

**CHEM 414/CHEM 414L: Biochemistry
Course Syllabus, Spring 2024**

INSTRUCTOR INFORMATION

Instructor: Dr. Thomas West

Office: STC 302

E-mail: Thomas.West@tamuc.edu

Phone: 903-886-5399

FAX: 903-468-6020

Office Hours: MTWR 12:45 pm-2:00 pm or by appointment.

Class Meetings: TR 11:00 am-12:15 pm; **Location:** STC 123

CHEM 414 Laboratory: Tuesday 6:00 pm-9:50 pm; **Location:** STC 324

Preferred Form of Communication: email

Response Time: within 48 hours

COURSE INFORMATION

Required Text Book: Principles of Biochemistry, 5th edition, Authors: Horton, Moran, et. al., ISBN: 978-0-321-70733-8

For CHEM 414L: Biochemistry Laboratory 3622/4560 by Author(s): Mark Demarest
ISBN: 978-0-7575-7929-5

Course Description: This course in biochemistry is intended to provide undergraduate students with a foundation and in depth knowledge of biochemistry. This course will be covering many aspects of biochemistry, including: biomolecules and metabolism. The course consists of lectures sessions and the topic covered will be given in details in the course schedule. This course will also be combined with the **Biochemistry laboratory course** that includes laboratories focusing on laboratory safety, design of experiments and data analysis; chromatographic methods; spectrophotometry; enzyme kinetics; and characterization of proteins, sugars and lipids. This laboratory course is intended to provide a foundation of knowledge of macromolecules and also to learn some molecular biological techniques which will be very beneficial to relate lectures to real world applications. There will be also laboratory-related lectures during the time scheduled for the laboratory sessions. These lectures are intended to describe the experiments, to learn how to analyze your data and draw conclusions.

Course Definition: Structure and function of large and small biomolecules involved in metabolism and information transfer in living organisms. The course treats both chemical and biological processes and their mechanisms. For students majoring in chemistry and life sciences, especially those interested in scientific, medical, or similar professional career.

Credits: 4 Course Credits (3 Course Credits for Class and 1 Course Credit for Laboratory).

Prerequisites or Co-requisites: CHEM 2325, CHEM 2425 or consent of the instructor.

Student Learning Outcomes (SLO): The main objectives of this course are to provide a basic foundation and understanding of the principles of modern biochemistry necessary for further work in the biochemical/biomedical areas. Unlike much earlier chemistry, the material is often conceptually complex and not yet amenable to straightforward mathematical interpretation. Accordingly, the students may find the material more heavily descriptive than in their earlier chemical studies. By the end of this course the students will have a better understanding of the structure and function of the biological macromolecules its metabolism and biosynthesis.

At the completion of this course students will be able to:

- Identify various biomolecules (amino acid, nucleotides, sugars, fatty acids).
- Understand complex biomolecule structure (proteins, polysaccharides and nucleic acids).
- Understand the concept of metabolic pathways relative to the synthesis of biomolecules.
- Understand the function of enzymes, their mechanisms and how their importance to the concept of metabolism.
- Comprehension of membrane structure and function.
- Understand key metabolic pathways such as glycolysis, gluconeogenesis, the citric acid cycle, electron transport and ATP synthesis.
- Interpret plots of enzyme kinetic data in laboratory setting.
- Perform various techniques to separate, characterize and quantitate proteins in laboratory setting.
- Perform techniques to isolate lipids in laboratory setting
- Communicate experimental results to the peers.
- Be able to relate the importance of biochemical concepts to other scientific disciplines as well as to its role in daily lives.

COURSE REQUIREMENTS

Instructional Methods: Face to face in classroom and laboratory settings. Course structure will involve assessment using exams and laboratory reports at designated dates during the semester.

Student Responsibilities for Success in Course: Students should review notes daily and become familiar with basic concepts of biochemistry as presented to them. Students should review laboratory procedures prior to performing assigned laboratories. Waiting until the day before the exam to study the material covered and being unprepared for assigned laboratories are not successful approaches.

GRADING

Final grades in this course will be based on the following scale:

A = 90%-100%

B = 80%-89%

C = 70%-79%

D = 60%-69%

F = 59% or below

A = 90-100 points
B = 80-89 points
C = 70-79 points
D = 60-69 points
F = 59 points or below

For students enrolled in CHEM 414/414L, your final grade will be based on your performance in 3 exams (20% each), the laboratory (25%) and the final exam (15%). *Make-up exams will not be allowed without a valid excuse. Extra credit assignments will **NOT** be provided during the lecture course.* Your lecture course grade will be based on 3 in-class exams representing 60% of your total course grade and a final comprehensive lecture examination representing 15% of your course grade. Grading of CHEM 414L will be based on 4 laboratory reports (20 points each) + laboratory exam (20 points) x 25% = total laboratory points to be counted towards your CHEM 414 final grade. *No make-up laboratories will be allowed. Extra credit assignments will **NOT** be provided during the laboratory course. The last day to drop with a Q grade is Thursday, March 28.*

TECHNOLOGY REQUIREMENTS

LMS

All course sections offered by Texas A&M University-Commerce have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:

<https://community.brightspace.com/s/article/Brightspace-Platform-Requirements>

LMS Browser Support:

https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm

YouSeeU Virtual Classroom Requirements:

<https://support.youseeu.com/hc/en-us/articles/115007031107-Basic-System-Requirements>

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu.

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

COMMUNICATION AND SUPPORT

The instructor will provide grades of exams within a week of administration.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

<https://community.brightspace.com/support/s/contactsupport>

COURSE AND UNIVERSITY PROCEDURE/POLICIES

Course Specific Procedures/Policies

The attendance record is taken from a daily sign-in sheet. A student who fails to sign the sign-in sheet will be counted as missing a lecture. The students will be expected to be available and prepared for the exams at the specified times. No make-up exams will be allowed without a valid excuse. Missing 8 lectures (represents 30% of the lectures during the semester) or missing 2 laboratories (represents 20% of laboratories) may result in your being dropped from the course. **Again, NO extra credit assignments will be given during this course.** Dishonest scholarship will earn an automatic zero (0) and initiate prosecution to the fullest extent. Incomplete grades may be given only if the student has a current average 70% and is precluded from completion of the course by a documented illness or family crisis.

Syllabus Change Policy

The syllabus is a guide. Circumstances and events may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

University Specific Procedures

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment (see Student Guidebook, Policies and Procedures, Conduct, Procedure 13.02.99.R0.06).

<http://www.tamuc.edu/admissions/registrar/documents/studentGuidebook.pdf>

Any student engaging in disruptive behavior will be dismissed from class on a first offense. A second offence may constitute dismissal from the course with a failing grade.

TAMUC Attendance

All students are expected to attend classes on a regular basis. The Department of Chemistry adheres to the attendance policy set by the University as stated in the most current Undergraduate Catalog. The attendance record is taken from a daily sign-in sheet. A student who fails to sign the sign-in sheet will be counted as missing a lecture. **According to the TAMU-Commerce Procedure**

13.99.99.R0.01, if a student has excessive absences, the instructor may drop the student from the course.

<http://www.tamuc.edu/admissions/registrar/generalinformation/attendance.aspx>

The instructor will only excuse an absence if the student provides, with appropriate documentation, an excusable reason allowed by the TAMU-Commerce Procedure 13.99.99.R0.01.

<http://tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf>

Academic Integrity

Academic cheating, plagiarism and other types of academic misconduct may result in the student being removed from the class with a failing grade. Extreme cases of academic misconduct may result in suspension or expulsion from the University as described in the Code of Student Conduct section of the Student's Guidebook (Procedure 13.99.99.R0.10). For more detail and the definition of academic dishonesty see the following procedures:

Undergraduate Academic Dishonesty 13.99.99.R0.03

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03>

ADA Statement

Students with disabilities

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services

Texas A&M University-Commerce

Gee Library, Room 162

Phone: (903) 886-5150 or (903) 886-5835

Fax: (903) 468-8148

E-Mail: StudentDisabilityServices@tamuc.edu

Website: Office of Student Disability Resources and Services

<http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/>

Please advise the instructor of any special problems or needs at the beginning of the semester.

A&M-Commerce Supports Students' Mental Health

The Counseling Center at A&M-Commerce, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and

confidential services, please visit www.tamuc.edu/counsel

Nondiscrimination Notice

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity or gender expression will be maintained.

Campus Concealed Carry

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations. For a list of locations, please refer to

(<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf>) and/or consult your event organizer). Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

AI Use Policy

Texas A&M University-Commerce acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course. Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism). Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors' guidelines. If no instructions are provided the student should assume that the use of such software is disallowed. In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources.

13.99.99.R0.03 Undergraduate Academic Dishonesty

13.99.99.R0.10 Graduate Student Academic Dishonesty

COURSE CALENDAR FOR CHEM 414

Date/Chapter

January

11-Chapter 1

16-Chapter 1; Chapter 2

18-Chapter 2

23-Chapter 3

25-Chapter 3

30-Chapter 4

February

1-Chapter 4

6-EXAM 1 (Tuesday)

8-Chapter 5

13-Chapter 5

15-Chapter 5; Chapter 6

17-Chapter 6

20-Chapter 7

22-Chapter 7

27-Chapter 7

29-EXAM 2 (Thursday)**March**

5-Chapter 8

7-Chapter 8

11-15 - No Class - Spring Break

19-Chapter 8; Chapter 9

21-Chapter 9

26-Chapter 9

28-Chapter 9; Chapter 10

April

2-Chapter 10; Chapter 11

4-Chapter 11

9-EXAM 3 (Tuesday)

11-Chapter 12

16-Chapter 12; Chapter 13

18-Chapter 13; Chapter 14

23-Chapter 14;

25-Chapter 18

30-Chapter 18

May**1-3 - Study Days****7-ACS CUMULATIVE FINAL EXAM (Tuesday, 10:30 am – 12:30 pm)**

TENTATIVE CHEM 414 LABORATORY SCHEDULE**January**

10-No Laboratory

17-Lab Safety and Best Practices

24-Analytical Error

31-Acid-Base Chemistry and Buffering Systems

February

7-Discussion/lab report 1 due 2/14

14-Titration and Thin-Layer Chromatography of Amino Acids

21-Determination of Protein Concentrations

28- Discussion/lab report 2 due 3/6

March

6-Gel Filtration Chromatography

13-No Class (Spring Break)

20-Enzyme Kinetics & Inhibition

27-Discussion/lab report 3 due 4/3

April

3-Sugar Unknown

10-Lipid Extraction

17- Discussion/Review/lab report 4 due 4/24

24-Cumulative Laboratory Exam

All dates and assignments of syllabus schedule for CHEM 414 and CHEM 414L are tentative and subject to change.