NFS 187 *Introduction to Biochemistry: Laboratory*
Fall 2019
125 Jeffords Hall

Graduate Teaching Assistant
Information coming soon.

Lab Coordinator
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Course Description

This laboratory course is an opportunity to get hands-on experience with fundamental concepts of biochemistry and biochemical techniques. Through our analyses, you will also develop your ability to analyze data and present the findings of your experiments. Concepts explored through lab activities include acid-base chemistry, protein isolation and analysis, enzyme kinetics, carbohydrate chemistry, and lipid properties. Analyses will involve techniques used in a broad range of scientific research such as titration, quantitation methods, spectrophotometry, and gel electrophoresis.

Learning Outcomes

- Demonstrate proficiency in basic hands-on and computational laboratory skills (e.g. pipetting, unit conversions, concentration calculations)
- Demonstrate an ability to perform biochemical analyses including titration, spectrophotometric quantitation, enzyme activity assays, gel electrophoresis, and isolation of proteins and lipids
- Explain principles, applications, and limits of common biochemical techniques
- Analyze, evaluate, and interpret data to draw conclusions
- Clearly and effectively communicate scientific findings including proper presentation of experimental data

Required Course Materials

1) Lab Handouts – Handouts for each lab will be posted on BlackBoard in advance and must be **PRINTED** and brought with you to **EACH lab**.
2) Ring binder (1") – Keep ALL lab handouts and course information documents in your binder and bring your binder with you to EVERY lab.
3) Lab notebook – Bound **composition style notebook** with **graph paper (quad) ruling**. NO spiral-bound or carbon paper notebooks. Composition notebooks with quad ruling are available at the bookstore.
4) Scientific calculator – Any type is fine; bring it with you to ALL lab periods.
5) Safety glasses or goggles – Available at the bookstore.

You also need **Microsoft Office** to complete your lab assignments. Alternative programs such as Google Sheets, Numbers, OpenOffice Calc, etc. do NOT have all of the features you'll need for your assignments and lab report. If you don't have Microsoft Office for your personal computer, you can obtain it *for free* as a UVM student (details here http://www.uvm.edu/it/software/about.html). Microsoft Word and Excel are also available on the computers at the library.

Copies of the textbook used for NFS 183, Biochemistry: Concepts and Connections, 2nd Edition by Appling, et al., are on reserve at the library. Although the textbook is not required for the lab, you may find it helpful.

Lab Policies

- **Attendance** in lab is mandatory. More than two unexcused absences are grounds for failing. If you are unable to attend a lab, you may attend **any other lab section *during the same week*** that fits your schedule **ONCE** and only once during the semester. When arriving at the make-up lab, you must fill out the Lab Makeup document (available in lab), have it signed by the lab TA who teaches the section you attend, and give it to me the following week. If you know that you will need to miss a lab at some point in the semester, talk to me ahead of time so that we can work out a plan for makeup work. **IMPORTANT**: If you need to miss a second lab, you *must first contact the Lab Coordinator for permission*.

- **Preparation**: Arrive prepared to actively engage in the activities and complete your work efficiently. Lack of preparation will increase the time you spend in lab, and lead to incomplete and/or erroneous data.

- **Lab Safety**: Understand and follow the University safety policy (see Safety Policy Contract). These guidelines are set by the University, and our compliance is a requirement to carry out these experiments at UVM. In addition, follow all guidelines provided during lab for the safe handling of materials and equipment and proper disposal of waste. If you are unsure how to handle or dispose of something, ASK! Anyone who does not follow proper safety and disposal procedures will be asked to leave and will lose credit for all work associated with the lab.

- **FOOD and DRINK**: Since this is a University Laboratory, and federal law governs the behavior in this space. **NO FOOD or DRINKS are allowed in the lab.** This includes water bottles kept in your bag. If you must drink something during the lab period, please keep it outside the lab door. Violations of federal lab safety laws can result in a significant fine for the University.

- **Communication**: Visit the **Blackboard** site regularly. Announcements with reminders and other important information will be posted throughout the semester. The BlackBoard site also has the link to the site where you will download your lab manuals, and where you will be able to track your lab grades. All e-mails will be sent to your **UVM e-mail account**. You are responsible for checking it daily (or setting up your UVM e-mail to forward to an account you check daily).

- **All cell phones, iPods, and similar devices must be turned off and safely put away before you arrive in the lab. Laptops are NOT allowed in lab (primarily to prevent something happening to your laptop).**

Late Work Policy

Unless you have made arrangements with me PRIOR to the due date, 10% per day will be deducted from the grade you receive on an assignment (down to 50% deduction – 5 days late). After this time, work may still be submitted for another two days with 50% deducted from the score you earn. You will NOT receive credit for any work turned in later than the beginning of the lab period following the due date (one week). Exceptions to these policies will ONLY be made in the case of an extended absence verified by your Dean's office or emergency situations. Due dates for all lab-related work are indicated in the Lab Schedule.

Grading

Your grade will be calculated based on the following point scale (see below for additional details on specific components). Extra credit will NOT be offered. The scale for final letter grades will be determined at the end of the semester and will not be more stringent than standard cutoffs.

	Points
Pre-Lab Quizzes (9 total, 6 points each)	54
Lab Notebook (5 checks total, 4 points each)	20
Data Analysis & Presentation Assignment	15
Sports Drinks Results	20
Citrus Juice Analysis Data Analysis	20
Brewing Yeast Protein Analysis Part I Results Wrap-Up Assignment	30
Investigating Lactase Kinetics Part I Results Part II Results & Conclusions	40
Carbohydrate Identification Results & Conclusions	20
Snack Food Lipids Results & Conclusions	20
Citrus Juice Analysis Lab Report Portfolio Full Draft and Peer Review Final Paper	100
Laboratory Practical	50
Participation	20
TOTAL POSSIBLE POINTS	**409**

Pre-Lab Quizzes

There will be a short quiz at the beginning of virtually every lab. Quizzes will include ~3-4 questions designed to assess your understanding of the lab activities for that lab period. To prepare for the quizzes, read your lab handout thoroughly to make sure that you understand the main goals of the lab and essential background concepts including specific techniques. You should be able to describe, in general terms, what you'll actually be doing in lab. Do NOT memorize experimental details such as volumes or times. DO make sure you are aware of anything noted as "IMPORTANT," as these steps/tips are essential to successfully completing the experiment.

Lab Notebook

Expectations for your lab notebook are described in the Lab Notebook Guide. Please read the guide carefully so that you understand the appropriate format for your lab notebook entries. **Do NOT assume that they are the same as a previous course**. Notebooks will be checked periodically in lab and scored based on the rubric provided in the Lab Notebook Guide. You will be evaluated based on the completeness of your entries for all prior experiments and the required pre-lab sections of the lab you'll carry out that day.

Lab Assignments

All labs will have associated assignments; see Lab Schedule for due dates. Unless otherwise noted, all assignments must be **submitted on BlackBoard BEFORE lab**. The goals of these assignments are for you to analyze your data, draw conclusions, and demonstrate your understanding of the experiments you performed in lab. Although you are encouraged to work with other students, **each person must turn in their OWN work**. This includes graphs and tables generated in Excel. **Plagiarism is a serious offense**, and ALL students involved will be reported to the Center for Student Conduct.

Citrus Juice Analysis Lab Report Portfolio

You will write a lab report for one of the analyses you perform. General expectations are described in the Lab Report Guide. Specific details (e.g. figure requirements) and a grading rubric will be provided.

Laboratory Practical

The laboratory practical, which will take place during your last lab period, is a series of activities designed to assess the lab techniques and data analysis skills you developed over the course of the semester. Each student will complete the laboratory practical INDIVIDUALLY. Additional details will be provided in lab and on BlackBoard at least a week prior to your practical.

Participation

Active participation in experiments and discussions is expected. Bring your Lab Notebook, Lab Binder (with the handouts), and a scientific calculator to every lab so that you are prepared to be fully engaged in the lab activities and discussions. Additionally, you are expected to behave responsibly, follow the guidelines in the Lab Safety Contract, use all equipment properly, and **CLEAN UP and ORGANIZE your bench** at the end of each lab. Participation points will be determined at the end of the semester using the following rubric.

IMPORTANT: On-time arrival at lab is expected. Two **points will be deducted** if you are **late** to lab several times during the semester; four points will be deducted for consistently arriving late. Additional points will be deducted for leaving your **bench messy and disorganized**.

20	Actively and consistently participates in discussions and is enthusiastically engaged with the material during lab activities.
18	Frequently contributes to discussions; is engaged with the material during lab activities.
16	Contributes to discussions with some regularity; is generally engaged with the material during lab activities.
14	Occasionally contributes to discussions voluntarily and contributes when called upon; is engaged with the material during lab activities a majority of the time.
12	Participates in lab discussions if called upon; engages with the material during lab activities with some consistency.
10	Generally shows minimal effort to participate or engage with the material during lab activities.
6	Makes little to no effort to engage in lab activities.
0	Attitude is disruptive and/or exhibits a negative attitude towards lab activities.

UVM Policies

Please refer to the information provided here for UVM polices related to cheating, plagiarism, and conduct in UVM classes.

Course Materials Property Rights: Consistent with the University's policy on intellectual property rights, it is the College of Agriculture and Life Science's policy that teaching and curricular materials (including but not limited to classroom lectures, class notes, exams, handouts, and presentations) are the property of the instructor. Therefore, electronic recording and/or transmission of classes or class notes (i.e. selling or posting) is prohibited without the express written permission of the instructor. Such permission is to be considered unique to the needs of an individual student (e.g. ADA compliance), and not a license for permanent retention or electronic dissemination to others. For more information, please see the UVM policy on Intellectual Property, sections 2.1.3 and 2.4.1