

# Biochemistry I (CHEM 4320)

Syllabus, CRNs: 28650

Spring 2017

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## Instructor

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## Class Meeting Time

MWF 11:00-11:50 am, Laney 103

## Office Hours

MWF 9:30-11 am  
Appointments are also available.

## Text

Biochemistry 4th Edition, D. Voet and J.G. Voet. (2010)

## Course Description and Objective

Biochemistry is an intensive study of the major classes of biomolecules including their structures, chemical properties, biological functions, and integration into human biochemistry. The objective of this course is for students to have a thorough understanding of proteins, carbohydrates, lipids, and human metabolism.

## Course Prerequisites

Grades of C or better in CHEM 3411 and BIOL 1440 are required for this course. You WILL be expected to remember and use material covered in these courses. The topics you are expected to have knowledge of include, but are not limited to: atomic structure, bonding, intermolecular forces, acid/base chemistry, organic functional groups and their properties, thermodynamics, equilibrium, cellular structure, and basic human anatomy.

## How to be successful in this course

1. **Attend lecture.** Those students who attend lecture regularly are the most likely to succeed. Many of the topics I cover will not be presented in the book. You are responsible for the material covered in class and the reading assignments. Attending class is highly recommended.
2. **Study time.** I recommend you devote about three hours of study time per lecture. I recommend you identify two or three other classmates to study with, asking questions, and using the textbook questions as a guide.
3. **Biochemistry requires practice and critical thinking skills.** Biochemistry is a field that requires you to practice and think. You have already learned the chemical concepts that will be applied in this course. Biochemistry requires you to know those concepts well enough to extend them to biological systems. **You must be able to reason with the concepts you learn.**

4. **Ask questions.** If you do not understand the concepts I have presented in lecture ask. Chemistry is a science in which one concept is built on another. If you do not understand a chemical concept, it is not going to get easier as the semester progresses. Please do not be embarrassed, there is no such thing as a stupid question. Stupidity lies in not asking. Please feel free to stop me in lecture with a question or, if you would prefer, stop by my office during office hours and ask.
5. **Be an interactive learner.** Ask questions and participate in class discussions. This is an excellent way to understand the material and hopefully you find many of the topics we cover are applicable to your life.

### **What do I expect you to learn for exams?**

You must learn the material presented and be able to apply it to biological problems. **Memorization is necessary but not sufficient to earn an A.** Test questions will require you to apply your knowledge; as a result, test questions will require you to give your reasoning and will not be in the same format every time. I highly recommend that you identify a few other students to study with: work problems from the text, search for questions on the internet, and try to invent questions to ask each other.

### **Grading**

3-4 Exams, 100 points each	= 300 - 400 points
4 Case Studies, 25 points each	= 100 points
Grant Outline and References	= 50 points
Grant Proposal	= 100 points
<u>2 Grant Reviews, 25 points each</u>	<u>= 50 points</u>
Total points	= 600 - 700 points

### **Grading Scale**

A: 90%

B: 80%

C: 70%

D: 60%

F: 50% and below

### Case Studies

Case studies are scenarios derived from research studies, medical cases, or a combination of the two where you must interpret data, utilize outside sources (the internet and primary literature), and problem solve. Each case study gives you relevant information and series of questions to answer. The studies are designed to further your understanding of material covered in class, expand into biochemical topics not covered in class, and exercise your critical thinking skills. The case studies are a valuable tool in helping you prepare for exams.

### Grant Proposal Project

The knowledge that we have in the various scientific disciplines comes from research, but research costs money. So, scientists apply for grants from funding agencies such as the National Institutes of Health (NIH) or National Science Foundation (NSF). To apply for funding, one must write a grant proposal describing the research they intended to undertake. You will have the opportunity to write a grant proposal in this course. You will be assigned a topic that you must do background research on in order to develop a research question that is still unknown for that topic. Instructions and resources for writing your proposal can be found on blackboard. **The point of the grant proposal is for you to learn how to search and understand primary scientific literature, to think creatively about scientific problems, and to learn to clearly and concisely present your ideas.**

### Grant Review Project

The NIH and NSF have limited funds to provide for research. So, grant proposal writing is part sound scientific ideas and part salesmanship. In order to decide which proposals should be funded funding agencies create peer review panels consisting of scientists who have demonstrated capability in a specific research field. Your classmates will be the peer review panel for your grant proposal, and you for theirs. You will be reading some of your classmates' proposals and writing critiques of both the content and writing style. Instructions for the peer review process can be found on blackboard.

### Missed Exams

A missed exam will be made up at my discretion. If you miss an exam for a **valid and significant reason**, and you contact me either through email or phone **before** the scheduled exam, then we can discuss the possibilities of a make-up exam. If you contact me after the exam, no make-up will be given. I strongly suggest that you make every effort to attend exams. Tardiness to an exam is discouraged.

### Attendance and Class Participation Policy

Attendance will be taken. Poor class attendance will be taken into account in determination of final grade at the critical areas. You are advised to attend all lectures since material presented in class will supplement the text and be included in exams. Students who miss class are responsible for the material presented in class and class announcements. You may always come to me with specific questions about missed material, but I will not provide a make-up lecture for you.

### Academic Honesty

Cheating or representing someone else's work as your own is **severely discouraged**. The penalties for cheating are **severe** and include, but are not limited to, assigning an "F" for the work and/or the course to expulsion from the University. The University of Central Arkansas affirms its commitment to academic integrity and expects all members of the university community to accept shared responsibility for maintaining academic integrity. Students in this course are subject to the provisions of the university's Academic Integrity Policy, approved by the Board of Trustees as Board Policy No. 709 on February 10,

2010, and published in the Student Handbook. Penalties for academic misconduct in this course may include a failing grade on an assignment, a failing grade in the course, or any other course-related sanction the instructor determines to be appropriate. Continued enrollment in this course affirms a student's acceptance of this university policy.

### **UCA Policies**

Students are encouraged to familiarize themselves with all the policies listed in the UCA Student Handbook. Students should pay particular attention to the Academic Policy on page 37 and the Sexual Harassment Policy on page 115.

The University of Central Arkansas adheres to the requirements of the Americans with Disabilities Act. If you need an accommodation under this Act due to a disability, please contact the UCA Disability Resource Center, 450-3613.

An Emergency Procedures Summary (EPS) for the building in which this class is held will be discussed during the first week of this course. EPS documents for most buildings on campus are available at <http://uca.edu/mysafety/bep/>. Every student should be familiar with emergency procedures for any campus building in which he/she spends time for classes or other purposes.

If a student discloses an act of sexual harassment, discrimination, assault, or other sexual misconduct to a faculty member (as it relates to “student-on-student” or “employee-on-student”), the faculty member cannot maintain complete confidentiality and is required to report the act and may be required to reveal the names of the parties involved. Any allegations made by a student may or may not trigger an investigation. Each situation differs, and the obligation to conduct an investigation will depend on the specific set of circumstances. The determination to conduct an investigation will be made by the Title IX Coordinator. For further information, please visit: <https://uca.edu/titleix>. \*Disclosure of sexual misconduct by a third party who is not a student and/or employee is also required if the misconduct occurs when the third party is a participant in a university-sponsored program, event, or activity.

## Lecture Schedule

\*This is a tentative schedule. All dates and contents are subject to change.

Week of	Topic	Chapters	Important Dates
Jan 16	<b>MLK Day</b> , Introduction, Water	1	
Jan 23	Acid/Base, Proteins	2, 3, 7	
Jan 30	Proteins (cont.)	“	<b>Jan. 30:</b> Case Study 1 Due
Feb 6	Proteins (cont.)	“	
Feb 13	Proteins (cont.), Enzymes	8, 9, 10	
Feb 20	Enzymes (cont.)	“	<b>Feb. 20: Exam 1</b> , Case Study 2 Due
Feb 27	Enzymes (cont.)	“	<b>Feb. 27:</b> Grant Outline Worksheet and Reference List Due
Mar 6	Enzymes (cont.), Carbohydrates	11	<b>Mar. 10:</b> Case Study 3 Due
Mar 13	Carbohydrates (cont.)	15, 16, 21	<b>Mar. 17: Exam 2</b>
Mar 20	<b>Spring Break</b>	“	
Mar 27	Introduction to Metabolism, Carbohydrate Metabolism		<b>Mar. 27:</b> Grant Proposal Due
Apr 3	Carbohydrate Metabolism (cont.) Citric Acid Cycle Oxidative Phosphorylation	12-14	
Apr 10	Lipids and Membranes	17, 18, 22	<b>Apr. 10:</b> Case Study 4 Due <b>Apr. 12:</b> Grant Proposal Reviews Due
Apr 17	Lipid Metabolism, Integration of Metabolism	“	<b>Apr. 21: Exam 3</b>
Apr 24	Study Sections		
May 1	<b>Final Exam</b>		<b>Mon. May 1st 2pm-4pm</b>