

Biochemistry II Discussion

BB 422/528/622

Spring 2025

Dean R. Tolan

Discussion Leader

Biochemistry Lab Coordinators, Dean Tolan, Yinze Wu and Jackson V. Ho

Discussion sections (1 h 45 m)

C1 Thu 1:30 – 3:15pm **PSY B33**

C3 Mon 2:30 – 4:15pm **CAS 326**

C2 Fri 2:30 – 4:15pm **SCI 115**

Office hours and contact info

Mon 4:00–5:00 pm **LSE 704**

Wed 12-1 **LSE 604**

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Laboratory sections (4 h; SCI 162)

#	Day	Time	Coordinator
B5	Thurs	5:30 – 9:30pm	Tolan
B6	Fri	10:10 – 2:10pm	Tolan
B7	Fri	3:35 – 7:35pm	Wu
B1	Mon	6:00 – 10:00pm	Wu
B2	Tues	8:00 – 12:00pm	Ho
B3	Tues	5:30 – 9:30pm	Ho

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Biochemistry Discussion

Discussion will provide helpful notes to complete lab experiments and **lab write-ups** for each chapter. There will be an **in-class activity** during discussion, and this contributes to your **attendance**.

Quizzes will be given at the end of every discussion. Discussions are **mandatory** and held in-person.

A lab **comportment** grade is assigned throughout the semester (a mid-semester feedback will be given).

Lab grade is composed of:

Lab grade component	Percentage
Laboratory write-ups	67%
Comportment	15%
Discussion attendance	9%
Discussion quizzes	9%

For 422 students – lab is 30% of course grade!

Outline of today's discussion

1. Lab syllabus
2. Your laboratory notebook; pre- and post-lab assignments
3. The laboratory manual
4. Using Your Laboratory Manual & Notebook
5. Laboratory Reports
6. Online radioactivity safety training (deadline Feb 19)
7. Chapter 7 concepts
8. Chapter 7 procedures
9. Chapter 7 checklist
10. In-class activity
11. Quiz

Lab Syllabus: Requirements

Prerequisites

- CAS BI/CH 421; or equivalent
- First Year Writing Seminar (e.g., WR 100 or WR 120)

Questions, concerns, differences in opinion

- Resolve it with your lab TFs, the your coordinator
- Questions about lab write-ups, ask during office hours and through Slack channel

Lab Syllabus: Requirements

Required materials

- Textbook:
 - *Biochemistry Lab Manual 6th Edition*, Tolan, Medrano & Low (BU Bookstore)
- Lab Materials:
 - Safety goggles
 - A lab coat
 - A bound notebook
 - Scientific calculator
 - USB flash drive
 - Black or blue pens (**NO pencils or white-out!**)
- Slack App
 - For you to help each other!
 - Discussion amongst students in general chat
 - TFs will try their best to answer and help you

Lab Syllabus: Lab Safety

- Dress appropriately
 - Closed-toed shoes, long pants, t-shirt, long hair tied back
 - **Safety eyewear & long lab coats** worn **at all times**
- No food, drink, or consumables of any kind
 - Water bottles should be hidden in backpacks or on table outside lab
- No application of cosmetics in lab
- All used plastics, sharps, and solid waste go in designated containers (read the signs)
- All hazardous chemicals disposed of appropriately (TFs will advise)
- Arrive to lab on time (**~5–10 min before start is best**). Do not be late!

Repeat violations will result in dismissal for the day and will negatively impact your comportment grade.

SCI 162 Lab Rules

1. Dispose of waste in the correct containers
 - a. Plastic consumables (barrels): pipette tips, conical tubes, eppendorf tubes
 - b. Biohazard bin (**red** or **yellow**): serological pipettes *placed horizontally*
 - c. Cardboard glass waste (**blue and white**): glass tubes, any broken glass (have TF clean)
 - d. Liquid waste and flammables go in separate identified amber bottles
do not overfill or try to stuff waste containers
2. Only use equipment at your bench, do not take from other benches even if they are empty
3. Clean up after yourself, including making sure your bench equipment has the correctly numbered label
4. If you take a reagent out of the fridge, please return it to the fridge.
5. Do not touch reagents or equipment that are not designated for your course.
6. Always wear safety gear and abide by basic laboratory safety
7. Absolutely no food or drinks allowed
8. If you are confused over anything (procedures, equipment, reagents, etc), please ask rather than guess!

Attendance at Labs and Discussions is mandatory!

Making up lab work*

- Anticipated absences (e.g. jury duty, BU athletics, interviews)
 - Notify your Lab Coordinator **ASAP**, at least a week of notice
(**must be cleared by Lab Coordinator; see syllabus for your section*)
- Sudden emergencies (e.g. family death, hospitalization, accident)
 - Requires *bona fide* documentation
- Students can miss **up to two weeks** of Biochemistry labs without having any additional negative impact to their scores due to excusable circumstances
- Make-up labs or work will be provided so the post-lab report can be completed

Making up discussion work

- No make-up quizzes for discussion are available past the discussion date (unless sudden emergency with proper documentation)

If you anticipate missing a discussion, you must contact Dr. Tolan more than a week in advance

Lab Syllabus: Grading

Laboratory Write-ups

- Pre-lab sections and all data collection/observations must be written in your laboratory notebooks **in pen**.
- Pre-lab and Post-lab write-up templates will be provided in GradeScope every week. Laboratory Report templates will be available for each chapter. You will complete the templates in GradeScope, and we will grade your submission.
- A **10% deduction penalty** will be applied for each day your write-up is turned in late (***every 24 hours from time due!**).

Lab Syllabus: Grading

Discussion Quizzes and Attendance

- Quizzes given at the end of each discussion section.
- Read introduction and procedure sections in lab manual to prepare for quizzes.
- In-class activity during discussion that will contribute to your attendance.

Comportment

- Attendance, punctuality, cleanliness, preparation, effort, laboratory skills, quality of experimentation, ability to work in a group, and adherence to safety regulations will all be factored into this evaluation throughout the semester.

Lab Syllabus: Academic Misconduct

Examples of Violations in Academic Conduct

- Photocopying or copying from lab manual or discussion slides
- Copying from lab partner, current students, or previous students (any part of the notebook)
- Copying verbatim from lab manual (introduction and lab procedures)
- Using a table or graph created by your lab partner
- Copying off another student or using personal notes during a discussion quiz

Students are free to talk about data and experiments, but required to work independently on all aspects of post-lab write-ups

Lab Syllabus: Schedule

Experimental Topic	Manual Chapters	Discussion Dates	Lab Dates	Dates for Reports due*, Project due, and Exams
Quantitative Determination of Sugar in Blood	7	Jan 27 – Jan 31	Jan 30 – Feb 4	
Plasmid DNA Preparation	6A	Feb 3 – 7	Feb 6 – 11	
		No Discussion	No Lab (13-18)	(Exam 1)
Transcription/Translation	8AB	Feb 18 – 21 (T;R;F)	Feb 20 – 25	Chapter 7 (50 pts) (proj 1)
SDS-PAGE Analysis of Translated Proteins & Autoradiography	8C	Feb 24 – 28	Feb 27 – Mar 4	
Determination of Sulfhydryl Groups with DTNB	9A	Mar 3 – 7	Mar 6 – 7	(Exam 2)
SPRING BREAK				
Determination of Sulfhydryl Groups with DTNB	9A	–	Mar 17 – 18	
Determination of Sulfhydryl Groups with Fluorescein-5-maleimide	9B	Mar 17 – 21	Mar 20 – 25	Chapters 6/8 (150 pts)
Isolation of Membranes	10A	Mar 24 – 28	Mar 27 – Apr 1	(Exam 3)
Preparation and Characterization of Membrane Lipids	10BC	Mar 31 – Apr 4	Apr 3 – 8	Chapter 9 (150 pts) (proj 2)
Characterization of Membrane Proteins: SDS-PAGE & Immunoblot	10D	Apr 7 – 11	Apr 10 – 15	
Staining Immunoblot of Membrane Proteins	10E	Apr 14 – 18	Apr 17 – 23 (R;F;T;W)	(Exam 4)
Molecular Modelling: Mutagenesis & Energy Minimization	11C	Apr 23 – 25 (W;R;F)	Apr 24 – 29 Chapter 11 worksheet due in class (52 pts)	Chapter 10 (200 pts) (proj 3)

Your Laboratory Notebook

It is your responsibility to keep and maintain a professional notebook throughout the course!



- Black or blue pen **only**
 - Neatly strike through mistakes
 - **No white-out, no pencils**

Lab Syllabus: Pre-Lab Write-Ups

Complete by hand in your **Lab Notebook** every week **before** lab

Uploaded electronically to Gradescope 30 min before your lab

I. **Title:** detailed and descriptive

II. **Purpose:** one or two sentences describing the objectives of the experiment

III. **Procedure and flowcharts (if necessary):**

- **In your own words (not verbatim from the manual)**, write a protocol for the assays and experiments you will accomplish in the laboratory
 - **Reagent list**
 - **Prepopulated tables** for data collection
 - **Prompts** for recording observations
 - Equations needed for on-the-fly calculations (“plug and chug”)
 - Procedural flow charts should be your own creation and outline the experimental steps, the input and output of each step, and the experimental conditions
- Meet and discuss with your lab partner beforehand to best organize your time in lab!**

Preparation is key in this course!

Your notebook should contain...

For each experiment:

- | | | |
|-------------------|---|--|
| Pre-lab write-up | { | <ul style="list-style-type: none"> • Title (pre-lab) • Note any hazardous materials that will be used (pre-lab) • Reagent list/table (pre-lab) • Procedure written out on the <u>left hand side of page (pre-lab)</u> |
| Post-lab write-up | { | <ul style="list-style-type: none"> • Data and observations on the <u>right hand side of page (during lab)</u> <ul style="list-style-type: none"> ○ Recorded in the lab notebook while performing the experiment. Will be submitted as part of your in-lab submission due end of lab day. |

GradeScope Pre-lab Assignment Modules

Q2 Purpose

3 points

In 1-2 sentences, describe what the experiment entails and the objectives of the experiment.

Q3 Procedure - Pre-lab

7 points

Prior to the laboratory, write out the experimental protocols for the experiments that you will conduct in the laboratory in your lab notebook, in your own words. The experimental protocols should also include tables of reagents that will be used in the experiment including, where appropriate, reagent molarities (for solutions), measured quantities (mass or volume), and number of moles. Tables that you will use for collecting data should also be prepared. Also be sure to include blank spaces in your procedure for the observations and measurements that you will make during the experiment.

Procedure to be written on the left hand side of the page while data and observations are on the right hand side of the page.

Create a pdf of your handwritten procedures and tables, and upload them below.

 No files uploaded

Importing Images to GradeScope

Remember: We can't rotate the images!

Take a picture of the table in your notebook, and upload it below

27F5BE95-3A00-4C4F-9260-D50E19EC6229.jpeg

Download

Time	Distance (m)	Velocity (m/s)	Acceleration (m/s ²)	Position (m)
0	0	0	0	0
0.01	0.01	0.01	0.01	0.01
0.02	0.04	0.02	0.02	0.04
0.03	0.09	0.03	0.03	0.09
0.04	0.16	0.04	0.04	0.16
0.05	0.25	0.05	0.05	0.25
0.06	0.36	0.06	0.06	0.36
0.07	0.49	0.07	0.07	0.49
0.08	0.64	0.08	0.08	0.64
0.09	0.81	0.09	0.09	0.81
0.10	1.00	0.10	0.10	1.00

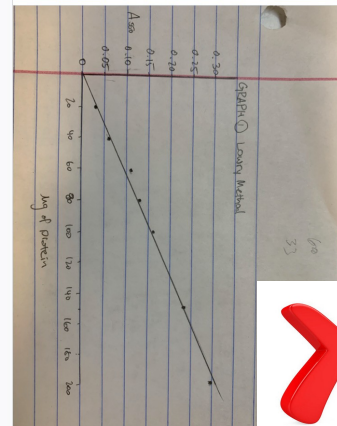


Take pictures or screen shots of the graphs, and upload them below.

Graph 1:

image.jpg

Download



Upload files in PDF or picture files only!

- ✓ A single PDF (under 100 Mb)
- ✓ .png, .jpg, .gif, .heic

No binary files

- ✗ Word doc
- ✗ Excel
- ✗ Powerpoint

Your Laboratory Manual

In each chapter:

Introduction

- Concepts, assays, and experiments in the chapter are explained

Problems

- While these problems are for your own benefit and will not be graded, you are highly encouraged to do these on your own. These practice problems will help with calculations for the *Notebook* section.

References

- A list of references from the *Introduction* section

Experimental Procedures

- A step-by-step explanation on how to perform the experiments

Notebook

- Use this section for completing your pre-lab and post-lab write-ups

Set-up and Materials

- A list of reagents, materials, and equipment you will need

Appendix

- Answers to the *Problems* section as well as other useful information to help you complete your write-ups

Your Laboratory Manual

Bring your lab manual to discussion

- Ask questions about unclear concepts and procedures

Do not bring the lab manual, or a photocopy, to lab

- The pre-lab write-up in your lab notebook should be all that you need to complete the experiment

Read the chapter introduction and procedure sections before each week of discussion to prepare for quiz

“As you progress through the lab manual after a few weeks, you will notice the *Experimental Procedures* section becomes less ‘cookbook’ and more of what a real protocol will look like. **It is your responsibility to figure out how to set up your tables, charts, master mixes, flowcharts, and data organization.**”

Student Friendly Features

Learning Points – reinforcing important key concepts

Hazardous Reagent – informing students of hazardous chemicals and reagents used in particular procedures

Time Saver – suggestions on how to better organize certain tasks to maximize efficiency in lab

Take Caution – calling attention to particular procedures or equipment that requires special care

Ask the Instructor – pointing out when TF assistance is needed/required

Tips & Tricks – suggestions on how to perform a particular procedure while reducing difficulty and hassle

Online Video

- Links to Youtube videos by scanning the corresponding QR codes

Using Your Laboratory Manual & Notebook

Each Week:

Before lab

- Read the introduction and procedure section in Manual
- Complete your **pre-lab write-up**
 - Read the notebook section of the lab manual to find out which data, tables and/or flowcharts are needed
- Submit electronic copy of pre-lab (Title, Purpose, Procedures) to Gradescope

During lab

- Record all of your findings for all assays and experiments

Before end of the lab

- Ensure that you and your lab partner(s) each have all the data needed
- Submit the data you collected to Gradescope before the end of the day in assignment "**Post-Lab write-up**"

After lab

- Begin/complete your **Laboratory Report**
- Prepare for next week's lab

Complete Lab Reports Require:

Pre-lab write-up (submitted **30 min** before start of your lab)

- Title, purpose, procedure

Post-lab write-up: Data Collection (submitted before the end of your lab day (by midnight))

- Show filled data tables and experiment recordings
- **You are responsible for having all data in your notebook. Graphs and charts based off missing data will receive no credit and may be grounds for academic misconduct.**

Analysis and questions

- Complete all sections in the template posted on Gradescope

Conclusions

- A complete paragraph for each post-lab report that summarizes the results of your experiments and any difficulties you encountered (less than 6 sentences)

Sample Calculations (for Laboratory Reports)

- Show a sample calculation for each different type of mathematical manipulation that is required
- **Credit will not be given to values with no sample calculations provided**

Preparing professional tables/graphs/figures

Table: Information about what is being shown (Title)

Table 6.1 - Cereal and Fe standard addition solutions

Solution #	Volume Cereal Solution (mL)	Volume Standard Fe Solution (mL)	Total Volume (mL)	Average Absorbance
1	10	0	100	0.0012
2	10	1	100	0.0025
3	10	2	100	0.0055
4	10	5	100	0.0125
5	10	10	100	0.0250
6	10	15	100	0.0375
7	10	20	100	0.0500
8	10	25	100	0.0630

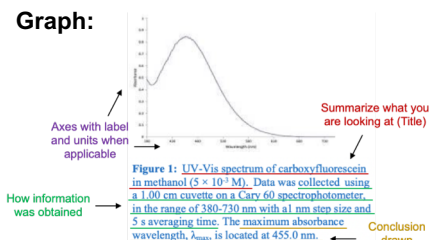
^aMeasured with a volumetric pipet. ^bSolution was 0.5 M ferrous sulfate

Header row, include units

Footnotes for extra information such as sample calculations.

Table needs title, located above the table.

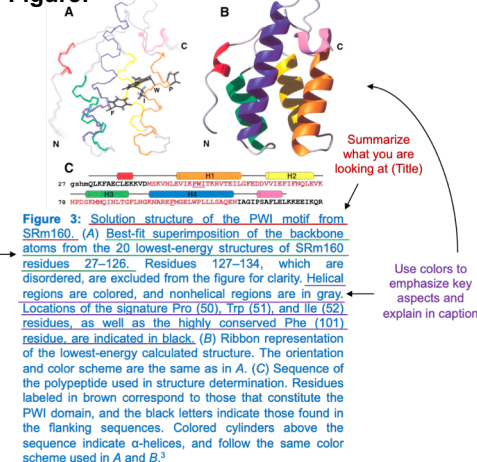
Graph:



Refer to document posted on website for more details!

Figures do not have titles above them but are captioned on the bottom. Title (descriptive and informative) is first part of the caption located below the figure.

Figure:



Use colors to emphasize key aspects and explain in caption

Online radioactivity safety training

- Training is required before doing radioactivity work in Chapters 8
 - Online radioactivity training provided by BU EHS & RSO through web (Radiation Awareness for Undergraduate Students)
- Deadline is Feb 19

Cannot perform experiments if you don't complete training and pass the quiz!

**Questions regarding discussion
and lab logistics?**