

C383: Biological Chemistry
Fall 2017

Dr. Ben Burlingham
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Lecture:
1:25 PM, MWF
Discussion:
Mon or Tues

Class Website: <http://courses.chem.indiana.edu/c483/default.asp>
Grades will be posted on Canvas.

Instructor Office Hours: M 9-10AM; W 2:30-3:30PM; R 11AM-noon
Students are also welcome to attend my C483 office hours (T 9-10AM, W 3:30-4:30PM, F 11AM-noon) and ask questions when there are no C483 students.

Class Organization:

In this three-credit course, there will be classroom lecture MWF and discussion sections on Monday or Tuesday. Attendance is required in both lecture and discussion.

Associate Instructor:

Joseph Fakhoury
Wyatt Paulishak

Office Hour:

3-4PM Fridays in C046
1-2PM Thursdays in C046

Course Description: Introduction to macromolecular structure, enzyme catalysis, the role of biological membranes, and major metabolic pathways

Learning Objectives. At the completion of the course, students will be able to:

- Explain how the chemical structures of proteins, polysaccharides, lipids, and nucleic acids dictate their function in biological systems
- Solve qualitative and quantitative problems concerning solution pH, reaction thermodynamics, enzyme kinetics, membrane potential
- Use chemical principles to describe the metabolic processes of energy acquisition, storage, and utilization
- Describe metabolic regulatory processes, including those mediated by signal transduction
- Recognize the chemical motifs of redox reactions, hydrolysis, and decarboxylation in metabolic chemistry

Text Materials:

Required: Biochemistry: A Short Course, 3e, by Tymoczko, Berg, and Stryer. You might choose to get the book, the loose leaf, or an electronic option.

Grading:

Discussion exercises:	120 pts
Exams:	300pts
Final Exam:	<u>150pts</u>
Total	570 pts

Anticipated grading scale: A = above 90%, B = 80-89.9%, C = 65-79.9%, D = 50-64.9%, F=below 50%. Plus/minus grades will be awarded.

Homework: Working out problems is necessary to be successful in biochemistry. The problems will not be graded, but you should keep up with them from day to day. Many exam questions will be similar or the same as homework questions. There are two types of homework.

Reading guides are lower-level questions that help you focus on what is essential in the chapter reading. If you can answer all these questions, you have a good baseline knowledge of biochemistry. Reading guides are available on the course website.

Problems come from two sources. Book Problems come from the end of the textbook chapter. These help you to apply your knowledge of biochemistry. Discussion Worksheet Problems are accessible on the course website. They cover/review general and organic chemistry concepts necessary for success in the course.

Discussion Quizzes: During discussion section, you will be reviewing/learning one fundamental concept in biochemistry that is needed to understand lecture material. These concepts are often the ones that give students the most trouble, yet are essential to a strong understanding of the course. During discussion, your AI will guide you through a 10-point exercise covering those skills. These problems are based on book and Discussion Worksheet problems. You may drop 2 of the 14 discussion exercises for a total discussion grade out of 120 points. There are no make-up discussion exercises; any missed exercise can be counted as a drop. The discussion schedule is on the website.

Exams: Many exam questions will strongly resemble or be identical to the Reading guides, Book Problems, and Discussion Problems. Three midterm exams, each worth 100 points, will be given from **7:15-9:15PM on September 21, October 19, and November 16 in a room TBA**. The two hour time slot is designed so that you will not need to rush through the exam. Because biochemistry is a subject that builds upon previously learned material, all exams will be cumulative in a sense, but will focus on the material covered since the previous exam. No makeup exams will be given; if a valid excuse is given for missing an exam, the percentage grade on the final will be substituted for the missed exam grade. Please talk to the instructor at least a week ahead of the exam if there is a known conflict with one of the exams.

Final Exam: The final exam will be cumulative and worth two midterm exams. The final will be given from **5-7PM, Friday December 15, in a room TBA**.

Academic Honesty:

The determination of academic misconduct is at the discretion of the instructor. The sanctions may range from deduction of points to a failing grade for the class. In all cases, the infraction will be immediately reported to the Dean of Students as well as the dean or director of the student's school. Please read the *Code of Student Rights, Responsibilities, and Conduct* for further detail.

Withdraw: See the College's Policy on withdrawing from class at:
<http://college.indiana.edu/ado/policies.shtml>

My suggested plan for approaching C383: You should maximize the results you get for the amount of effort you put in. You can use the same amount of time in different ways and be more or less effective. If you avoid procrastination, you will do much better in the class!!! Here is how I would do it if I were you.

1. **Before class**, at minimum, I would read the summary of the section to be covered in class, becoming familiar with the key concepts and terminology. Ideally, I would read the section and answer many of the questions on the Reading Guide. If I ran into something I didn't understand right away, I would note it.
2. **During class**, because I have already become familiar with the topics and types of questions, I would take notes, writing more details on the types of questions I had problems with.
3. **AS SOON AS POSSIBLE after class** (while things are still fresh), I would finish the Reading Guide questions, then review them briefly. After that, I would attempt the Book Problems. I would seek help with problems right away, rather than waiting until right before the exam.
4. **Then start again for the next class!**

Tips for maximum success:

- **You need to attend all classes and discussions.**
- Practice, practice, practice. Solve all assigned homework (and maybe work on some that are not assigned!)
- Develop and use your own study aids, such as flashcards and study guides.
- Be persistent in asking questions. Take advantage of discussion sections. Come to office hours as soon as you are having problems.
- Form study groups.
- Don't get behind! One day behind puts you two days behind; you won't understand the next day because you missed the previous.

I want to see you succeed! My personal goal is to see every individual student succeed to the level he or she is willing to work. Please feel free to talk with me any time you want—keep me up to date with how you are doing.

Tentative Schedule: The class and discussion schedules on the following pages may be changed by the instructor to better meet the needs of the class.

Date	Chapter	Book Problems
Aug 21	Ch 1	Ch 1: 7, 11, 12
Aug 23	Ch 2	Ch 2: 12, 15, 18-20
Aug 25	Ch 2	
Aug 28	Ch 33	Ch 33: 4, 7, 8, 14, 20*, 22, 25
Aug 30	Ch 33	
Sep 1	Ch 3	Ch. 3: 1, 3, 6, 12, 15-19
Sep 6	Ch 4	Ch 4: 4, 15, 20, 24, 27
Sep 8	Ch 5	Ch 5: 3, 6, 9, 19, 21, 22
Sep 11	Ch 6	Ch 6: 6-10, 14, 17-20, 22-23
Sep 13	Ch 6	
Sep 15	Ch 7	Ch 7: 3, 4, 6, 7, 10, 12
Sep 18	Ch 7	Ch 7: 15, 16, 20, 21, 23, 24
Sep 20	Review Exam 1	
Sep 22	Ch 8	Ch 8: 3, 8-11, 17
Sep 25	Ch 8	Ch 8: 5-7, 14
Sep 27	Ch 9	Ch 9: 13, 16, 17, 18, 22
Sep 29	Ch 10	Ch 10: 2, 16, 17, 21
Oct 2	Ch 11	Ch 11: 2, 4, 5, 12
Oct 4	Ch 12	Ch 12: 2, 3, 7, 10, 19, 20, 23, 24, 25
Oct 9	Ch 13	Ch 13: 8, 11, 13, 23, 26, 27
Oct 11	Ch 14	Ch 14: 1, 2, 4, 5, 8, 10
Oct 13	Ch 15	Ch 15: 9, 10, 12, 15, 27, 32
Oct 16	Ch 15	Ch 15: 18-20, 22, 24
Oct 18	Review Exam 2	
Oct 20	Ch 16	Ch 16: 2, 4, 7-9, 15, 16, 20
Oct 23	Ch 16	Ch 16: 5, 12, 13, 33, 35
Oct 25	Ch 17	Ch 17: 2, 3, 7, 13, 16, 17, 19, 25
Oct 27	Ch 18	Ch 18: 1, 5, 7, 10, 15, 19
Oct 30	Ch 19	Ch 19: 1, 5, 8, 10, 12, 14, 16, 27
Nov 1	Ch 19	Ch 19: 15, 17, 18, 25
Nov 3	Ch 20	Ch 20: 1-4, 6, 8, 9, 12, 15, 17
Nov 6	Ch 21	Ch 21: 3, 5, 13, 19, 23, 26
Nov 8	Ch 24	Ch 24: 6, 7, 13, 23, 24, 28
Nov 10	Ch 25	Ch 25: 4, 5, 7, 12
Nov 13	Ch 26	Ch 26: 1, 2, 6, 9, 11, 12
Nov 15	Review Exam 3	
Nov 17	Ch 27	Ch 27: 3, 8, 12, 15, 25, 28, 29, 33
Nov 27	Ch 28	Ch 28: 1, 6, 7, 15, 18, 19, 21, 28
Nov 29	Ch 29	Ch 29: 12, 14, 16, 17, 25, 27, 28
Dec 1	Ch 30	Ch 30: 4, 5, 9, 12
Dec 4	Ch 30	Ch 30: 15, 16, 21, 25, 28
Dec 6	Ch 31	Ch 31: 7, 9-12, 14, 17, 21
Dec 8	Review	
Dec 15	Final Exam	

Discussion Section Schedule

Dates	Topic
M Aug 21-T Aug 22	1. Review of Acid-Base Chemistry: Part 1
M Aug 28-T Aug 29	2. Review of Acid-Base Chemistry: Part 2
M Sept 4-T Sep 5	No meeting-Labor Day
M Sept 11-T Sept 12	3. Functional groups and hydrolysis
M Sept 18-T Sept 19	4. Six classes of enzyme catalyzed reactions
M Sept 25-T Sept 26	5. Graphic analysis-kinetics and binding
M Oct 2- T Oct 3	6. Carbohydrate chemistry
M Oct 9-T Oct 10	7. Thermodynamics of biological reactions: qualitative
M Oct 16-T Oct 17	8. Thermodynamics of biological reactions: quantitative
M Oct 23-T Oct 24	9. Enzyme mechanisms in glycolysis
M Oct 30-T Oct 31	10. Metabolic redox reactions
M Nov 6- T Nov 7	11. Reduction potential
M Nov 13-T Nov 14	12. Integrated carbohydrate regulation
M Nov 27- T Nov 28	13. Motifs in metabolic chemistry
M Dec 4- T Dec 5	14. Cofactors and summary of metabolic reactions