

BMB 370 – Introductory Biochemistry Lab

Course format Credit hours: 3
Course modality: In person
Lecture: Monday, 8:00–8:50 am, BPS room 1410
Laboratory: Tuesday (section 001), Wednesday (section 002), and Thursday (section 003), 9:10–12:00 am, Biochemistry 117
Recitation: Friday, 12:40–1:30 pm BPS room 1410

Course website address <https://d2l.msu.edu/d2l/home/1673719>

Instructors Dr. Claire Vieille vieille@msu.edu
Dr. Sean Weise weisesea@msu.edu

Teaching assistants Rachel Nicholas nicho456@msu.edu
Connor Powers powersco@msu.edu
Tianqi Wang wangqi73@msu.edu

Office hours:

Claire Vieille	Monday, 4:00 pm to 6:00 pm, BPS Rm 6172
Sean Weise	Monday – Thursday, 12:00 pm to 4:30 pm, Biochemistry Rm 105
Rachel Nicholas	TBD
Connor Powers	TBD
Tianqi Wang	TBD

Description: This introductory laboratory course emphasizes basic quantitative laboratory skills and data analysis using biochemical methods and principles for the study of sugars, proteins, and nucleic acids.

Course Overview: BMB 370 provides an introduction to biochemical and molecular concepts, techniques, and data analysis tools commonly used in basic research and in industrial labs. The course has a course pack that contains the objectives, requirements, and procedures to be carried out in each of the laboratory periods. Weekly lectures introduce students to the concepts and methods involved in the corresponding lab period. Weekly lab periods familiarize students with basic biochemistry techniques using experiments with carbohydrates, proteins, and nucleic acids. These experiments and their analysis provide a foundation for students who want to join research labs and apply for internships. Weekly recitations cover experimental learning outcome debrief, data analysis, and general Q&A.

Required Course Materials and technology:

- Students must supply protective eye wear (safety glasses)
- No shorts, sandals, or open-toed shoes are allowed in the laboratory
- Strongly suggested to bring your laptop computer (to directly collect data) and your phone (to take pictures of your work) in the lab
- Strongly suggested to use a scientific calculator for your homework and in the lab.
- No textbook is required for this course.
- The course will use **D2L** (accessed at <http://d2l.msu.edu>) and **Google Docs**.



- The D2L quiz feature (homework) works better in Google Chrome than in other browsers, so we strongly encourage you to use Chrome for your homework.

Desired course learning outcomes

After completing this course, students should be able to

1. Pipet accurately and reproducibly
2. Prepare simple pH buffers, solutions, and media
3. Prepare serial dilutions
4. Choose an appropriate buffer for a given pH
5. Quantify protein concentration in a sample
6. Perform simple enzyme assays and calculate enzyme activity
7. Determine solute concentrations in a sample using enzyme assays
8. Isolate plasmid DNA and understand the isolation process
9. Set up DNA restriction digests and run agarose gels
10. Set up a PCR reaction and understand conceptually what is taking place
11. Determine the size of a DNA fragment or a protein based on their migration in a gel
12. Represent experimental data using graphs and other visualization tools

Strategies to succeed in the course

- Attending the lectures and recitations is mandatory; taking notes of important concepts
- After missing a class, watching the recording of the lecture, or getting another student's notes
- Going over the slides of a lecture *before attending the lecture* to get familiar with the topic and to note any question that might come up during class
- Reviewing the lecture material and the course companion before doing the homework and trying a first homework attempt without looking at course notes. Not relying on other students' answers as it defeats the learning process and does not prepare you for the exams and for working in a research lab
- Completing the for-credit D2L homework every week (deadline Friday 11:59 pm)
- Reviewing the Monday lectures before coming to the lab session to help with understanding and navigating the lab experiments
- Actively contributing to team work in the lab to gain as many laboratory skills as possible, to test your understanding of the material, and benefit from peer learning
- Reading the homework feedback posted weekly on D2L to better learn how to set up calculations correctly
- Following the instructions to complete notebooks and turn in notebooks on time
- **ASKING QUESTIONS** during/immediately after lectures, during office hours, during appointments outside of office hours, during the lab periods, during recitations, or by e-mail
- Being proactive and not waiting until after the second exam to seek help on how to improve your grade

Learning Continuity

If you are unable to attend class for an extended period of time:

- Contact the instructors as soon as possible with a justification for your absence

- As much as the timing in the semester allows it, instructors will do their best to provide you with a timeline for completing the assignments.
- If you are absent for over a week, instructors will do their best to allow you to catch up with the learning experience as allowed by time and resource limits

Assessments: Class performance will be evaluated predominantly through weekly lab notebooks, weekly D2L homework, two in-class lab practicals and one final written exam. Students will receive problem sets to train/practice data analysis with step-by-step instructions for calculations one week prior to experiment time. Lab notebooks will be graded on critical analysis and interpretations as indicated by student-written conclusions.

Students will receive 2 points in their lab notebook grades for arriving on time and be ready to start the lab promptly at 9:10 am.

Grades in BMB 370

Notebooks	55%
Two practical exams	10% each
D2L homework	15%
Final written exam	10%
Total	100%

Tentative grading scale	
%	Grade
≥ 90	4
≥ 85	3.5
≥ 80	3
≥ 75	2.5
≥ 70	2
≥ 65	1.5
≥ 60	1
≤ 60	0

The lowest lab notebook score and the lowest homework score will be dropped to accommodate events such as illnesses.

You must provide adequate documentation to the instructor for an absence to be excused. Excusable absences include academic absences (e.g., conference attendance), attending a funeral, or illness. In the case of medical absences students are welcome and encouraged to redact as much information from the "doctor's note" as they would like, that still conveys the evidence of illness during the relevant time-period that prevents attendance. Weddings and leisure/family travel do not constitute excusable absences.

You will have one week to complete your lab notebook for each week's laboratory exercises. Because of the ample time provided, lab notebooks turned in late due to last minute computer problems, unanticipated illness, or other life events will not be excused and will be graded as late. Please do not leave lab notebook completion to the last minute. The late penalty for notebooks is 10% of the points for the assignment per day (including weekends) up to a maximum of 50% off. No notebooks will be accepted past two weeks after the deadline. All grades will be communicated through the D2L gradebook.

If you have an unexcused absence from a lab, you can still turn in the notebook for that lab but will receive 50% credit.

Challenging Grades

From the time an assignment's grade is posted, students have **2 weeks to challenge their grade** by contacting Dr. Weise with a list of items from the grading rubric they believe were graded incorrectly and noting where in the assignment they satisfactorily covered that content.

Honors option

TBA

Diversity, Equity, and Inclusion Policy

Inclusion and diversity are core values of MSU, the College of Natural Science, and the Department of Biochemistry & Molecular Biology. Drs. Vieille, and Weise are committed to creating and maintaining an inclusive classroom in which students can work together in an atmosphere free from all forms of discrimination and harassment. Along with the expectations for coursework, we expect that we will all treat each other with respect and collegiality, and that we will be open to conversations and perspectives that challenge our own perspectives.

All people have the right to be addressed and referred to in accordance with their personal identity. Students should please let us know if they would like to use a name or pronouns different from those used for you by the University.

Mandatory Reporting Policy

As professors, one of our responsibilities is to help create a safe learning environment for our students and for the campus as a whole. As members of the university community, we are required to report any instances of sexual harassment, sexual violence and/or other forms of prohibited discrimination. If a student has a need to report about any such event(s), but would rather share information with a confidential employee who does not have this reporting responsibility, a list of those individuals can be found here <https://caps.msu.edu/>.

Policy on religious observance

It is the policy of MSU to permit students to observe holidays set aside by their chosen religious faith. If a student needs to be absent from class on a religious holiday, please make arrangements with instructors in advance.

Grief Policy

Please read the Grief Absence Policy at <https://reg.msu.edu/ROInfo/Notices/GriefAbsence.aspx>. Instructors will do their best to provide students with a timeline for completing homeworks and group worksheets compatible with students' absence.

Student Integrity and Academic Honesty Statement

Article 2.3.3 of the Academic Freedom Report states that “The student shares with the faculty the responsibility for maintaining the integrity of scholarship, grades, and professional standards.” In addition, the BMB Department adheres to the policies on academic honesty as specified in General Student Regulations 1.0, Protection of Scholarship and Grades; the all-University Policy on Integrity of Scholarship and Grades; and Ordinance 17.00, Examinations. (See Spartan Life: Student Handbook and Resource Guide and/or the MSU Web site: www.msu.edu.)

Therefore, unless authorized by the instructor, students are expected to complete all course assignments, including homework, lab work, and exams, without assistance from any source. Students are expected to develop original work for this course. Students who violate MSU academic integrity rules may receive a penalty grade, including a failing grade on the assignment or in the course. The instructor should be contacted if a student is unsure about the appropriateness of the course work (See also <http://www.msu.edu/unit/ombud/dishonestyFAQ.html>).

Syllabus FS23 BMB 370 – Introductory Biochemistry Lab

Important dates to remember

Classes Begin:	Monday Aug 28th
Labor day:	Monday Sept 4 th
Last day to drop with no grade reported:	Monday Oct 16 th , 4:00 pm
Fall break:	Monday Oct 23 th – Tuesday Oct 24 th
Thanksgiving break	Thursday Nov 23 th – Friday Nov 24 th
Classes End:	Friday Dec 8 th
Final Exam:	Monday Dec 11 th , 7:45 am – 9:45 am

Course Schedule

Date	Instructor	Session name	Weekly topics	Homeworks	Notebooks
Mon Aug 28	CV	Lecture 0	Intro to the course	Due Friday at 11:59 pm	Due on lab day at 9:00 am
Tue-Thu Aug 29-31					
Fri Sept 1	CV	Lecture 1	Measuring devices	Homework 1	
Mon Sept 4		Labor day			
Tue-Thu Sept 5-7	SW	Lab 1			
Fri Sept 8	SW-CV	Recitation 1			
Mon Sept 11	CV	Lecture 2	pH, pKa	Homework 2	
Tue-Thu Sept 12-14	SW	Lab 2			Notebook 1
Fri Sept 15	SW-CV	Recitation 2			
Mon Sept 18	CV	Lecture 3	Introduction to the spectrophotometer	Homework 3	
Tue-Thu Sept 19-21	SW	Lab 3			Notebook 2
Fri Sept 22	SW-CV	Recitation 3			
Mon Sept 25	CV	Lecture 4		Enzyme assays and effect of pH on enzyme activity	Homework 4
Tue-Thu Sept 26-28	SW-CV	Lab 4			Notebook 3
Fri Sept 29	CV	Recitation 4			
Mon Oct 24	CV	Review session			
Tue-Thu Oct 3-5	SW	Practical exam 1	On labs 1 to 3		Notebook 4
Fri Oct 6					
Mon Oct 9	CV	Lecture 5	Total protein determination	Homework 5	
Tue-Thu Oct 10-12	SW	Lab 5			
Fri Oct 13	SW-CV	Recitation 5			
Mon Oct 16	CV	Lecture 6	Plasmid DNA purification	Homework 6	
Tue-Thu Oct 17-19	SW	Lab 6			Notebook 5
Fri Oct 20	SW-CV	Recitation 6			
Mon Oct 23		Fall break			
Tue Oct 24					
Wed-Thu Oct 25-26	SW	Lab 7	G6P and glucose concentration assays		Notebook 6
Fri Oct 27	SW-CV	Recitation 7			(sec 1 due on Wed)
Mon Oct 30	CV	Review session			
Tue-Thu Oct 31-Nov 2	SW-CV	Practical exam 2	On labs 4 to 6		
Fri Nov 3					
Mon Nov 6	CV	Lecture 8	Restriction enzymes	Homework 8	
Tue-Thu Nov 7-9	SW	Lab 8			Notebook 7_sec 2 & 3
Fri Nov 10	CV	Recitation 8			
Mon Nov 13	CV	Lecture 9	PCR	Homework 9	
Tue-Thu Nov 14-16	SW	Lab 9			Notebook 8
Fri Nov 17	SW	Recitation 9			
Mon Nov 20					
Tue Nov 21	SW	Lab 7	G6P and glucose concentration assays		Notebook 9
Wed Nov 22					
Thu Nov 23		Thanksgiving			
Fri Nov 24					
Mon Nov 27	CV	Lecture 10	Affinity column protein purification	Homework 10	
Tue-Thu Nov 28-30	SW	Lab 10			Notebook 7_sec 1
Fri Dec 1	CV	Recitation 10			
Mon Dec 4	CV	Lecture 11	Protein electrophoresis	Homework 11	
Tue-Thu Dec 5-7	SW	Lab 11			Notebook 10
Fri Dec 8	CV	Recitation 11			
Mon Dec 11, 7:45 am	CV	Written exam		On labs 8 to 11	

CV: Claire Vieille; SW: Sean Weise