

# Syllabus Experimental Biochemistry

## CHEM-UA 885 Fall 2016 (4 credits)

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**LECTURE:** Friday, 9:30am – 10:45am TISC, room LC11

**LAB:** Section 1: Wednesday, 9:30am – 1:45pm Brown 455  
Section 2: Wednesday, 2:30pm – 6:45pm Brown 455

**INSTRUCTOR:** Nate Traaseth  
660 Brown, [traaseth@nyu.edu](mailto:traaseth@nyu.edu), Tel: (212) 992-9784  
Office hours: Monday, 3pm – 4:30pm (or by appointment)

**LAB INSTRUCTORS:**  
Dr. Rohini Qamra, [rohini.qamra@nyu.edu](mailto:rohini.qamra@nyu.edu) Section 1, 2  
Dr. Somdeb Mitra, [@nyu.edu](mailto:@nyu.edu) Section 1  
Michael Brady, [mb5469@nyu.edu](mailto:mb5469@nyu.edu) Section 2

**REFERENCES** *Optional:* (a) *Experimental Biochemistry 3rd Edition* by Switzer and Garrity.  
(b) *Biochemistry 7th/8th Edition* by Berg, Tymoczko, Gatto, Stryer.  
(c) Publications distributed through NYU Classes

### COURSE CONTENT

This course is a one-semester laboratory class aimed at emphasizing classical and state-of-the-art techniques in biochemistry. The laboratory modules will emphasize: (a) techniques in protein expression, purification, and quantification such as chromatography, gel electrophoresis, and Western blot, (b) techniques in biophysical chemistry such as kinetics, spectroscopy, and X-ray crystallography, and (c) techniques in nucleic acid molecular biology such as purification, polymerase chain reaction, and quantifying melting temperatures.

#### (1) Class Website:

*NYU Classes* will be used to post information concerning the course. This may include lecture notes, videos, readings, lab protocols, and web links. Check content on a regular basis.

#### (2) Grades: The final grade will be determined by the following distribution:

Lab Reports & Notebook	60%	(600 points)
Experimental Design	10%	(100 points)
Final Exam	20%	(200 points)
Attendance	10%	(100 points)

**Lab Reports.** There will be a total of 6 reports due during the semester. Reports will be submitted through NYU Classes and should include an appendix with scanned pages from your lab notebook. You may discuss results with a partner with the understanding that your lab report represents your own work. All reports will be checked for plagiarism and appropriate measures will be taken if two reports are discovered to be sufficiently similar.

**Lab Notebook.** You will need to keep detailed notes in your laboratory notebook in order to reproduce the findings of your experiments. The notebook is the location where all primary observations are recorded. You will include scanned pages from your lab notebook in laboratory reports.

**Experimental Design.** During the semester, you will be asked to design a modern version of a classical experiment in biochemistry and submit a written proposal. Your grade will be based on your ability to propose and present a novel and creative way to redo a previous experiment using techniques that may not have been available when the original experiment was carried out.

**Attendance.** Biochemistry lab is hands-on and attendance is important for success in the class. The lecture periods will introduce the following week's lab. Several labs occur over multiple weeks; therefore, it is important to avoid any absences. Part of your grade will be based on attendance; **25 points will be deducted for each absence.** There will be one make-up lab day given at the end of the semester. Three or more missed labs during the semester will result in an "Incomplete" grade.

### (3) Lab Partner Policy

You will work with one or more lab partners throughout the semester. Sometimes disagreements may arise between you and your partner. If you are unable to resolve unforeseen problems, please contact and discuss with Prof. Traaseth or your lab instructor immediately.

### (4) Supplies

You are responsible for bringing a professional lab notebook and safety glasses.

### (5) Safety

Safety is the most important part of the class. You will be required to sign a **Safety Agreement Form** to participate in the lab. If you do not follow the guidelines in this document, your lab instructor can ask you to leave the lab. Among the salient features of this document include always wearing lab glasses, gloves, and lab, as well as following waste disposal guidelines as instructed for each lab.

## Lab and Lecture Schedule

Week	Lab	Topic	Lecture	Lecture Topic
1	Sept 7	<i>No lab</i>	Sept 9	Introduction to class
2	Sept 14	Pipette calibration; AA pH titration	Sept 16	Cloning techniques
3	Sept 21	DNA purification	Sept 23	PCR techniques
4	Sept 28	Polymerase chain reaction	Sept 30	Site directed mutagenesis
5	Oct 5	Restriction digests and electrophoresis	Oct 7	Protein expression and purification
6	Oct 12	Purification of GST	Oct 14	Proteomic techniques
7	Oct 19	Electrophoresis and Western blot of GST	Oct 21	Enzyme kinetics
8	Oct 26	Tyrosinase enzyme activity	Oct 28	Analysis of protein structures w/Pymol
9	Nov 2	Myoglobin purification	Nov 4	Measurement of binding constants
10	Nov 9	Myoglobin ligand binding	Nov 11	RTK recruitment/phosphorylation
11	Nov 16	Purification of SH2 domain for NMR	Nov 18	Biomolecular NMR spectroscopy
12	Nov 23	<i>TBD</i>	Nov 25	<i>No class (TG)</i>
13	Nov 30	Crystallization of lysozyme; NMR of SH2 ± phosphopeptide	Dec 2	X-ray crystallography ( <i>Dr. Qamra</i> )
14	Dec 7	Analysis of lysozyme crystals; NMR of SH2 ± phosphopeptide	Dec 9	Hands-on NMR tutorial with Topspin
15	Dec 14	<i>Make-up day</i>	Dec 16	<b>Final exam</b>