Experimental Biochemistry 11:115:413 Fall

Note the course schedule is subject to change: dates, time, location. The updated information will be available to students on the canvas site and the course schedule site.

The table below provides the course meeting times. This course has a 4 hr 40 min lab component and 55 min lecture component.

Course component	Meeting days and times	Meeting location	Section
lecture	M 9:00 - 9:55 AM	Online synchronous	All sections
laboratory	T 11:00 AM - 3:40 PM	In person room 206 Lipman Hall	Section 1 11:115:413:01
laboratory	W 9:00 AM - 1:40 PM	In person room 206 Lipman Hall	Section 2 11:115:413:02
laboratory	TH 9:00 AM - 1:40 PM	In person room 206 Lipman Hall	Section 3 11:115:413:03
laboratory	F 9:00 AM - 1:40 PM	In person room 206 Lipman Hall	Section 4 11:115:413:04

TEACHING TEAM CONTACT INFORMATION:

Instructors:
Dr. Natalya Voloshchuk natalya.voloshchuk@ rutgers.edu

COURSE WEBSITE, RESOURCES AND MATERIALS:

Personal protective equipment

Usual: Safety goggles and lab coat (required, available from laboratory technician during first lab meeting). Everyone is required to wear closed-toe shoes, long pants, goggles, and a lab coat while performing laboratory work
New: face masks are required for all in-person meetings

Learning management software: Canvas

The course does not have required or recommended textbook. The course content is organized on the course Canvas site in the weekly modules. To access the course, please visit https://tlt.rutgers.edu/canvas. For more information about course access, support or technological assistance with the Canvas site contact the Canvas Help Desk via email at 877-361-1134 immediately upon having an issue.

Laboratory notebook: LabArchives

All students are required to maintain a laboratory notebook. Electronic laboratory notebook (LabArchives platform) will be used in this course. Open LabArchives account at the URL below. Note each section has specific URL (these links are also posted on the course Canvas site under Week 1& 2 module)

Section 1 Tuesday:
https://mynotebook.labarchives.com/self_signup/MzEwNTcuMHwwLzIzODkwL1NlY3Rpb24vMzQwMjE0OTA0fDc4ODM3LjA=
Section 2 Wednesday:
https://mynotebook.labarchives.com/self_signup/MzEwNTguM3wwLzIzODkxL1NlY3Rpb24vMjQwMzc5OTUwMnw3ODg0MC4z
Section 3 Thursday:
https://mynotebook.labarchives.com/self_signup/MzEwNTkuNjAwMDAwMDAwMDAyfDAvMjM4OTIvU2VjdGlvbi82ODI1MjU2Mzd8Nzg4NDMuNTk5OTk5OTk5OTk=
Section 4 Friday:
https://mynotebook.labarchives.com/self_signup/MzEwNjAuOXwwLzIzODkzL1NlY3Rpb24vMzM2ODgxMDMyOHw3ODg0Ni45

Do not ask the teaching team to solve technical issues you are experiencing in Canvas or LabArchives. Instead, please call or email the respective company and follow up with them to resolve your technical issues. To protect yourself from possibly missing a deadline because of a technical issue, we ask that you work in advance of deadlines to ensure timely completion of assignments. Please have a backup plan in place in case your computer or your internet go down during the semester as make-ups will not be given due to technical difficulties.

COURSE DESCRIPTION:
This course is intended to provide a comprehensive understanding of basic theories, techniques, and methods practiced in biochemistry laboratory

LEARNING GOALS

1) develop practical skills in the following biochemical methods and techniques: gel electrophoresis, Western, ELISA, protein activity assays and kinetics, PCR, affinity chromatography, UV-Vis spectroscopy
2) describe chemical and/or physical properties of biological molecules that are measured by the following biochemical methods and techniques: gel electrophoresis, ELISA, protein activity assays and kinetics, PCR, UV-Vis spectroscopy
3) collect, record, and analyze experimental data
4) formulate and communicate experimental results
5) identify controls for experimental set up
6) identify and explain relationships among hypothesis, methods, assumptions, and evidence
7) solve problems involving the following biochemical concepts: protein shape, size, and charge; protein-small molecule interactions, and enzymatic activity; protein-protein interactions, DNA amplification, chemical reactions of carbohydrates

ASSESSMENTS
Purpose: Assessments test students' ability to draw inferences from experimental evidence, carry out relevant calculations, and concentrate on understanding of the biochemical principles underlying experimental procedures.

Types: 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. There is NO TIME EXTENSION except for documented reasons.

Please note this is general schedule and is subject to change: dates, time, location. The updated information will be available to students on the canvas site and the course schedule site.

Lab Report 1 is based on "Protein in solution: concentration determination (Lowry assay)" experiment completed on 9/21/21, 9/22/21, 9/23/21, 9/24/21 and "Protein in solution: concentration determination (Bradford and $A_{280\ nm}$ assays)" experiment completed on 09/28/21, 09/29/21, 09/30/21, 10/1/21. The due date to submit Lab Report 1 is
10/5/2021 11:00 am Tuesday section. LATE REPORTS WILL NOT BE ACCEPTED.
10/6/2021 9:00 am Wednesday section. LATE REPORTS WILL NOT BE ACCEPTED.
10/7/2021 9:00 am Thursday section. LATE REPORTS WILL NOT BE ACCEPTED.
10/8/2021 9:00 am Friday section. LATE REPORTS WILL NOT BE ACCEPTED.
Lab Report 2 is based on "Enzyme kinetics: yeast alcohol dehydrogenase" experiment completed on 10/5/21, 10/6/21, 10/7/21, 10/8/21 and "Affinity purification and enzyme kinetics: yeast alcohol dehydrogenase" experiment completed on 10/12/21, 10/13/21, 10/14/21, 10/15/21. The due date to submit Lab Report 2 is
10/26/2021 11:00 am Tuesday section. LATE REPORTS WILL NOT BE ACCEPTED.
10/27/2021 9:00 am Wednesday section. LATE REPORTS WILL NOT BE ACCEPTED.
10/28/2021 9:00 am Thursday section. LATE REPORTS WILL NOT BE ACCEPTED.
10/29/2021 9:00 am Friday section. LATE REPORTS WILL NOT BE ACCEPTED.

Lab Report 3 is based on "Comparative proteomics, SDS PAGE" experiment completed on 11/2/21, 11/3/21, 11/4/21, 11/5/21 and "Comparative proteomics, Western blot" experiment completed on 11/9/21, 11/10/21, 11/11/21, 11/12/21. The due date to submit Lab Report 3 is
11/30/2021 11:00 am Tuesday section. LATE REPORTS WILL NOT BE ACCEPTED.
12/1/2021 9:00 am Wednesday section. LATE REPORTS WILL NOT BE ACCEPTED.
12/2/2021 9:00 am Thursday section. LATE REPORTS WILL NOT BE ACCEPTED.
12/3/2021 9:00 am Wednesday section. LATE REPORTS WILL NOT BE ACCEPTED.

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

NOTEBOOKS

All students are required to maintain a laboratory e-notebook using LabArchives platform. A 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. Do not upload lecture power point slides and posted protocols into your notebook. 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. Important: Due 90 min before lab starts. LATE WORK WILL NOT BE ACCEPTED.
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. Important: Due 90 min before next lab starts. LATE WORK WILL NOT BE ACCEPTED

QUIZZES/EXAMS
There is a lab quiz scheduled every lab session (first 5-10 min, lab protocol-based, open e-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.

STUDENT PARTICIPATION EXPECTATIONS

TIME COMMITMENT

General rule is one should plan to dedicate approximately 3hrs outside the class per credit of the class (9 hours for this class).

ATTENDANCE

Monday meetings: Students are expected to attend and participate in all meetings.
Laboratory sessions: 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 lab quizzes.

Missing an assignment/deadline: LATE WORK IS NOT ACCEPTED

If you have missed an assessment due to sickness or any other reason, please contact Dr. Voloshchuk at natalya.voloshchuk@rutgers.edu as soon as possible.

TEACHING TEAM FEEDBACK AND RESPONSE TIME

We are providing the following list to give you an idea of our intended availability throughout the course. (Remember that you can email help@canvas.rutgers.edu or call 848-932-4702 if you have a technical problem.)

- Grading and Feedback

  For weekly assignments, quizzes, and exams, you can generally expect feedback within 7 days.

- E-mail

We will reply to e-mails within 24 hours on school days.

- Discussion Board

  We will check and reply to messages in the discussions every 24 hours on weeknights.
- Office hours by appointment (via Zoom or in person)

  Please email to set up office hours with TAs. The name and email will available on the course canvas site.

COURSE GRADE IS CALCULATED AS FOLLOWS:

Total	100%
Weekly quizzes average	25%
Exams (average of 3)	20%
Lab reports (average of 3)	30%
Notebook	20%
Lab work	5%

COURSE GRADING SCALE

Grade	Range
A	**89 – 100**
B+	**85 – 88**
B	**79 – 84**
C+	**75 – 78**
C	**69 – 74**
D	**59 – 68**
F	**Below 59**

TECHNOLOGY REQUIREMENTS

Baseline technical skills necessary for online courses

- Basic computer and web-browsing skills
- Navigating Canvas

Technology skills necessary for this specific course

- Live web conferencing using Zoom
- How to convert handwritten work to pdf

Required Equipment

- Computer: current Mac or PC with high-speed internet connection

- Webcam: built-in or external webcam, fully installed
- Microphone: built-in laptop or tablet mic or external microphone

Required Software

- Microsoft Word or equivalent
- Microsoft Excel or equivalent
- Microsoft PowerPoint or equivalent

DISCUSSION AND COMMUNICATION GUIDELINES

The following are my expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.

- **Writing style**: While there is no need to participate in class discussions as if you were writing a research paper, you should remember to write using good grammar, spelling, and punctuation. Informality (including an occasional emoticon) is fine for non-academic topics. Please also refrain from using all CAPITAL LETTERS, as this is often interpreted as shouting.
- **Tone and civility**: Let us maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm does not always come across online. Treat your instructor and fellow students with respect at all times and in all communications.
- **Citing your sources**: When we have academic discussions, please cite your sources to back up what you say. (For the textbook or other course materials, list at least the title and page numbers. For online sources, include a link.)
- **Backing up your work**: Consider composing your academic posts in a word processor, where you can save your work, and then copying into the Canvas. Please keep a copy of this for your records in case it is required later.

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:

Please note this is general schedule and is subject to change: dates, time, location. The updated information will be available to students on the canvas site and the course schedule site.

Week	Synchronous Zoom meeting	Lab work 206 Lipman Hall
Week 1&2	9/8/21 (Wed = Monday schedule) **9:00 - 9:55 am** Welcome and Course introduction	none
Week 3	9/13/21 **9:00 - 9:55 am** Solutions, concentrations, pipetting. UV-Vis spectrophotometry: instruments, measurements, data analysis.	9/14/21Tue 9/15/21 Wed 9/16/21 Thu 9/17/21 Fri
Week 4	9/20/21 **9:00 - 9:55 am** Proteins in solution: concentration determination via Lowry assay	9/21/21 Tue 9/22/21 Wed 9/23/21 Thu 9/24/21 Fri
Week 5	9/27/21 **9:00 - 9:55 am** Proteins in solution: concentration determination (Bradford and A_{280nm} assays)	9/28/21 Tue 9/29/21 Wed 9/30/21 Thu 10/1/21 Fri

Week 6	10/4/21 **9:00 - 9:55 am** Enzyme kinetics: yeast alcohol dehydrogenase **Lecture exam 1 (9/13, 9/20,9/27 material)**	10/5/21 Tue 10/6/21 Wed 10/7/21 Thu 10/8/21 Fri **Lab report 1 is due (9/20, 9/27 labs)**
Week 7	10/11/21 **9:00 - 9:55 am** Protein purification using affinity chromatography and enzyme kinetics	10/12/21 Tue 10/13/21 Wed 10/14/21 Thu 10/15/21 Fri
Week 8	10/18/21 **9:00 - 9:55 am** Genetically modified organisms (GMO): inserted gene PCR amplification	10/19/21 Tue 10/20/21 Wed 10/21/21 Thu 10/22/21 Fri
Week 9	10/25/21 **9:00 - 9:55 am** Genetically modified organisms (GMO): amplified DNA analysis	10/26/21 Tue 10/27/21 Wed 10/28/21 Thu 10/29/21 Fri **Lab report 2 is due (10/4, 10/11 labs)**
Week10	11/1/21 **9:00 - 9:55 am** Comparative proteomics, SDS PAGE **Lecture exam 2 (10/4, 10/11,10/18, 10/25 material)**	11/2/21 Tue 11/3/21 Wed 11/4/21 Thu 11/5/21 Fri
Week11	11/8/21 **9:00 - 9:55 am** Comparative proteomics, Western blot	11/9/21 Tue 11/10/21 Wed 11/11/21 Thu 11/12/21 Fri
Week 12	11/15/21 **9:00 - 9:55 am** ELISA	11/16/21 Tue 11/17/21 Wed 11/18/21 Thu 11/19/21 Fri
Week 13	11/22/21* note unusual schedule (Monday meeting on 11/22/21, lab work the following week) **9:00 - 9:55 am** Properties of carbohydrates	11/30/21 Tue 12/1/21 Wed 12/2/21 Thu 12/3/21 Fri **Lab report 3 is due (11/1, 11/8 labs)**

Week 14	12/6/21 **9:00 - 9:55 am** **Lecture exam 3 (11/1, 11/8,11/15, 11/22 material)**	12/7/21 Tue 12/8/21 Wed 12/9/21 Thu 12/10/21 Fri