

Course Overview

Biochemistry, also known as biological chemistry, is the study of the chemical processes that occur in living organisms. Examples of professions directly related to biochemistry include: analytical chemist, biomedical scientists, healthcare scientist, clinical research associate, forensic scientist, scientific laboratory technician, and toxicologist, to name a few. The primary goal of this course will be to help you develop a solid picture of basic organic and biological chemistry.

This one-year course is designed to meet the curriculum requirements of Chippewa Valley Technical College's Introduction to Biochemistry 806-186. GHS has an articulation agreement with CVTC that provides transcribed credit for Intro to Biochemistry. Thus, this course is considered a CVTC course, as well as a GHS course, and you may choose to receive dual credit. Upon successful completion, you will receive one GHS credit for Intro to Biochemistry and four CVTC college credits for Intro to Biochemistry 806-186. FYI, your CVTC college credits are transferrable to other technical colleges and four-year universities.

Course Topics.

Topics to be covered include: (1) recognizing the structure, physical properties, and chemical reactions of organic molecules, body fluids, and acids, as well as (2) understanding biological functions and their relationships to enzymes, proteins, lipids, carbohydrates, and DNA. These topics will be covered at a rapid pace. This includes learning about the presented concepts, conducting related laboratories, and testing your retention and problem solving skills.

Course Prerequisites.

Chemistry with a grade of "B" or better

Course Materials

Required Text, per CVTC.

Hill, J. W., Baum, S. J., & Scott-Ennis, R. J. (2000). *Chemistry and Life: An Introduction to General, Organic, and Biological Chemistry*. 6th Ed. Upper Saddle River, NJ: Prentice Hall.

Guided Inquiry Text.

Garoutte, M. P. & Mahoney, A. B. (2014). *General, Organic, and Biological Chemistry: A Guided Inquiry*. Hoboken, NJ: John Wiley & Sons, Inc.

Other Required Items.

School Issued Chromebook and Earbuds or Headphones

Loose-leaf Paper and Binder OR Composition-style Notebook and Binder

Scientific Calculator (capable of executing typical mathematical operations, including logarithms, exponential functions, etc. and handling scientific notation)

Course Format

Direct Interactive Instruction.

This strategic methodology will allow us to work as a team to outline learning objectives, organize and cover concepts via guided inquiry activities and argument driven inquiry laboratories, as well as infuse structured guided and independent practice opportunities that offer immediate feedback. Interactive learning tasks will be organized in a binder, which will not only encourage organization, but also serve as a portfolio of your learning.

Daily Coursework.

Cornell-style Notes. Cornell-style notes will be provided. All students are strongly encouraged to take these notes and review them regularly. This research-based approach to note taking, if followed, will encourage concentration and retention. You may choose to use your loose-leaf paper to complete these notes and then place them in your binder, or you may choose to use your composition-style notebook.

Problem Sets. A list of recommended problems will be assigned from our textbook and/or guided inquiry activities. All students are strongly encouraged to solve all problems. Completing this work will help you think critically and practice your problem solving skills. Answer keys will be provided so you can get immediate feedback and seek out any additional assistance when needed. You may choose to use your loose-leaf paper to complete these problem sets and then place them in your binder, or you may choose to use your composition-style notebook.

Laboratory Studies/Reports.

Laboratories. Laboratories will allow for a hands-on, direct experience of concepts covered in class. You will gain proper laboratory technique skills, as well as communicate procedures, observations, results, and conclusions in words and writing

through the Argument Driven Inquiry model. Furthermore, you will apply experimental techniques to solve chemical problems. To enhance the laboratory experience, some video-based interactives and interactive computer simulations will also be utilized.

Your competency in the lab will be assessed in two ways: via your laboratory log and laboratory reports. A laboratory log will include your pre- through post-lab recordings. Parts of your log will be submitted and serve as formative assessments of your learning. Lab log submissions may be revisited, if you so choose, to show growth in your understanding. Alternatively, laboratory reports are summative assessments and therefore may not be redone, with the exception of your first report.

Safety in the lab is vital. You will be required to sign and abide by a safety contract, as well as follow laboratory directions in order to participate.

Quizzes, Tests, Midterm Exam, and Final Exam.

Quizzes. Quizzes will be given weekly, at minimum. Because these quizzes are formative in nature, you may choose to show additional understanding by retaking quizzes after meeting specific review criteria.

Tests. Tests will be given after the completion of each chapter or chapter grouping. Tests are summative assessments and may not be retaken.

Midterm and Final Exams. Two comprehensive exams will be given throughout the school year. These exams will take place approximately at the middle and end of the school year. Midterm and final exams are summative assessments and may not be retaken.

Academic Assistance

If you should have moments of struggle in this course, please see me immediately. I will help you to get to the root of your concerns and establish a plan of action that provides additional scaffolding (e.g., individualized instruction, graphic organizers, targeted problem-solving opportunities, etc.). I will also be monitoring your growth through formative assessment opportunities and will initiate a meeting, plan of action, etc. if necessary. Your academic success is very important to me.

Academic Honesty

Academic misconduct in any portion of the academic work for this course is a serious offense. Therefore, it is expected that all students conduct themselves with honesty, integrity, and professionalism. Since this is a college course, we will follow CVTC's academic dishonesty policy.

The CVTC Student Handbook has details about Academic Honesty, which you should read and understand, so that you can apply Academic Honesty principles to your course work. (To find the most current copy of the handbook online, Google "CVTC WI Student Handbook.") The handbook covers guidelines on plagiarism, cheating, misrepresentation, falsifying, misuse of others materials, fabrication, and other related topics. I will share just a couple of specific examples with you below.

Students are expected to do their own work at all times unless advised that collaboration is acceptable. When you take a test, you are expected to keep your eyes on your own paper and protect your test paper from being copied by a classmate. You may not have someone take an online/hybrid or proctored test for you. Do not buy course work, have others complete any part of your course activities or assessments for you, or share your work with others (even after the course is completed). This would be academically dishonest. Copying from another person's paper or test is academic dishonesty; it will result in a grade of "0" for that assignment. In addition, you will be referred to Student Services for discipline based on college policy.

You may use facts from other sources if you re-write them in your own words. Any time you quote directly from another source or paraphrase substantially, you must cite the source you used. Failure to use proper citation procedure is considered plagiarism. Plagiarism will result in a grade of "0" if it is flagrant and/or deliberate. In addition, you will be referred to Student Services for discipline based on college policy.

Credit for Prior Learning (CPL)

CVTC Credit for Prior Learning grants college credit for previous knowledge and skills you have mastered through work or volunteer experiences. You might also have previous knowledge from certifications, apprenticeships, military training and professional development. If you are interested in learning more about this opportunity, please contact the Credit for Prior Learning Office.

Equity, Diversity, Equal Opportunity, and Disabilities Accommodations Statement

CVTC will provide equal access to and opportunity in its programs and facilities, without regard to race, ethnicity, color, creed, religion, national origin, ancestry, sex, disability, age, arrest or conviction record, marital status, parental status, mental health, veteran's status, pregnancy, or sexual orientation.

Grading Scale and Assessment Values

Since this is a dual credit course, you will have two separate grades reported: one according to GHS policy and the other according to CVTC policy.

GHS GRADING

Assessments will be given the following weights in order to determine each quarter grade.

- 80% Summative Assessment (e.g., Tests, Laboratory Reports)
- 20% Formative Assessment (e.g., Quizzes, Biochemistry Literature Studies, Laboratory Log)

A semester grade will be determined through the weighted system below.

- 45% Quarter Grade
- 45% Quarter Grade
- 10% Comprehensive Exam *

CVTC GRADING

Assessments will be given the following weights in order to determine each quarter grade.

- 80% Summative Assessment (e.g., Tests, Laboratory Reports)
- 20% Formative Assessment (e.g., Quizzes, Biochemistry Literature Studies, Laboratory Log)

A final grade will be determined through the weighted system below.

- 20% Quarter 1
- 20% Quarter 2
- 5% Midterm Exam
- 20% Quarter 3
- 20% Quarter 4
- 15% Final Exam

**NOTE: The comprehensive exam will be dropped if it adversely influences the semester grade.*

GHS Grading Scale

100-93A	89-87..... B+	79-77C+	69-67.....D+	59-↓ F
92-90A-	86-83..... B	76-73C	66-63.....D	
	82-80..... B-	72-70C-	62-60.....D-	

Late Policy.

Coursework must be turned in on assigned due dates. Per CVTC Introduction to Biochemistry 806-186 policy, late coursework will be issued a 30% deduction. Furthermore, students who do not take their test or exam on the assigned date and period will incur a 10% reduction in their grade for each day. Special consideration may be given if a doctor note is provided.

Grading Feedback from Instructor.

Typically, CVTC instructors will return assignments within one week of the due date, but no more that two weeks. It is my intent to return your tests the next day or as soon as everyone has completed the test, which ever comes first. And, I will return your laboratory reports within one week of the due date or as soon as everyone has completed the report, which ever comes first.

Guidelines for Success

You are starting your career right now. How so? Your classroom performance is likely to be a direct reflection of the type of performer you will be in your job. For example, if you show up to class late, you run the risk of that behavior pouring over into work. Because of this, be sure that you are performing at a level that you believe is the best representation of yourself at all times. Here are some additional guidelines for success:

- Prepare yourself for learning before the day of class. Read all the assigned materials and complete the assigned learning tasks. Ask questions about the content. Think about how the content relates to you, and how it might connect to your future career.
- Engage yourself in the learning community. Actively participate. The more you do, the more you will learn.
- Complete tasks on time. It is disruptive to the learning process when students are arriving at different times or missing deadlines. Notify your instructor if you have a situation or a scheduling conflict.
- Dress appropriately when learning on campus or when performing tasks in learning labs.
- Communicate professionally. Be respectful to each other and each other's ideas. This means not interrupting others or talking to your neighbor while others are talking. Use positive, inclusive language when addressing someone's comments, even when their opinion is different than your own. Type professional emails that include a salutation and contain a business tone.

Tentative Lesson Schedule, Semester I

Week	Lesson Topics	Readings	Laboratories	Summative Assessments
UNIT 1...Chemistry Foundations				
Sep 1 (2 period week)	Lab Safety and General Chemistry Review			
Sep 5 (4 period week)	General Chemistry Review	2.4, 2.7, 3.2, 3.6-13, 3.15, & 7.1-5		
Sep 12	General Chemistry Review	2.4, 2.7, 3.2, 3.6-13, 3.15, & 7.1-5	Evaporation and Intermolecular Forces (PI)	Lab Report
Sep 19 (4 period week)	General Chemistry Review	2.4, 2.7, 3.2, 3.6-13, 3.15, & 7.1-5		Ch 2, 3, & 7 Test
Sep 26	Acid-Base Chemistry	10.3, 10.6 & 10.7	Introduction to Acids and Bases (PI)	
Oct 3	Acid-Base Chemistry	10.3, 10.6 & 10.7	Introduction to Reversible Reactions (PI)	
Oct 10	Acid-Base Chemistry	10.3, 10.6 & 10.7	Properties of Biological Buffers	Lab Report
Oct 17 (3 period week)	Acid-Base Chemistry	10.3, 10.6 & 10.7		Ch 9 & 10 Test
UNIT 2...Fundamentals of Organic Chemistry				
Oct 24	Hydrocarbons	13.1-13.12		
Oct 31 (4 period week)	Hydrocarbons	13.1-13.12		Ch 13 Test
Nov 7	Functional Groups	14-17		
Nov 14	Alcohols, Ethers, and Thiols & Aldehydes and Ketones	14.1-3, 14.6, & 14.9 15.1-4 & 15.6	Identifying Unknown Liquids (PI)	Lab Report
Nov 21	<i>BREAK</i>			
Nov 28	Carboxylic Acids and Derivatives	16.1-2, 16.4-7, 16.9, 16.11-12, & 16.14		
Dec 5	Amines	17.1-3 & 17.5		
Dec 12	Functional Groups Wrap-up	14-17		Ch 14-17 Test
Dec 19	Comprehensive Review of Units 1 and 2			MIDTERM EXAM
Dec 26	<i>BREAK</i>			
UNIT 3...Biological Macromolecules				
Jan 2	Carbohydrates	19.1-6	Structure and Properties of Carbohydrates Lab	Lab Report
Jan 9	Carbohydrates	19.1-6		Ch 19 Test
Jan 16 (4 period week)	Lipids	20.1-2 & 20.4-6	Structure and Properties of Lipids	Lab Report

Tentative Lesson Schedule, Semester II

Week	Lesson Topics	Readings	Laboratories	Assessments
Jan 23	Lipids	20.1-2 & 20.4-6		Ch 20 Test
Jan 30	Proteins	18.2, 21.1, 21.3, 21.6-9, & 21.11	Structure and Properties of Proteins	Lab Report
Feb 6	Proteins	18.2, 21.1, 21.3, 21.6-9, & 21.11	Isolation of a Protein Lab	
Feb 13	Proteins	18.2, 21.1, 21.3, 21.6-9, & 21.11	Exploring Lactose Digestion (PI)	Ch 21 & 18.2 Test
Feb 20 (4 period week)	Enzymes	22.2 & 22.5-7	Enzyme Optimization Lab	Lab Report
Feb 27	Enzymes	22.2 & 22.5-7		Ch 22 Test
Mar 6	Nucleic Acids and Protein Synthesis	23.1-4 & 23.6	DNA Staining	Lab Report
Mar 13	Nucleic Acids and Protein Synthesis	23.1-4 & 23.6	From Gene to Protein (PI)	
Mar 20	Nucleic Acids and Protein Synthesis	23.1-4 & 23.6	Gel Electrophoresis Basics (PI)	Ch 23 Test
Mar 27	<i>BREAK</i>			
UNIT 4...Basic Metabolic Processes				
Apr 3 (4 period week)	Metabolism and Energy	24.1-5		
Apr 10	Metabolism and Energy	24.1-5	Sodium Alginate Respiration Lab	Lab Report
Apr 13 (4 period week)	Carbohydrate Metabolism	25.1-3		
Apr 17	Carbohydrate Metabolism	25.1-3	Introduction to Cellular Respiration (PI)	
Apr 24	Carbohydrate Metabolism	25.1-3		Ch 24 & 25 Test
May 1	Lipid Metabolism	26.1-6		
May 8	Protein Metabolism	27.1-3		Ch 26 & 27 Test
May 15	Comprehensive Review of Units 3 and 4			FINAL EXAM