



CHEM 3212: Biochemistry

Credits: 3

Prerequisites: HS 2212

Course Description: This course provides an introduction to the biochemistry of the central dogma as it relates to health science. Structure function relationships of macro and macromolecules will be explored as they relate principles of metabolism, enzymology, system response to environmental stimuli, and health and disease.

Required Textbook and Materials:

Ahern, K., Rajagopal, I., & Tan, T. (2018). *Biochemistry free for all (version 1.3)*. Oregon State University. <https://biochem.oregonstate.edu/content/biochemistry-free-and-easy>

Software Requirements/Installation: There are no special requirements that exceed general internet access

Learning Objectives and Outcomes:

By the end of this course students will be able to:

1. Describe the process of gene regulation (central dogma) to include promoter activity leading to the synthesis and transport of proteins such as enzyme, receptors, etc.
2. Relate basic structure and function of biomolecules to metabolism and survival.
3. Demonstrate basic understanding of system response to environmental stimuli as it relates to health and disease.

Course Schedule and Topics: This course will cover the following topics in eight learning sessions, with one Unit per week.

Week 1: Unit 1 - Introduction: Scientific thinking as it relates to the biochemistry of evolution in health.

Week 2: Unit 2 - The Central Dogma: Genetic vs. Epigenetic

Week 3: Unit 3 - DNA Promoter Regulation and Transcription

Week 4: Unit 4 - RNA Processing and Translation

Week 5: Unit 5 - Protein Folding, Stability and Transport

Week 6: Unit 6 - Protein Functions and Kinetics

Week 7: Unit 7 - Metabolism and Energy Production



Week 8: Unit 8 - Metabolism of Amino and fatty acids

Week 9: Unit 9 - Course Review and Final Exam

Learning Guide: The following is an outline of how this course will be conducted, with suggested best practices for students.

Unit 1: Introduction: Scientific thinking as it relates to the biochemistry of evolution in health.

- Read the Learning Guide and the Reading Assignment
- Participate in the Discussion Assignment (post, comment, and rate in the Discussion Forum)
- Make entries to the Learning Journal
- Complete and submit the Written Assignment
- Take the Self-Quiz

Unit 2: The Central Dogma: Genetic vs. Epigenetic

- Read the Learning Guide and the Reading Assignment
- Participate in the Discussion Assignment (post, comment, and rate in the Discussion Forum)
- Make entries to the Learning Journal
- Complete and submit the Written Assignment
- Peer-assess Unit 1 Written Assignment
- Take the Self-Quiz

Unit 3: DNA promoter Regulation and Transcription

- Read the Learning Guide and the Reading Assignment
- Participate in the Discussion Assignment (post, comment, and rate in the Discussion Forum)
- Make entries to the Learning Journal
- Peer assessment Unit 2 Written Assignment
- Take the Self-Quiz
- Take the Graded Quiz

Unit 4: RNA Processing and Translation

- Read the Learning Guide and the Reading Assignment
- Participate in the Discussion Assignment (post, comment, and rate in the Discussion Forum)
- Make entries to the Learning Journal
- Take the Self-Quiz

Unit 5: Protein Folding, Stability and Transport

- Read the Learning Guide and the Reading Assignment
- Participate in the Discussion Assignment (post, comment, and rate in the Discussion Forum)
- Make entries to the Learning Journal



- Complete and submit the Written Assignment
- Take the Self-Quiz

Unit 6: Protein Functions and Kinetics

- Read the Learning Guide and the Reading Assignment
- Participate in the Discussion Assignment (post, comment, and rate in the Discussion Forum)
- Make entries to the Learning Journal
- Peer assessment Unit 5 Written Assignment
- Take the Self-Quiz
- Take the Graded Quiz

Unit 7: Metabolism and Energy Production

- Read the Learning Guide and the Reading Assignment
- Participate in the Discussion Assignment (post, comment, and rate in the Discussion Forum)
- Make entries to the Learning Journal
- Complete and submit the Written Assignment
- Take the Self-Quiz

Unit 8: Metabolism of Amino and fatty acids

- Read the Learning Guide and the Reading Assignment
- Make entries to the Learning Journal
- Peer assessment Unit 7 Written Assignment
- Take the Self-Quiz

Unit 9: Course Review and Final Exam

- Review the course and take the Review Quiz; it will not be included in the final grade
- Prepare for, take, and submit the Final Exam
- The Final Exam will take place during Week/Unit 9 (UoPeople time); exact dates, times, and other details will be provided accordingly by your instructor

Course Requirements:

Written Assignments

Some units in this course require that you complete a Written Assignment. You are required to submit your assignments by the indicated deadlines and in addition, to peer-assess three of your classmates' assignments according to provided instructions. During this peer-assessment, you are expected to provide details in the feedback section of the assignment's Specimen Assessment Form, indicating why you awarded the grade that you did to your peer. Failure to submit assignments and/or peer-assessments may result in failure of the course.



Discussion Assignments

Some units in this course require that you complete a Discussion Assignment. You are required to develop and post a substantive response to the Discussion Assignment in the Discussion Forum. A substantive response is one that fully answers the question that has been posed by the instructor.

In addition, you must extend the discussion by responding to at least three of your peers' postings in the Discussion Forum.

Discussion Forums are only active for each current and relevant learning week, so it is not possible to contribute to the forum once the learning week has come to an end. Failure to participate in the Discussion Assignment by posting in the Discussion Forum as required may result in failure of the course.

Learning Journals

The Learning Journal is a tool for self-reflection on the learning process. In addition to completing directed tasks and assignments, you should use the Learning Journal to document your activities, record problems you may have encountered, and draft answers for Discussion/Written Assignments. The Learning Journal should be updated on a weekly basis, because they will be assessed by your instructor as part of your final grade.

Quizzes

This course will contain three types of quizzes – the Self-Quiz, the Graded Quiz, and the Review Quiz. These quizzes may contain multiple choice, true/false, or short answer questions.

The results of the Self-Quiz and the Review Quiz will not count towards your final grade. However, it is highly recommended that you complete the Self-Quiz each week to ensure that you have adequately understood the course materials. Along with the Reading Assignments, the results of the Self-Quiz should be used as part of an iterative learning process, to thoroughly cover and test your understanding of course material. You should use the results of your Self-Quiz each week as a guide to go back and review relevant sections of the Reading Assignments again. Likewise, the Review Quiz should be used to assist you in a comprehensive review and full understanding of all course material, in preparation for your Final Exam. The results of the Graded Quiz will count towards your final grade.

Final Exam

The Final Exam will take place following the completion of eight units of work. The format of the Final Exam is similar to that of the quizzes, and may contain a combination of different question types. The exam is a maximum of one hour in duration and is graded electronically. Specific instructions on how to prepare for and take the exam will be provided during Week/Unit 9.

Course Forum

The Course Forum is the place to raise issues and questions relating to the course. It is regularly monitored by the instructors, and is a good place to meet fellow students taking the same course. While it is not required to participate in the Course Forum, it is highly recommended.

Course Policies:

Grading Components and Weights

Each graded component of the course will contribute some percentage to the final grading scale, as indicated here:

Learning Journals	25%
Two Graded Quizzes	20% (10% each)
Discussion Assignments	15%
Written Assignments	15%
Final Exam	25%
TOTAL	100%

Grading Scale

This course will follow the standard 100-point grading scale defined by the University of the People, as indicated here:

Letter Grade	Grade Scale	Grade Points
A+	98-100	4.00
A	93-97	4.00
A-	90-92	3.67
B+	88-89	3.33
B	83-87	3.00
B-	80-82	2.67
C+	78-79	2.33
C	73-77	2.00
C-	70-72	1.67
D+	68-69	1.33
D	63-67	1.00
D-	60-62	0.67
F	Under 60	0.00

Grade Appeal

If you believe that the final grade you received for a course is erroneous, unjust, or unfair, please contact your course instructor. This must be done within seven days of the posted final grade. For more information on this topic, please review the Grade Appeal Procedure in the University Catalog.



Participation

Non-participation is characterized by lack of any assignment submissions, inadequate contributions to the Discussion Forums, and/or lack of peer feedback to Discussion/Written Assignments. Also, please note the following important points about course participation:

- Assignments must be submitted on or before the specified deadline. A course timeline is provided in the course schedule, and the instructor will specify deadlines for each assignment.
- Any student showing non-participation for two weeks (consecutive or non-consecutive) is likely to automatically fail the course.
- Occasionally there may be a legitimate reason for submitting an assignment late. Most of the time, late assignments will not be accepted and there will be no make-up assignments.
- All students are obligated to inform their instructor in advance of any known absences which may result in their non-participation.

Academic Honesty and Integrity

If and when you submit any work that requires research and writing, it is essential to cite and reference all source material. Failure to properly acknowledge your sources is known as “plagiarism” – which is effectively passing off an individual’s words or ideas as your own. University of the People adheres to a strict policy of academic honesty and integrity. Failure to comply with these guidelines may result in sanctions by the University, including dismissal from the University or course failure. For more information on this topic, please review the Academic Integrity Policy in the University Catalog.

Any materials cited in this course should be referenced using the style guidelines established by the American Psychological Association (APA). The APA format is widely used in colleges and universities across the world and is one of several style and citation formats required for publication in professional and academic journals. Purdue University’s Online Writing LAB (OWL) is a free website that provides excellent information and resources for understanding and using the APA format and style. The OWL website can be accessed here: https://owl.purdue.edu/owl/purdue_owl.html

Code of Conduct

University of the People expects that students conduct themselves in a respectful, collaborative, and honest manner at all times. Harassment, threatening behavior, or deliberate embarrassment of others will not be permitted.

Any conduct that interferes with the quality of the educational experience is not allowed and may result in disciplinary action, such as course failure, probation, suspension, or dismissal. For more information on this topic, please review the Code of Conduct Policy in the University Catalog.