University of Mary Washington

Department of Chemistry

CHEM 317: Biochemistry I
Fall 2024
Sections 1 & 2

Instructor: Dr. Randall D. Reif
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Office Hours:

Mondays	1:30-4:00 PM
Tuesdays	3:30-5:00 PM
Wednesdays	1:30-2:30 PM

Other times by appointment.
I also have an open door policy-drop by anytime my door is open!

Class Times: Sections 1 & 2: M, W, F 10:00 – 10:50 AM Jepson 225

Required Course Materials:

David L. Nelson and Michael M. Cox, *Lehninger Principles of Biochemistry,* Worth Publishing, Eighth Edition, 2021

Recommended: **Mary Osgood and Karen Ocoor, *The Absolute, Ultimate Guide to Lehninger Principles of Biochemistry,* Eighth Edition, Study Guide and Solutions Manual**

Calculator with scientific notation and logarithmic/exponential functions; NO PDA's (Palm Pilots, Visor Handhelds, etc.) Highly recommend Texas Instruments TI-30X series available in the Bookstore.

Small white board (8.5" x 11"), dry erase markers and eraser

Access to Canvas: This course will make use of the Canvas Course management system. Please check here frequently as materials posted will include course announcements, assignments, videos, and other course materials as necessary.

Access to Zoom: This course will make use of Zoom for video conferencing during class times if the University moves to remote learning at any time.

Course Prerequisites

This course requires a grade of C or better in CHEM 212.

Course Description

Biochemistry is designed to provide an understanding about the molecular and mechanistic characteristics of biological systems. CHEM 317 will focus on the structures of proteins, sugars, nucleic acids, and lipids and how these structures affect the functions of these essential molecules.

After completing the course, a student should

- Gain an understanding of basic structures of all classes of macromolecules
- Demonstrate a comprehension of the kinetic, equilibrium and thermodynamic principles related to biological systems
- Be able to relate structure and function of the biologically relevant molecules

Learning Outcomes 

This course will:

1. Help students develop a satisfactory knowledge base for upper level students in Biochemistry
2. Allow students to demonstrate proficiency in Biochemistry (Critical Thinking)
3. Enhance student ability to find, interpret, and communicate peer reviewed original research (Communication)
4. Prepare students for advanced study in graduate/professional school or employment in a chemistry-related field
5. Enhance student ability to interpret and solve chemical problems (Critical Thinking skills)

Digital Intensive Learning Outcomes 

As a part of the Digital Intensive program, the successful student is one who:

1. Successfully locates and critically evaluates information using the Internet, library databases, and other digital tools (Digital Fluency)
2. Uses digital tools to safely, ethically, and effectively produce and exchange information and ideas
3. Creatively adapts to emerging and evolving technology

Grading

The grade in the course will be based on the number of points accrued throughout the semester. Each assignment is worth a specific percentage of the final grade, shown below. The dates for the assignments will be announced in class or are listed on the tentative schedule.

Grade component	**Total %**
One-hour examinations (3) – 15% each	45%
Quizzes	10%
Enzyme Live Webinar Project	15%
Digital Assignments	5%
Participation	5%
Cumulative Final Examination	20%
Total possible points for semester	100%

The dates of exams are given on the tentative schedule. No cellular phones, PDAs, or other personal devices will be permitted during an examination. If a calculator is required for the quiz or exam, no formulas or information may be stored in the memory of the device. Quizzes and assignments can be announced or unannounced. **There are no make-ups for in-class assignments, quizzes, or examinations.**

The final course grade will be based on the following point scale:

Points accrued	**Letter grade**	**Points accrued**	**Letter grade**
≥ 93 %	A	76.9-73.0 %	C
92.9-90.0 %	A-	72.9-70.0 %	C-
89.9-87.0 %	B+	69.9-67.0 %	D+
86.9-83.0 %	B	66.9-60.0 %	D
82.9-80.0 %	B-	≤ 59.9 %	F
79.9-77.0 %	C+		

A mid-semester report of unsatisfactory (U) will be reported if you have a C- or below in the course thus far.

Live Enzyme Webinar Project 

For this project, you will work with a partner (Teamwork) to "Adopt an Enzyme". You will work together to choose an enzyme to research and present a mock Live Webinar. As scientific presentations have become commonly presented through the internet (Digital Fluency), this project will give you a speaking presentation experience reflective of the real world. The UMW Speaking and Writing Center is a useful resource to help with the project. *More details for this project will be released throughout the semester.* Some important dates of the project are shown below and are subject to change:

1.) October 11, 2024 – Enzyme must be selected and reported to the instructor
2.) November 4- December 1, 2024 – Final presentation must be recorded and posted for viewing by the instructor and fellow students in the class. A Zoom presentation is an easy wait to record your presentation.
3.) December 8, 2024 – All blog post questions and answers posted and peer-evaluation forms turned in to the instructor.

Digital Assignments 

In addition to the Enzyme Webinar Project which serves as the capstone project for the course, you will also complete two other assignments that will build your knowledge of digital resources used by biochemists for a variety of purposes. *More details for these assignments will be released throughout the semester.* Some important dates of the project are shown below and are subject to change:

1.) Primary Literature Citation Assignment (Due October 18, 2024) – For this assignment, you will use SciFinder Scholar to find a primary research article related to your enzyme of choice for the webinar project above. You will then use SciFinder to locate at least 5 scholarly articles that have cited the paper of choice. **You will then create and turn in a reference citation list of these sources along with a screenshot of your SciFinder Scholar pages showing these references**. This will showcase your ability to use SciFinder which is a vital digital tool used in chemistry.

2.) Bioinformatics Handbook Project (Due November 1, 2024) – Bioinformatics Databases are a critical resource for biochemists and biologists to learn valuable information about the major macromolecules that perform the chemistry of life. Therefore you (and a partner) will select one Bioinformatics database and explore it in detail. This will develop your teamwork and communication skills as well as your digital fluency. You will then create a "Handbook" for that bioinformatics website by creating a detailed step-by-step procedure to perform one function that the database is known for. Afterward, you will be assigned another group's Handbook to use and peer evaluate. You will provide feedback to that group's handbook based on your experience attempting to perform the function of that bioinformatics website.

Exams 

There will be three in-class exams during the semester which will emphasize material introduced since the last exam. There will be no make-up exams without prior arrangements with me.

The 50 minute examinations will be given in class on the dates indicated. **You may begin the examinations at 10:00 am and the exam must be completed by 10:55am on that day**.

The Final Exam will be a comprehensive and must be taken at the time scheduled by the University: December 13, 2024 at 8:30 – 11:30 AM. According to University policy, any student who does not take the final exam will fail the course.

No cellular phones, PDAs, or other personal devices will be permitted during an examination. You may only use non-graphing calculators for ALL quizzes and examinations.

Make-up exams will only be arranged for exceedingly unavoidable circumstances that are documented (death in family, hospitalization, etc.). Convenient travel arrangements *do not qualify*. You need to notify me immediately of such an emergency. ***Make-up exams will not be given after corrected exams are handed back to the rest of the class.***

If you feel that a mistake has been made in the grading of your exam, you must bring the exam to me no later than one week after the graded exam is returned.

Quizzes 

The intent of the **quizzes** is to help keep you up to date with the material, prepare you for the examinations, and help the instructor identify if the class understands the concepts presented in the lecture. Quizzes can be announced or unannounced and will be similar to problems in the text or come from the assigned reading or lecture material. There will be no make-up quizzes without prior arrangements with me.

Canvas

You must have access to Canvas (https://canvas.umw.edu). Frequently, pertinent articles will be handed out in class or posted on Canvas and the contents thereof will be included in the required information for quizzes and exams. Assignments, announcements and other information will also be posted on Canvas for reference.

File Uploads to Canvas: Many times throughout the semester you will be required to upload files into Canvas. **Please note that the ONLY file types you should EVER upload are .pdf, .doc, .docx, or .jpeg (only image type it can display)**. A recommended way to upload images is to paste them into a word document in sequence, save the document as .docx and then upload the file. There are many other ways to do this, but canvas works reliably with those files types.

Honor System

Any assignment for which you will receive a grade (unless designated as a group assignment) must be completed and pledged as your own work. The honor pledge must be written in full: I *hereby declare upon my word of honor that I have neither given nor received unauthorized help on this work. (Signature)*. It is your duty as students and ours as faculty to uphold the Honor Code, which is described in detail in the Guidebook & Constitution. Suspected violations of the Honor Code will be addressed according to the policy established by the Honor Council. I will not grade an assignment without a signed pledge.

Inclusive Learning

I feel strongly that the classroom and laboratory should be inclusive environments where People from different backgrounds, temperaments, experiences, and life circumstance can all participate in shared learning. I expect everyone to follow UMW's ASPIRE values. Listening, respectfulness, and civility are cornerstones of inclusive learning and will be expected from everyone.

Course Recording Policy

To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use. Students who wish to record lectures or class activities for study purposes must inform the faculty member first. Students with approved accommodations from the Office of Disability Resources permitting the recording of class meetings must present the accommodation letter to the instructor in advance of any recording being done. On any days when classes will be recorded, the instructor will notify all students in advance. Distribution or sale of class recordings is prohibited without the written permission of the instructor and other students who are recorded. Distribution without permission is a violation of educational privacy law. This policy is consistent with UMW's Policy on Recording Class and Distribution of Course Materials.

Family Educational Rights and Privacy Act (FERPA)

FERPA is a Federal law that protects student educational records. It is a violation of this law to put a stack of graded papers at the front of the classroom for students to retrieve. There is a chance that another student could see a grade on the assignment. To retain confidentiality, the grade on assignments will be placed on a back page. If you would like to retrieve your paper from the classroom, please sign and date the provided waiver form. If you do not feel comfortable having your papers placed on a table at the front of the classroom,

you can pick your papers up in person at my office. Please indicate on the waiver, your choice of manner to obtain assignments.

Class Attendance and Participation

Attendance in lecture is required during 2 class periods per week. Occasionally, material will be presented in lecture that is beyond the scope of your textbook or with a different emphasis than that of the text, and you will be responsible for learning this material even if you are absent.

Regardless of attendance, all assignments are due on the scheduled date. **No late assignments will be accepted without my prior consent.**

You should notify me of an expected absence as early as possible. Make-up exams will not be given except in the event of EXTREMELY extenuating circumstances.

Disability Resources

The Office of Disability Services has been designated by the University as the primary office to guide, counsel, and assist students with disabilities. If you receive services through that office and require accommodations for this class, please make an appointment with me as soon as possible to discuss your approved accommodation needs. Bring your accommodation letter with you to the appointment. I will hold any information you share with me in the strictest confidence unless you give me permission to do otherwise. Any student with particular needs should contact the Office of Disability Resources; 401 Lee Hall or at 540-654-1266. They will require appropriate documentation of a disability.

Title IX

University of Mary Washington faculty are committed to supporting students and upholding the University's *Policy on Sexual and Gender Based Harassment and Other Forms of Interpersonal Violence.* Under Title IX and this Policy, discrimination based upon sex or gender is prohibited. If you experience an incident of sex or gender based discrimination, we encourage you to report it. ***While you may talk to me, understand that as a "Responsible Employee" of the University, I MUST report to UMW's Title IX Coordinator what you share***. If you wish to speak to someone confidentially, please contact the below confidential resources. They can connect you with support services and help you explore your options. You may also seek assistance from UMW's Title IX Coordinator. Please visit http://diversity.umw.edu/title-ix/ to view UMW's *Policy on Sexual and Gender Based Harassment and Other Forms of Interpersonal Violence* and to find further information on support and resources.

Ruth Davison, Ph.D.
Title IX Coordinator

Lee Hall, Room 401
1301 College Avenue
Fredericksburg, VA 22401
Phone: 540-654-5656
E-mail: rdavison@umw.edu
Website: http://diversity.umw.edu/title-ix/

Confidential Resources
On-Campus
Talley Center for Counseling Services
Lee Hall 106, 540-654-1053

Student Health Center
Lee Hall 112, 540-654-1040

Off-Campus
Empowerhouse
24-hr hotline: 540-373-9373

Rappahannock Council Against Sexual Assault (RCASA)
24-hr hotline: 540-371-1666

Lecture Notes

While the PowerPoint slides are a nice supplement to lecture notes, they will not serve as an effective substitute. Handwritten lecture notes are more likely to contain key concepts and principles from class.

Role of the Textbook

It is strongly recommended that the text readings be completed BEFORE coming to class. The text is a powerful asset, but is not a substitute for attending class. Tests will emphasize material from lectures.

Exam Preparation

The best way to prepare for exams is to keep up with the material by reviewing notes, reading the text, and completing study questions. Reviewing the material with a partner is an excellent way to study. In addition to my office hours, I encourage everyone to take advantage of the student chapter of the ACS help sessions as well as the many chemistry resources available in the library and on the web.

Weather Policy

To determine if classes will be held during inclement weather check the school website or call campus safety. If the campus is closed due to weather or other conditions on a day when an exam is scheduled, the exam will take place during the next class period when campus is open. If an assignment is due in class on a day when campus is closed due to weather or other conditions, it will be due at the next scheduled class meeting.

A.I. Use Statement

AI is permitted in a limited capacity in this course. Students should refer to individual assignments for details as well as how/when appropriate citation for the tool should be used.

Although AI use is permitted in this course, you should keep the following points in mind:

1.) AI is a continuously developing tool. Keep track of how you use AI (e.g., original and revised prompts, where in your thinking process you used AI, different output over time). An electronic file with screenshots and notes or a written journal of your process documents your workflow and, as needed, supports appropriate attribution and citation.
2.) Fact check all AI output. AI tools are built on systems and inputs with acknowledged biases. Early and current AI output has produced factual errors and the tools 'hallucinate' or fabricate information. This is especially true if the AI is prompted about something for which it has little or no information. Unless you know the answer with 100% certainty, check responses with trusted sources.
3.) AI is only as good as the prompts it receives. It may take practice and time to use AI for results meeting expectations and standards. As a result, AI may not be the best or easiest route for completing a task.
4.) Different professors treat the use of AI tools differently. Double-check with individual professors if you are unsure about whether AI use is appropriate for a specific assignment.

Important Dates

9/2 – Labor Day, No class
9/27 – Exam I
10/14 – Fall Break, No Class
11/1 – Exam II
11/22 – Exam III
11/27-29 – Thanksgiving Break, No Class
Final Exam: Friday, 12/13/24 at 8:30-11:00 am

Tentative Schedule:

Dates and times are likely to change depending upon interest and other factors.

Date	Topic	Reading
8/26, 8/28, 8/30	Foundations of Biochemistry	Chapter 1
9/2, 9/4, 9/6, 9/9	Water	Chapter 2
9/11, 9/13, 9/16	Amino Acids, Peptides, and Proteins	Chapter 3
9/18, 9/19, 9/20, 9/23, 9/25	Amino Acids, Peptides, and Proteins	Chapter 3
9/27	**Exam I**	**Chapters 1-3**
9/30, 10/2, 10/4	The 3-D Structure of Proteins	Chapter 4
10/7, 10/9, 10/11	Protein Function	Chapter 5
10/14, 10/16, 10/18	Protein Function	Chapter 5
10/21 10/23, 10/25, 10/28, 10/30	Enzymes	Chapter 6
11/1	**Exam II**	**Chapter 4-6**
11/4, 11/6, 11/8, 11/11	Carbohydrates and Glycobiology	Chapter 7
11/13, 11/15, 11/18, 11/20,	Nucleotides and Nucleic Acids	Chapter 8
11/22	**Exam III**	**Chapter 6-8**
11/25	Lipids	Chapter 10
11/27, 11/29	Thanksgiving Break: No Class	
12/2, 12/4, 12/6	Lipids	Chapter 10
12/13	***Cumulative Final Exam***	***8:30am-11:00am***

Last day to drop a course: September 13

Last day to withdraw from a course or change to pass/fail grading: November 1