



ADVANCED BIOCHEMISTRY

Welcome to CHE/BIO 450, Fall 2015:

Chemistry/Biology 450 is an upper division course designed to teach the fundamental principles of the chemistry involved in biological processes. The beauty of biochemistry is that it offers fun and excitement for everyone. If your preferred field is chemistry, this course will help you understand how chemical reactions drive biological processes. If biology is more enjoyable to you, this course will discuss the details of biological systems at the atomic level. Regardless of which field you prefer, I encourage you throughout this semester to read thoroughly, apply reading material to activities designed for practice and ask as many questions as necessary in order to succeed. Ultimately, the biological application of chemistry is one of my favorite things to talk about. I am happy you are here and I look forward to helping you discover the exciting field of biochemistry.

INSTRUCTOR

Ariane Jansma, Ph.D.

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Office Hours: Tea Available

Tues. 9:00 am – 11:00 am

Wed. 8:00 am – 10:00 am

Thurs. 11:00 am – 1:00 pm

Fri. 8:00 am – 10:00 am

Additional Times by Appointment

SCHEDULE

Lecture, Section 1: MWF	11:00 am – 12:05 pm	Taylor 312
Lecture, Section 2: MWF	12:15 pm – 1:20 pm	Taylor 105
Lab Section 1: W	2:45 pm – 5:45pm	RS 106
Lab Section 2: R	1:30 pm – 4:30pm	RS 106
Lab Section 3: F	2:45 pm – 5:45 pm	RS 321

Required TEXT BOOK and SUPPLIES

- **Biochemistry, Concepts and Connections**, by Appling (with access to Mastering Chemistry), (ISBN: 9780321839763)
Required
- **iClicker**: Used to moderate group activities and to take attendance
Required

Recommended SUPPLIES

- Lap top computer – we will be working in teams throughout the semester using the protein visualization software pymol
 - Please discuss with your team to ensure there is one lap top per team for every class
- Pymol Software
 - You will receive a tutorial the first week of class to help you install the student version of Pymol (free) on your personal computers

COURSE GOALS and LEARNING OBJECTIVES

At the end of the course, you will be able to:

- Recognize the structures of the 20 amino acids
- Apply specific properties of these amino acids to protein folding and activity
- Identify and evaluate enzymatic active sites based on appropriate chemical reactivity
- Apply specific chemical reactions to the processes of metabolism
- Recognize how and when cells must degrade specific proteins
- Outline defining mechanisms and lifecycles of several representative viruses

ATTENDANCE

History has shown that class attendance is necessary for success in this course. We will spend time in class discussing the material and applying this information to questions which will be covered in the exams. It is definitely in your best interest to attend class. Regular class attendance and participation is therefore required and will be monitored. Prior instructor notification via email is necessary for an absence to be excused. Missed assignments can only be made up for full credit for excused absences and students are responsible for all assignments and material covered.

EXAMS

Exams will be held during the lab sections. You may choose which lab section to attend for the exam, based on what works best for your schedule. Exams during lab time serve two purposes. First, this provides sufficient time to use the lecture corresponding to an exam day as a review session. Second, because this course covers such an extensive amount of material, this will provide sufficient time to allow 2 hours to complete the exam.

EVALUATION

The activities described above will contribute to your total course grade according to the following:

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| • Lecture Examinations (3)..... | 30% |
| • Homework Assignments..... | 10% |
| • RATs, Quizzes and Participation..... | 20% |
| • Laboratory..... | 20% |
| • Final Examination..... | 20% |

GRADES

Letter grades will be assigned at the end of the course based on your percentage of total possible points, according to the following scale:

	A 93 – 100%	A- 90 – 92.9%
B+ 87 – 89.9 %	B 83 – 86.9 %	B- 80 – 82.9 %
C+ 77 – 79.9 %	C 73 – 76.9 %	C- 70 – 72.9 %
D+ 67 – 69.9 %	D 63 – 66.9 %	D+ 60 – 62.9 %
F < 59.9 %		

ACADEMIC DISHONESTY

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. As stated in the university catalog, “Academic dishonesty is the act of presenting information, ideas, and/or concepts as one’s own when in reality they are the results of another person’s creativity and effort. Such acts include plagiarism, copying of class assignments, and copying or other fraudulent behavior on examinations. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for a) that particular assignment or examination, and/or b) the course.” See [Academic Policies](#) in the undergrad student catalog.

ACADEMIC ACCOMMODATION

While all students are expected to meet the minimum academic standards for completion of this course as established by the instructor, students with disabilities may require academic accommodations. At Point Loma Nazarene University, students requesting academic accommodations must file documentation with the Disability Resource Center (DRC), located in the Bond Academic Center. Once the student files documentation, the Disability Resource Center will contact the student’s instructors and provide written recommendations for reasonable and appropriate accommodations to meet the individual learning needs of the student.

This policy assists the University in its commitment to full compliance with Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities (ADA) Act of 1990, and ADA Amendments Act of 2008, all of which prohibit discrimination against students with disabilities and guarantees all qualified students equal access to and benefits of PLNU programs and activities.

FERPA POLICY

In compliance with federal law, neither PLNU student ID nor social security number should be used in publically posted grades or returned sets of assignments without student written permission. This class will meet the federal requirements by (each faculty member choose one strategy to use: distributing all grades and papers individually; requesting and filing written student permission; or assigning each student a unique class ID number not identifiable on the alphabetic roster.). Also in compliance with FERPA, you will be the only person given information about your progress in this class unless you have designated others to receive it in the “Information Release” section of the student portal. See Policy Statements in the undergrad student catalog.

CHE/BIO 450 TENTATIVE CLASS SCHEDULE

WEEK	DATE	LECTURE TOPICS	CHAPTERS	LAB
Week 1	Tues 09/01	Welcome to Biochemistry Pymol Homework Assigned	////////////////////	NO LAB
	Wed 09/02	Introduction to Chapters 2 and 3	Homework Reading	
	Fri 09/04	Chapter 5: Primary Structure	5.1	
Week 2	Mon 09/07	LABOR DAY – No Class	////////////////////	Acid/Base amino acids
	Wed 09/09	Chapter 5: Primary Structure Pymol assignment due by 5pm	5.2 – 5.3	
	Fri 09/11	Chapter 6: 3-D Protein Structure Chapter 2 and 3 Homework due by 5pm	6.1 – 6.3	
Week 3	Mon 09/14	Amino Acid Quiz Chapter 6: 3-D Protein Structure	6.4 – 6.7	β -Galactosidase Part 1
	Wed 09/16	Chapter 7: Protein Function	7.8 – 7.10	
	Fri 09/18	Chapter 7: Protein Function	7.9 – 7.12	
Week 4	Mon 09/21	Chapter 7: Protein Function	7.13 – 7.15	Exam 1 Chap 2/3, 5, 6, and 7
	Wed 09/23	Review Session, Chap 2, 3, 5, 7	////////////////////	
	Fri 09/25	Chapter 8: Enzymes	8.1 – 8.3	
Week 5	Mon 09/28	Chapter 8: Enzymes	8.4 – 8.6	β -Galactosidase Part 2 Lab Report 1 Due 9/19, 5pm
	Wed 09/30	Chapter 8: Enzymes	8.7 – 8.9	
	Fri 10/02	Chapter 10: Membranes and Cell Transport	10.4 – 10.4	
Week 6	Mon 10/05	Quiz 2, Enzymes Chapter 11: Metabolism	11.1 – 11.3	β -Galactosidase Part 3
	Wed 10/07	Chapter 11: Metabolism	11.4 – 11.5	
	Fri 10/09	Chapter 12: Glycolysis	12.1 – 12.4	
Week 7	Mon 10/12	Chapter 12: Glycolysis	12.5 – 12.6	Exam 2 Chap 9, 10, 11, 12
	Wed 10/14	Review Session, Chap 8, 10, 11, 12	////////////////////	
	Fri 10/16	Chapter 12: Glycogen metabolism (Dr. Koudelka)	12.7 – 12.8	
Week 8	Mon 10/18	Chapter 12: Glycogen metabolism (Dr. Koudelka)	12.9	NO LAB
	Wed 10/21	Chapter 12: Glycogen metabolism	12.10	
	Fri 10/23	Fall Break Day – NO CLASS	////////////////////	
Week 9	Mon 10/26	Chapter 13: Citric Acid Cycle	13.1 – 13.2	β -Galactosidase Part 4
	Wed 10/28	Chapter 13: Citric Acid Cycle	13.3 – 13.5	
	Fri 10/30	Chapter 13: Citric Acid Cycle	13.6 – 13.9	

Week 10	Mon 11/02	RAT 2 (14.1) Chapter 14: Oxidative Phosphorylation	14.2 – 14.3	Luciferase Part 1 Lab Report 2 Due 11/06, 5pm (for 10% extra credit)
	Wed 11/04	Chapter 14: Oxidative Phosphorylation	14.4 – 14.5	
	Fri 11/06	Chapter 14: Oxidative Phosphorylation	14.6 – 14.7	
Week 11	Mon 11/09	Chapter 15: Photosynthesis (Light Reactions)	15.1 – 15.3	Exam 3 Chap 12.7 – 15.3
	Wed 11/11	Review Session, Chap 12.7 – 15.3	////////////////////	
	Fri 11/13	Chapter 15: Photosynthesis (Dark Reactions)	15.4 – 15.5	
Week 12	Mon 11/16	Chapter 15: C₄ cycle	15.6	Lab Report 2 Due 11/18, 5pm Luciferase Part 2
	Wed 11/18	Metabolism Review	////////////////////	
	Fri 11/20	Chapter 16: Lipid Metabolism	16.1 – 16.2	
Week 13	Mon 11/23	Chapter 16: Fatty Acid Metabolism	16.3 – 16.4	NO LAB
	Wed 11/25	Thanksgiving Recess – NO CLASS	////////////////////	
	Fri 11/27	Thanksgiving Recess – NO CLASS	////////////////////	
Week 14	Mon 11/30	Chapter 18: Amino Acid Metabolism	18.1 – 18.2	Luciferase Part 3
	Wed 12/02	Chapter 18: Amino Acid Metabolism	18.3 – 18.4	
	Fri 12/04	Handout: Oncogenesis	Handout	
Week 15	Mon 12/07	Handout: Viruses	Handout	Luciferase Part 4
	Wed 12/09	Handout: Viruses (Dr. Koudelka)	Handout	
	Fri 12/11	Final Review Session	////////////////////	
Week 16	Mon 12/14	Final Exam Section 1, 10:30 am	////////////////////	Final Exam (Multiple Choice)
	Wed 12/16	Final Exam Section 2, 10:30 am	////////////////////	
	Fri 12/18	NO CLASS	////////////////////	