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 113 and 117
Lab Lecture: Friday, 12:40–1:30 pm BPS room 1410
Attendance to lectures and lab is mandatory.

Course website address

https://d2l.msu.edu/d2l/home/2390210
https://d2l.msu.edu/d2l/home/2390216
https://d2l.msu.edu/d2l/home/2390214
https://d2l.msu.edu/d2l/home/2390212

Instructors

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

Teaching assistants

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Office hours:

Dr. Weise	Mon 1 pm – 4pm, Tues – Thurs 2-4 pm Biochemistry Rm 105B
Dr. Vieille	Mon 2:30 – 4 pm, BPS 6172

Course Description:

BMB 370 provides an introduction to biochemical and molecular concepts, techniques, and data analysis tools commonly used in basic research and in industrial labs. 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 proteins and nucleic acids. These experiments and their analysis provide a foundation for all biochemistry students that will be particularly helpful for those who want to join research labs and apply for internships. Weekly lab lectures cover experimental learning outcomes, 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
- Laptop computer and smart phone are required in lab every week. Because you will need Microsoft Office as well as SnapGene Viewer software, a PC or Mac is required. Chromebooks will not work.
- Basic scientific calculator, the Texas Instruments TI-30Xa is recommended. A more complicated graphing calculator is often a hindrance
- Standalone (**not web browser-based**) Microsoft Office apps Excel, Word, and PowerPoint. Instructions for downloading these apps for free can be found here: https://tech.msu.edu/technology/hardware-software/microsoft-licenses/#undergrad

Grading Policies:

Class performance will be evaluated through weekly lab notebooks, weekly D2L homework, two in-class lab practical exams and one final written exam.

Notebooks	45%
D2L homework	5%
2 practical exams	16.7% each
Final written exam	16.7%
Total	**100%**

Grading Scale

%	Grade
≥ 90	4.0
≥ 85	3.5
≥ 80	3.0
≥ 75	2.5
≥ 70	2.0
≥ 65	1.5
≥ 60	1.0
< 60	0

Lecture, lab, and lab lecture are all mandatory. Attendance will be recorded.

Homework

- **Due Monday of each week at 11:59 pm**
- Cumulative average homework grade worth 5% of the total course grade
- Homework consists of 10 multiple choice questions on the lecture channel on D2L. You can access the homework in the week's folder under the content tab in D2L.
- The homework is designed as a partial review of Monday's lecture and to prepare you for that week's lab. Questions are often designed to encourage you to read the lab instructions ahead of time.
- For every math problem you have to solve in the lab there is a similar problem in the homework. Help with homework problems can be found in the "Lab Companion" which is under "Useful Stuff" in the lecture channel on D2L.
- The answers to all the homework questions are posted on D2L the day after the homework is due. The answer key has full explanations to the theoretical questions and has the math problems fully worked out with explanations.
- All homework assignments are available for you on D2L from the first day of class. There will be no extensions of homework due dates.

Lab Notebooks

- **Due the week following the lab, Tuesday, Wednesday, or Thursday at 8:30 am, depending on your section**
- Lab notebooks should be submitted in PDF format via a dropbox in your section channel of the course on D2L. The dropboxes for each week's notebook are under "Assignments."
- Cumulative average lab notebook grade worth 45% of the total course grade.
- Because you have one week to complete the lab notebooks, due date extensions will not be granted. Lab notebooks turned in at 8:31am will be considered 1 day late.
- The late penalty for notebooks is 10% of the points for the assignment per 24 hr period (including weekends) up to a maximum of 50% off. Lab notebooks turned in late due to last minute computer problems, unanticipated illness, or other life events will be graded as late. Do not leave lab notebook completion to the last minute.

- Late notebook submissions will not be graded if submitted more than one week after the deadline. The last two lab notebooks of the semester will not be accepted later than 8:30 am on the Tuesday of final exam week.
- Two points in each lab notebook grade are given for arriving to lab on time, having already filled the required tables in the lab instructions, and being ready to start the lab promptly at 9:10 am. FIlling out tables ahead of time encourages you to read the lab instructions ahead of time.
- Lab notebook grades will be lowered by 25% for arriving to the lab 1 hour late and by 50% for arriving 2 or more hours late.
- Lab notebook requirements are stated at the end of each week's lab instructions, under the headers "Data Analysis" and "Conclusions"
- **DO NOT** turn in the lab instructions for your lab notebook. You will receive a 25% penalty if you do so. A specific "Lab Notebook Template" for the lab notebooks is posted under "Useful Stuff" on the lecture channel on D2L.
- An example lab notebook is available on D2L for the first week's lab, so you can see what a lab notebook should look like.
- An important part of science is professionalism. You will start learning how to present professional looking results in this course. For this reason, all the sections of the lab notebook have very specific guidelines. These guidelines are specified in the Lab Companion. Failure to adhere to these guidelines will result in point deductions for the lab notebook.
- Lab notebooks cannot be resubmitted once they have been graded.

Practical Exams

- The average of each practical exam is worth 16.7% of the total course grade.
- Practical exams are exams where you perform lab methods almost identical to what you did in class and prepare a short exam report to be turned in on D2L before the end of the exam period.
- Tables, graphs, and answers to questions should follow the same guidelines as the lab notebook.
- The methods you will be asked to complete for the exams are posted on D2L under "Exams".
- Each practical exam will also include a few short answer questions covering the corresponding theory part of the course. The subject matter of those questions is also contained in the practical exams posted on D2L.
- Practical exams are open note, open computer, but not open cell phone. Even with the open note policy, a thorough understanding of the theory and methods is required to do well on the exam.
- Practical exams are due at the end of the exam period at 12:00 pm. There will be as 1% deduction for every minute late.
- Practical exams should be submitted in PDF format via a dropbox in your section channel of the course on D2L. The dropboxes for the practical exams are under "Assignments."

Final Exam

- The average final exam score is worth 16.7% of the total course grade.
- A study guide and example exam from a previous year are posted on D2L under "Exams"
- The final exam is a written short answer exam administered during finals week. Usually for this course it is Monday at 7:45 am in our lecture room.
- The exam is 2 hours long. Extra time on the exam will not be permitted without RCPD accommodations.
- The exam is not open book but you are allowed to bring a 5' x 8' notecard filled with whatever you can fit on the card. The card can be filled out front and back. Cards larger than 5' x 8' will be cut to

5’ x 8’ at the instructor’s discretion prior to the start of the exam. Even with the notecard, a thorough understanding of the theory, methods, and calculations are required to do well on the exam.

- Bring a calculator to the exam. It will be needed.
- Cell phone use, even for a calculator, is prohibited on the exam. Cell phone use will result in a 0 for the exam.
- The final exam is not cumulative and will cover the molecular biology and recombinant protein purification labs that were not covered on the practical exams.

Lab and Exam Attendance Policies:

- No more than two excused absences are allowed. Further absences will be considered unexcused absences and lab notebook submission will be graded for 50% credit even if turned in on time.
- No more than two unexcused absences are allowed. The third unexcused absence will result in a 0 for the course.
- The maximum number of absences allowed is 2 excused absences and 2 unexcused absences. A fifth absence will result in a 0 for the course.
- Students must provide adequate documentation to the instructor preferably before, but no later than 48 hours after the absence for an absence to be excused. It is the student's responsibility to contact Dr. Weise regarding excusable absences. Absences will not be excused retroactively (after 48 hr). Excusable absences include academic absences (e.g., conference attendance), attending a funeral, or illness. In the case of medical absences students are welcomed and encouraged to redact as much information from the "doctor’s note" as they would like, as long as the note still conveys the evidence of illness for the time period that prevented attendance. Participation in sports (MSU or other), weddings, and leisure/family travel or family obligations do not constitute excusable absences.
- For an excused absence to attend a funeral, a grief absence must be obtained from the College of Natural Science. https://natsci.msu.edu/undergraduate/current-students/undergraduate-academic-student-affairs/index.aspx
- Make-up labs and exams will be offered for excused absences only. All make-up labs and exams must be completed within one week of the missed lab. A missed make-up lab will default to the unexcused absence policy of 50% credit using data provided by Dr. Weise and will be due at the original date with an additional 10% off for each day late. A missed make-up exam will result in a 0 for that exam.
- Lab notebooks for the first absence (excused or unexcused) can be turned in by the original due date for 100% credit using data provided by Dr. Weise. It is the student's responsibility to contact Dr. Weise to request data.
- Lab notebooks for excused absences can be turned in for 100% credit. Except under exceptional circumstances the lab notebook is still due by the original due date and time.
- Lab notebooks for unexcused absences can be turned in by the original due date and time for 50% credit using data provided by Dr. Weise. It is the student's responsibility to contact Dr. Weise to request data.
- There are no make-ups for unexcused exam absences. An unexcused exam absence will result in a 0 for that exam.

Cheating and Academic Dishonesty Policies:

- While most lab work is done in pairs, students are expected to do their own work on lab notebook submissions. Duplicated lab notebooks, whole or in part, will result in a 0 for that lab notebook for all students involved.

- A second incidence of cheating will result in a 0 for the course and reporting to the university.
- AI may be used to assist in the understanding of material for the completion of lab notebooks, similar to conducting a web search for information.
- Direct answers to questions, calculations, graphs, or figures generated by AI (cited or uncited) are not allowed in lab notebooks or exams. This is considered plagiarism and defeats the learning process.
- Work generated by AI will result in a 0 for that lab notebook or exam. A second incidence will result in a 0 for the course and reporting to the university.
- Cheating on exams will result in a 0 for that exam and reporting to the university.
- Leaving the exam room prior to submitting the exam without the consent of the instructor may constitute cheating and result in a 0 for the exam
- Students are expected to develop original work for this course. (See also http://www.msu.edu/unit/ombud/dishonestyFAQ.html).
- Falsified documentation for an absence will result in a 0 for the lab notebook or exam involved and reporting to the university.

RCPD Accommodation:

- It is the responsibility of students with RCPD accommodation letters to present these letters to the instructors during the first week of the semester, or as soon as the accommodation is granted (even if you do not intend to use the accommodation). RCPD accommodations will not be granted retroactively.
- It is the responsibility of students with RCPD accommodation to contact and meet with instructors during office hours to discuss the specific implementation of their accommodations. This approach ensures that things go smoothly and predictably during labs and exams. It also helps avoid disclosure of accommodations to other students.

Challenging Grades:

From the time an assignment's grade is posted, students have **1 week to challenge their grade** by contacting Dr. Weise, **not TAs**. This is best done during Dr. Weise's office hours. Grading challenges will not be considered during class or lab time. Grading challenges will not be considered after 5 pm on the Friday of finals week regardless of when the grade was posted.

Strategies to succeed in the course:

- Attendance to lectures (Mon and Fri) and lab is mandatory. Attendance will be monitored. You will be expected to know everything mentioned during class or lab time. **Take notes.**
- If you miss a class or a lab, get notes from another student and contact Dr. Weise for data to submit your lab notebook. 50% credit is better than a 0.
- If you missed a lab that will be covered on the first or second lab practical, contact Dr. Weise to arrange a time to familiarize yourself with the lab protocol you missed.
- Complete the required tables and familiarize yourself with the protocol before coming to lab. Students are expected to read the lab instructions before coming to the lab.
- Students often find that working from a printed copy of the lab instructions works better than reading it from a laptop or tablet in the lab. If this is the case for you and if you have access to a printer, print out each week's lab instructions.
- Download and use the Lab Companion posted on D2L to help solve homework and lab problems. Understand what you are doing, do not blindly apply formulas.

- Do not rely on online answers or other students' answers for homework. It defeats the learning process, does not prepare you for the exams, or for working in a research lab.
- Be an active participant in the lab. Do not let your lab partner do all the work. If you do, you will not be prepared for the practical and final exams.
- Read the homework answer keys posted weekly on D2L to better learn how to set up calculations correctly. The homework answer keys are also a great way to study.
- Use the lab notebook template posted on D2L and follow the directions in the lab instructions to complete your notebooks. Turn in lab notebooks on time.
- Lab notebooks should be submitted in **PDF format** to prevent formatting errors by D2L.
- After posting your lab notebook on D2L, double-check that your turned in the correct lab notebook, that all calculations, tables, graphs, figures, and conclusions are included, and that your document is formatted correctly. You can always resubmit the corrected notebook if you find a mistake. A notebook can be resubmitted after the due date, but it will be subject to the 10% per day penalty.
- Read the weekly feedback on graded lab notebooks to understand what you did incorrectly so you can improve in your next submissions.
- **ASK QUESTIONS** during/immediately after lectures, during office hours, during appointments outside of office hours, during the lab periods, and during recitations.
- Be proactive and do not wait until after the second exam to seek help on how to improve your grade. By this point it is difficult to improve your grade. We are here to help you. Make use of office hours.

Honors option

TBD. Offering of an honors option in spring 2026 will depend on how many TAs we can secure for the course.

Student Integrity and Academic Honesty

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.)

Access, Opportunity, and Excellence

The BMB 370 instructors 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.

Please let us know if you would like to use a name or nickname different from that used by the University and we will accommodate you

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 any such event(s), but would rather share information confidentially with

an employee who does not have this reporting responsibility, a list of those individuals can be found here https://caps.msu.edu/.

Religious Observance Policy:

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 labs compatible with students' absence.

Course Schedule

Day	Session and topic	Instructor	Homework due Monday at 11:59 pm Lab Notebook due at 8:30 am on lab day
Mon Jan 12	Volume and Density	Dr. Weise	
Tues - Thurs	Volume and Density Lab	Dr. Weise	Volume and Density Homework
Fri Aug 16	pH Lecture	Dr. Weise	
Mon Jan 19	Martin Luther King Day		
Tues-Thurs	pH Lab	Dr. Weise	pH Homework Volume and Density Lab Notebook
Fri Jan 23	Lab Lecture pH	Dr. Weise	
Mon Jan 26	Dilutions and Spectrophotometer Lecture	Dr. Weise	
Tues-Thurs	Dilutions and Spectrophotometer Lab	Dr. Weise	Dilutions and Spec Homework pH Lab Notebook
Fri Jan 30	Dilutions and Spectrophotometer Lab Lecture	Dr. Weise	
Mon Feb 2	A280 & Bradford Assay Lecture	Dr. Weise	
Tues-Thurs	A280 & Bradford Assay Lab	Dr. Weise	A280 & Bradford Assay Homework Dilutions and Spec Lab Notebook
Fri Feb 6	A280 & Bradford Assay Lab Lecture	Dr. Weise	
Mon Feb 9	Review for Exam 1	Dr. Weise	
Tues-Thurs	Exam 1	Dr. Weise	A280 & Bradford Assay Lab Notebook
Fri Feb 13	Classes Cancelled		
Mon Feb 16	Lowry Assay Lecture	Dr. Weise	
Tues-Thurs	Lowry Assay Lab	Dr. Weise	Lowry Assay Homework
Fri Feb 20	Lowry Assay Lab Lecture	Dr. Weise	
Mon Feb 23	Enzyme Assay Lecture	Dr. Weise	
Tues-Thurs	Enzyme Assay Lab	Dr. Weise	Enzyme Assay Homework Lowry Assay Lab Notebook
Fri Feb 27	Review of Practical Exam 2	Dr. Weise	
Mon Mar 2 Tues-Thurs Fri Mar 6	Spring Break		Enzyme Assay Lab Notebook
Mon Mar9	Review for Exam 2	Dr. Weise	
Wed-Thus	Exam 2	Dr. Weise	
Fri Mar 13	Review of Exam 2	Dr. Weise	
Mon Mar 16	Lecture Plasmid Prep	Dr. Vieille	
Tues-Thurs	Plasmid Prep & Transformation Lab	Dr. Weise	Plasmid Prep Lab Homework
Fri Mar 20	Plasmid Prep Lab Lecture	Dr. Weise	
Mon Mar 23	Bacterial Transformation Lecture	Dr. Vieille	
Tues-Thurs	Bacterial Transformation Lab	Dr. Weise	Bacterial Transformation Homework Plasmid Prep Lab Notebook
Fri Mar 27	Bacterial Transformation Lab Lecture	Dr. Weise	
Mon Mar 30	PCR Lecture	Dr. Vieille	
Tues-Thurs	PCR Lab	Dr. Weise	PCR Homework Bacterial Transformation Lab Notebook
Fri Apr 3	PCR Lab Lecture	Dr. Weise	
Mon Apr 6	DNA Agarose Gel Lecture	Dr. Vieille	
Tues-Thurs	DNA Agarose Gel Lab	Dr. Weise	DNA Agarose Gel Homework PCR Lab Notebook
Fri Apr 10	DNA Agarose Gel Lab Lecture	Dr. Weise	
Mon Apr 13	Protein Purification Lecture	Dr. Vieille	
Tue-Thurs	Protein Purification Lab	Dr. Weise	Protein Purification Homework DNA Agarose Gel Lab Notebook
Fri Apr 17	Protein Purification Lab Lecture	Dr. Weise	
Mon Apr 20	SDS-PAGE Lecture	Dr. Vieille	
Tues – Thurs	SDS-PAGE Lab	Dr. Weise	SDS-PAGE Homework SDS-PAGE Notebook Due Fri 11:59 pm
Fri Apr 24	SDS-PAGE Lab Lecture	Dr. Weise	
Mon Apr 27	Final Exam 7:45am	Dr. Weise	