

## **NFS 183** *Introduction to Biochemistry*

Fall 2019

Mon/Wed/Fri 9:40am – 10:30am

Terrill 108

### Instructor Information

Laura Almstead, PhD

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Office Hours: Wednesdays 4:30pm – 6:00pm

Thursdays 11:30am – 1:00pm

or by appointment (e-mail me to schedule a time)

### Course Description

Biochemistry explores the chemical reactions that make life possible. This course primarily focuses on the sets of reactions involved in metabolism of carbohydrates and lipids. We start with fundamental concepts essential for understanding these processes including the structures and properties of biomolecules and energetics of cellular reactions. In addition, we examine how proteins function as cellular catalysts and how their activity is regulated to control fuel metabolism in the body. From there, we turn our attention to the metabolic pathways involved in the formation and breakdown of carbohydrates and lipids, with an emphasis on the roles of the pathways in the body and how they are controlled. Our discussion of metabolism wraps up with a summary of how carbohydrate and lipid metabolism are coordinately regulated in the body to maintain energy balance. Finally, we'll explore the pathways of cellular information processing – DNA replication and gene expression – to see how proteins are synthesized in cells and the effects of mutations on the structures and functions of proteins. Throughout the class, we'll apply biochemical concepts to explain various diseases and address questions such as: Why is carbon monoxide so toxic? What's the rationale behind carbo-loading? Why do fats yield more calories per gram than carbohydrates?

Prerequisites: CHEM 042 or CHEM 141/142 or acceptable coursework in organic chemistry.

### Learning Outcomes

- Explain how the structures and properties of biomolecules relate to their roles in cells
- Explain how enzymes increase rates of cellular reactions and how their activity is controlled in cells
- Describe the metabolic pathways involved in synthesis and breakdown of carbohydrates and lipids
- Explain how regulation of carbohydrate and lipid metabolism helps maintain energy balance in the body
- Describe how genetic information is replicated and how it is used to direct the synthesis of proteins in cells
- Apply your knowledge to predict and explain the outcomes of disruptions or alterations to the cellular processes we discuss

## Course Materials

- 1) Biochemistry: Concepts and Connections, 2<sup>nd</sup> Edition by Appling, et al.
- 2) MasteringChemistry access
- 3) iClicker remote
- 4) Scientific calculator (any kind is fine)

The textbook for this course is **Biochemistry: Concepts and Connections, 2<sup>nd</sup> Edition** by Appling, et al. There are a few copies on reserve at the library. Required readings from the textbook and/or other sources will be assigned for each class. Readings that are not from the textbook will be provided on BlackBoard. The readings are intended to make you better prepared for our class discussions. Focus on becoming familiar with the main concepts and new terminology; do not spend time trying to absorb every detail.

Access to **MasteringChemistry** (our on-line homework site) is required. New textbooks packaged with MasteringChemistry access plus access to an electronic version of the text (eText) are available at the bookstore. If you purchase a used copy or previous edition of the textbook, you will need to buy MasteringChemistry access separately on-line. You can also buy MasteringChemistry access with access to the eText instead of purchasing a hard copy textbook. Access without the eText is \$69.99 and with the eText is \$119.99. MasteringChemistry access is textbook-specific, so make sure that you select the correct text AND edition (see above). Instructions for purchasing access and joining our class's site are posted on BlackBoard. You must register and complete the *introductory assignment BEFORE midnight on TUESDAY, September 3.*

Each class will include multiple choice questions and/or other activities, and responses will be collected via the iClicker system. You must obtain an **iClicker remote** and *register it through BlackBoard BEFORE our second class on WEDNESDAY, August 28* (see the Course Information folder on BlackBoard). The section titled "Participation" below describes further details regarding iClicker use.

**Lecture handouts** will be posted on BlackBoard prior to class and **full lecture slides** will be available after class. Lecture handouts are edited versions of the lecture slides with some information omitted. You may find it helpful to print lecture handouts before class to facilitate note taking in class. It is also to your benefit to go through the full lecture slides after each class to review the material and answer the follow-up questions provided at the end of each lecture. The **lecture follow-up questions** are questions you should be able to answer based on concepts covered in class. They are an opportunity for you to practice applying the concepts and can help you assess your understanding of the material.

A list of important **vocabulary words** will be posted on BlackBoard before we begin a new topic in class. Review the terms and define/explain them BEFORE we discuss the material in class. A basic understanding of the terms will be expected.

## Class Policies

- *Laptops will be allowed for note taking purposes ONLY.* Anyone found using their laptop for something not directly related to class will lose laptop privileges for the remainder of the course.
- *ALL electronics (e.g. cell phones) must be turned off and kept OFF your desk.* Use of electronic devices limits your ability to engage in class and is distracting to people around you. Be courteous and help create a positive learning environment.
- *Attendance is essential.* We will discuss various concepts that are not directly covered in your textbook and examine others more or less deeply than the book. You are only responsible for the material we cover in class, which includes discussion questions and activities. If you are not present in class, you lose the benefit of participating in the discussions/activities and the knowledge gained from these interactions. If you miss class, you are responsible for reviewing the lecture materials posted on BlackBoard as soon as possible and coming to see me to discuss any questions you have on the material you missed.
- *Questions are welcomed and encouraged at all times.* Please let me know if something is not clear! If you find yourself struggling, talk to me as soon as possible so that you do not fall behind.
- Announcements and reminders will be sent to your **UVM e-mail address**. You are responsible for checking your UVM e-mail on a **daily basis** (or having your UVM e-mail forwarded to an account you check daily).

## Grading

Exams will not be curved. Any extra credit opportunities will be available to the entire class; please do not ask for individual opportunities. The scale for final letter grades will be determined until the end of the semester, but will not be more stringent than standard cutoffs.

Participation	10%
MasteringChemistry Homework	30%
Exams 1 – 3	14% each (42% total)
Final exam	18%
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TOTAL	100%

## MasteringChemistry Homework Assignments

Homework assignments will be posted on MasteringChemistry (<http://www.masteringchemistry.com>) to give you practice applying the material covered in class and help you assess your understanding of the material. You must register for our course through the MasteringChemistry website to access the assignments. Each homework will consist of activities and/or questions that cover material discussed in class. *Homeworks will be available by 1:00pm on Wednesdays and due the following SUNDAY before midnight (11:59pm) unless otherwise indicated in the Lecture Schedule. Assignments are still due on weeks when you have an exam, and when there are no classes on Monday due to a holiday. There will be a **30% deduction PER DAY for answers submitted after the due date.** Your lowest score will be dropped. In addition, there is a mandatory introductory assignment (see the Lecture Schedule). *Completion of the introductory assignment counts for points towards your Participation score.**

## Participation

Multiple-choice questions will be given during each class period using the iClicker system. These questions are designed to help you develop your application, analysis, and evaluation skills using the concepts we discuss in class. Additionally, iClicker questions will be geared towards promoting peer instruction and class discussions and will allow both you and me to assess your preparation for class and understanding of new material. **One point will be given for every response received, and an additional point will be awarded for the correct response.** Each student is expected to enter their **own response** using their **registered iClicker remote**. If students are found entering responses using their classmates' remotes, each student will receive ZERO for the participation portion of your grade. In addition to iClicker questions, we will periodically have in-class activities designed to give you practice applying course concepts, some of which will count for points towards your participation score. *iClicker questions and in-class activities may NOT be made-up* except in the instance of an extended absence excused by your Dean's office. Final participation scores will be calculated using the rubric below.

Participation Avg.	Final Percentage (out of 10%)
90-100%	10%
80-89.9%	9%
70-79.9%	8%
60-69.9%	6%
50-59.9%	4%
40-49.9%	2%
0-39.9%	0%

## Exams

There are four exams distributed over the course of the semester (see the Lecture Schedule for specific dates). Exams will primarily consist of multiple choice questions with some short answer questions. Study guides with exam details, study tips, and a summary of the relevant lecture follow-up questions will be available on BlackBoard approximately one week prior to each exam. **IMPORTANT:** Your fourth (final) exam is cumulative. You must bring a #2 pencil and eraser with you to all exams.

***Make-up exams will be given only in emergency situations.*** Any student who will miss an exam must contact me **BEFORE** the exam is scheduled to begin. Except in special circumstances, an excuse from your Dean's office or other documentation will also be required to make up the exam. If you have a conflict with the final exam, you must let me know before Friday, November 29.

UVM Policies Below are links to various UVM policies you may find useful.

**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

**Student Learning Accommodations:** In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact SAS, the office of Disability Services on campus. SAS works with students and faculty in an interactive process to explore reasonable and appropriate accommodations, which are communicated to faculty in an accommodation letter. All students are strongly encouraged to meet with their faculty to discuss the accommodations they plan to use in each course. A student's accommodation letter lists those accommodations that will not be implemented until the student meets with their faculty to create a plan. Contact SAS: A170 Living/Learning Center (802-656-7753) [https://www.uvm.edu/academicsuccess/student\\_accessibility\\_services](https://www.uvm.edu/academicsuccess/student_accessibility_services)

**UVM's policy on disability certification and student support:** <https://www.uvm.edu/policies/student/disability.pdf>

**Religious Holidays:** Students have the right to practice the religion of their choice. If you need to miss class to observe a religious holiday, please submit the dates of your absence to me in writing by the end of the second full week of classes. You will be permitted to make up work within a mutually agreed-upon time.

**Academic Integrity:** This policy addresses plagiarism, fabrication, collusion, and cheating.  
<https://www.uvm.edu/policies/student/acadintegrity.pdf>

**Grade Appeals:** Procedures for contesting a grade are outlined here:  
<http://www.uvm.edu/policies/student/gradeappeals.pdf>

**Grading:** Information on grading and GPA calculation can be found here:  
<http://catalogue.uvm.edu/undergraduate/academicinfo/examsandgrading/>.

**Code of Student Rights and Responsibilities:**  
<http://catalogue.uvm.edu/undergraduate/academicinfo/rightsandresponsibilities/>

**FERPA Rights Disclosure:** The purpose of this policy is to communicate the rights of students regarding access to, and privacy of their student educational records as provided for in the Family Educational Rights and Privacy Act (FERPA) of 1974. [https://www.uvm.edu/deanofstudents/confidentiality\\_and\\_ferpa](https://www.uvm.edu/deanofstudents/confidentiality_and_ferpa)

**Promoting Health & Safety:** The University of Vermont's number one priority is to support a healthy and safe community. Center for Health and Wellbeing <http://www.uvm.edu/~chwb/> Counseling & Psychiatry Services (CAPS) Phone: (802) 656-3340 C.A.R.E. If you are concerned about a UVM community member or are concerned about a specific event, we encourage you to contact the Dean of Students Office (802-656-3380). If you would like to remain anonymous, you can report your concerns online by visiting the Dean of Students website at <http://www.uvm.edu/~saffairs/>.

**Final exam policy:** The University final exam policy outlines expectations during final exams and explains timing and process of examination period.  
[http://catalogue.uvm.edu/undergraduate/academicinfo/examsandgrading/?\\_ga=2.109740103.354575143.1522726744-2032053719.1522726744](http://catalogue.uvm.edu/undergraduate/academicinfo/examsandgrading/?_ga=2.109740103.354575143.1522726744-2032053719.1522726744)