE, RESOURCES AND MATERIALS:

- Laboratory protocols, weekly presentations, and other relevant materials are posted on the Sakai course site under course content
- Safety goggles /lab coat (required, available for purchase from laboratory technician). Everyone is required to wear closed-toe shoes, long pants, goggles, and a lab coat while performing laboratory work
- All students are required to maintain a laboratory notebook. Laboratory electronic notebook (LabArchives platform) will be used in this course. Open LabArchives account (\$15.00) at the URL below. Note each section has specific URL (these links are also posted on the Sakai site: course content → week1 → LabArchives link)

Section 1(Tuesday):

https://mynotebook.labarchives.com/self_signup/ODkyMy4yfDE5MjMxMC82ODY0L1NIY3Rpb24vMTgyODI4NTY3NXwyMjY1MS4y

Section 2 (Wednesday morning):

https://mynotebook.labarchives.com/self_signup/ODkyNC41fDE5MjMxMC82ODY1L1NIY3Rpb24vMjU5MTC3NzQxMHwyMjY1NC41

Section 3 (Thursday):

https://mynotebook.labarchives.com/self_signup/ODkyNy4xfDE5MjMxMC82ODY3L1NIY3Rpb24vMzAzOTQ5NTMzNnwyMjY2MS4x

Section 4 (Wednesday afternoon):

https://mynotebook.labarchives.com/self_signup/ODkyNS44fDE5MjMxMC82ODY2L1NIY3Rpb24vMzg3NzMyODk0NXwyMjY1Ny44

COURSE DESCRIPTION:

This is the first course in a two-course sequence that is intended to provide a comprehensive understanding of basic theories, techniques, and methods practiced in biochemistry laboratory

LEARNING GOALS:

- 1) develop practical skills in some of the widely used biochemical methods and techniques: gel electrophoresis, Western, ELISA, protein activity assays and kinetics, PCR, chromatography, UV-Vis spectroscopy
- 2) apply biochemical principles for these techniques to experimental data analysis
- 3) collect, organize, analyze, and communicate experimental results
- 4) identify and explain relationships among hypothesis, methods, assumptions, and evidence
- 5) solve problems involving the following biochemical concepts: protein shape, size, and charge; protein-small molecule interactions, and enzymatic activity; protein-protein interactions, DNA amplification, reactions of carbohydrates

ASSIGNMENTS/RESPONSIBILITIES & ASSESSMENT:

Laboratory quizzes, three exams, three laboratory reports, laboratory e-notebook, laboratory performance evaluation.

LABORATORY REPORTS

Each student must complete a total of three written lab reports. These reports are meant to be independent efforts on the part of each student. Regardless of whether the lab experiment was completed as part of a group, each student must write her/his own report in his/her own style and words. It is appropriate (and encouraged) to consult and discuss background science, your data and the preparation of lab reports. However, you must write up **individual lab reports**, answer all questions in **your own words** and prepare all graphs/tables individually. Details for lab report requirements will be provided during corresponding lecture.

Lab Report 1 is based on “Protein in solution: concentration determination (Lowry and Biuret assays)” experiment completed on 9/20/16, 9/21/16, 9/22/16 and “Protein in solution: concentration determination (Bradford and $A_{280\text{ nm}}$ assays)” experiment completed on 09/27/16, 09/28/16, 09/29/16. The due date to submit Lab Report 1 is

10/04/2016 12:40 pm Tuesday section. LATE REPORTS WILL NOT BE ACCEPTED.

10/05/2016 9:20 am Wednesday morning section. LATE REPORTS WILL NOT BE ACCEPTED.

10/06/2016 9:20 am Thursday section. LATE REPORTS WILL NOT BE ACCEPTED.

10/05/2016 2:20 pm Wednesday afternoon section. LATE REPORTS WILL NOT BE ACCEPTED.

Lab Report 2 is based on “Enzyme kinetics: yeast alcohol dehydrogenase” experiment completed on 10/04/16, 10/05/16, 10/06/16 and “Affinity purification and enzyme kinetics: yeast alcohol dehydrogenase” experiment completed on 10/11/16, 10/12/16, 10/13/16. The due date to submit Lab Report 2 is

10/18/2016 12:40 pm Tuesday section. LATE REPORTS WILL NOT BE ACCEPTED.
10/19/2016 9:20 am Wednesday section. LATE REPORTS WILL NOT BE ACCEPTED.
10/20/2016 9:20 am Thursday section. LATE REPORTS WILL NOT BE ACCEPTED.
10/19/2016 2:20 pm Wednesday section. LATE REPORTS WILL NOT BE ACCEPTED.

Lab Report 3 is based on “Comparative proteomics, SDS PAGE” experiment completed on 11/01/16, 11/02/16, 11/03/16 and “Comparative proteomics, Western blot” experiment completed on 11/08/16, 11/09/16, 11/10/16. The due date to submit Lab Report 3 is
11/15/2015 12:40 pm Tuesday section. LATE REPORTS WILL NOT BE ACCEPTED.
11/16/2015 9:20 am Wednesday section. LATE REPORTS WILL NOT BE ACCEPTED.
11/17/2015 9:20 am Thursday section. LATE REPORTS WILL NOT BE ACCEPTED.
11/16/2015 2:20 pm Wednesday section. LATE REPORTS WILL NOT BE ACCEPTED.

All reports should be submitted through the Sakai course site. All reports will be graded using Turnin.com anti-plagiarism software.

NOTEBOOKS

All students are required to maintain a laboratory notebook. A neat and well organized notebook is primary record of the performed experiments in the course. A protocol for each experiment should be written in the notebook before you begin, and edited as you do the experiment. Only your laboratory protocol in your laboratory notebook will be used in the laboratory to guide you through lab procedure. You can judge your record keeping by how easily another scientist will be able to replicate experiment by using only information in your notebook. Notebooks will be evaluated each laboratory session.

Laboratory notebook grade is based on three major requirements:

- 1) Before lab component: weekly protocol preparation before lab session starts.
- 2) In lab component: in class data entry, comments, notes, protocol edits, observations.
- 3) After lab component: data analysis, calculations, summary. Must be completed weekly before start of the next lab.

QUIZZES/EXAMS

There is a lab quiz scheduled every lab session (first 5-10 min, lab protocol-based, open notebook). Average of these quizzes with one lowest grades dropped will be calculated in the course grade. Students arriving late in class will not be permitted to take the quiz and will receive a zero quiz grade for that week.

The average of three exams is included in the final grade for the course. Exams test students' ability to draw inferences from experimental evidence, carry out relevant calculations, and concentrate on understanding of the biochemical principles underlying experimental procedures.

ATTENDANCE

Students are expected to attend and participate in all lectures.

Attendance of all laboratory sessions is mandatory. Attendance means arriving on time to lab session, prepared, and ready to carry out experiment in a safe manner. **There will be no makeup labs. There will be no makeup quizzes.**

COURSE GRADE IS CALCULATED AS FOLLOWS:

	%
Lab quizzes average	35
Lecture exam (average of 3)	15
Lab report (average of 3)	30
Notebook	15
Evaluation*	5

* students are evaluated by course instructor and teaching assistant on their ability to interact and cooperate with lab partners, participation, and adherence to lab safety and clean-up rules

ACCOMODATIONS FOR STUDENTS WITH DISABILITIES

Please follow the procedures outlined at <https://ods.rutgers.edu/students/registration-form>. Full policies and procedures are at <https://ods.rutgers.edu/>

ACADEMIC INTEGRITY

In this course you are bound by all the academic standards detailed in Rutgers University Academic Integrity Policy.

The university's policy on Academic Integrity is available at <http://academicintegrity.rutgers.edu/academic-integrity-policy>. The principles of academic integrity require that a student:

- properly acknowledge and cite all use of the ideas, results, or words of others.
- properly acknowledge all contributors to a given piece of work.
- make sure that all work submitted as his or her own in a course or other academic activity is produced without the aid of impermissible materials or impermissible collaboration.
- obtain all data or results by ethical means and report them accurately without suppressing any results inconsistent with his or her interpretation or conclusions.
- treat all other students in an ethical manner, respecting their integrity and right to pursue their educational goals without interference. This requires that a student neither facilitate academic dishonesty by others nor obstruct their academic progress.
- uphold the canons of the ethical or professional code of the profession for which he or she is preparing.

Adherence to these principles is necessary in order to ensure that

- everyone is given proper credit for his or her ideas, words, results, and other scholarly accomplishments.
- all student work is fairly evaluated and no student has an inappropriate advantage over others.
- the academic and ethical development of all students is fostered.
- the reputation of the University for integrity in its teaching, research, and scholarship is maintained and enhanced.

Failure to uphold these principles of academic integrity threatens both the reputation of the University and the value of the degrees awarded to its students. Every member of the University community therefore bears a responsibility for ensuring that the highest standards of academic integrity are upheld.

In this class we will take cheating very seriously. All suspected cases of cheating and plagiarism will be automatically referred to the Office of Judicial Affairs, and we will recommend penalties appropriate to the gravity of the infraction.

COURSE SCHEDULE:

week	lecture	lab
1	<u>9/12/16</u> Introduction to laboratory, laboratory safety, record keeping. Basic techniques: solutions, concentrations, pipetting. UV-Vis spectrophotometry: instruments, measurements, data analysis.	9/13/16 Tue 9/14/16 Wed 9/15/16 Thu
2	<u>9/19/16</u> Proteins in solution: concentration determination (Lowry and Biuret assays)	9/20/16 Tue 9/21/16 Wed 9/22/16 Thu
3	<u>9/26/16</u> Proteins in solution: concentration determination (Bradford and A _{280nm} assays)	9/27/16 Tue 9/28/16 Wed 9/29/16 Thu
4	<u>10/3/16</u> Enzyme kinetics: yeast alcohol dehydrogenase Lecture exam 1 (9/12, 9/19, 9/26) Lab report 1 is due (9/19, 9/26 labs)	10/4/16 Tue 10/5/16 Wed 10/6/16 Thu
5	<u>10/10/16</u> Protein purification using affinity chromatography and enzyme kinetics	10/11/16 Tue 10/12/16 Wed 10/13/16 Thu
6	<u>10/17/16</u> Genetically modified organisms (GMO): inserted gene PCR amplification Lab report 2 is due (10/3, 10/10 labs)	10/18/16 Tue 10/19/16 Wed 10/20/16 Thu
7	<u>10/24/16</u> Genetically modified organisms (GMO): amplified DNA analysis	10/25/16 Tue 10/26/16 Wed 10/27/16 Thu
8	<u>10/31/16</u> Comparative proteomics, SDS PAGE Lecture exam 2 (10/3, 10/10, 10/17, 10/24)	11/1/16 Tue 11/2/16 Wed 11/3/16 Thu
9	<u>11/7/16</u> Comparative proteomics, Western blot	11/8/16 Tue 11/9/16 Wed 11/10/16 Thu
10	<u>11/14/16</u> ELISA Lab report 3 is due (10/31, 11/7)	11/15/16 Tue 11/16/16 Wed 11/17/16 Thu
11	<u>11/21/16</u> no class	11/22/16 no class 11/23/16 no class 11/24/16 no class
12	<u>11/28/16</u> Properties of carbohydrates	11/29/16 Tue 11/30/16 Wed 11/1/16 Thu
13	<u>12/5/16</u> lecture only Lecture exam 3 (10/31, 11/7, 11/14, 11/28)	12/6/16 Tue 12/7/16 Wed 12/8/16 Thu