

Abilene Approval Chart for Curriculum Changes

A = Approve I = Information Item R = Respond in Writing

Course Number CHEM 114 or Degree Plan(s) _____

State the requested change and reason. A memo may be attached if more space is

necessary.

This request is to add CHEM 114, Introduction to Organic and Biological Chemistry, to the Life and Physical Sciences Menu

Indicate the requested change.

	Change to a Course	Dept./School ¹	College	Dean	TEC	UGEC	AUAC/Grad	Provost	President
1.	Title (description unchanged)	A	A	A	I	–	I	I	I
2.	Description (not affecting content)	A	A	A	I	–	I	I	I
3.	Course term(s)	A	I	A	I	–	I	I	I
4.	Content (change of course outcomes)	A	A	A	I	–	I	A	I
5.	Number of hours (lecture, lab, contact)	A	A	A	A	–	A	A	I
6.	Course number within the hundred	A	A	I	I	–	I	I	I
7.	Course number beyond the hundred	A	A	A	A	–	A	A	I
8.	Prerequisites	A	A	A	I	–	I	I	I
9.	Course fee(s)	A	–	A	–	–	–	A	I
10.	From U to G or G to U	A	A	A	A	–	A	A	I
11.	Cross-list course	A	A	A	A	–	A	A	I
12.	Department of record	A	A	A	A	–	A	A	I
13.	Close a course	A	A	A	A	–	A	A	I
14.	New course (includes combining or splitting courses)	A	A	A	A	–	A	A	I

A = Approve I = Information Item R = Respond in Writing

	Change to the University Requirements (All Campuses)	Dept./School¹	College	Dean	TEC	UGEC	AUAC/Grad	Provost	Faculty	President	Trustees
1.	University Requirements — Change course outcomes of an included course ²	A	A	A	–	A	–	A	–	A	–
2.	University Requirements — Add or drop a required course from the University Requirements ²	A	A	A	–	A	–	A	A	A	–
3.	University Requirements — Add or drop a course from a menu within the University Requirements ²	A	–	–	–	A	–	A	–	A	–
4.	University Requirements — Change hours within a menu in the University Requirements ²	A	A	A	–	A	–	A	A	A	–
	Change to Catalog Information (for Campus)										
1.	General Requirements for Bachelor's Degrees and Associate's Degrees	–	–	–	–	–	A	A	A	A	–
2.	Policies governing academic probation and suspension	–	–	–	–	–	A	A	A	A	–
3.	Requirements for graduating with honors	–	–	–	–	–	A	A	A	A	–
	Change to a Degree Plan Proposed by Faculty or College										
5.	Educational Program — Revise ³	A	A	A	A	–	A	A	–	A	–
6.	Educational Program — Adopt/change admission requirements	A	A	A	A	–	A	A	–	A	–
7.	Educational Program — Add ³	A	A	A	A	–	A	A	A	A	I
8.	Educational Program — Discontinue	A	A	A	A	–	A	A	A	A	I
9.	GPA — Revise program-required GPAs	A	A	A	A	–	A	A	–	A	–
10.	Minor — Revise	A	A	A	I	–	I	I	–	I	–
11.	Minor — Add	A	A	A	A	–	A	A	–	A	–
12.	Minor — Discontinue	A	A	A	A	–	A	A	–	A	–
13.	Degree — Add	A	A	A	A	–	A	A	A	A	I
14.	Degree — Discontinue	A	A	A	A	–	A	A	A	A	I
	Change to a Degree Plan Proposed By Provost										
15.	Educational Program — Discontinue	R	–	R	A	–	A	A	A	A	I
16.	Minor — Discontinue	R	–	R	A	–	A	A	–	A	–
17.	Degree — Discontinue	R	–	R	A	–	A	A	A	A	I

¹ When an academic unit does not have a council, the UGEC and/or UUAC will serve as its academic council, depending on the nature of the issue.

² Courses that satisfy ACU's University Requirements will normally have lower-level numbering, be free of prerequisites and co-requisites, appeal to more than one or two majors, and "not narrowly focus on those skills, techniques, and procedures specific to a particular occupation or profession" (SACS 2.7.3). Departments may request exceptions to the first three criteria.

³ For undergraduate majors, a minimum of 30 hours is required. These programs must have a minimum of 6 elective hours, unless the requirements of external accrediting bodies make it impossible.

Department/School Chair(s)	
	9/6/2022
_____ <i>Signature</i>	_____ <i>Approval date</i>
_____ <i>Signature</i>	_____ <i>Approval date</i>

College Academic Council(s)	
_____ <i>Signature</i>	_____ <i>Approval date</i>
_____ <i>Signature</i>	_____ <i>Approval date</i>

Dean(s)	
_____ <i>Signature</i>	_____ <i>Approval date</i>
_____ <i>Signature</i>	_____ <i>Approval date</i>

Teacher Education Council	
_____ <i>Chair's signature</i>	_____ <i>Approval date</i>

University General Education Council	
_____ <i>Chair's signature</i>	_____ <i>Approval date</i>

Abilene Undergraduate Academic Council	
_____ <i>Chair's signature</i>	_____ <i>Approval date</i>

Graduate Council	
_____ <i>Chair's signature</i>	_____ <i>Approval date</i>

Provost	
_____ <i>Signature</i>	_____ <i>Approval date</i>

Faculty	
_____ <i>Chair of Faculty Senate</i>	_____ <i>Approval date</i>

President	
_____ <i>Signature</i>	_____ <i>Approval date</i>

CHEM 114: Introduction to Organic and Biological Chemistry

Abilene Christian University
Spring 2023

Instructor Information

Instructor

Dr. Kathleen Lee

Email

Kathleen.Lee@acu.edu

Office Location

Halbert-Walling Research Center 326

Phone

325-674-2020 (office)

Office Hours

Tues & Thurs 8:30-11
Tues 2-4

Course Information

Class Location

HAL 303A

Meeting Times

MWF 10-10:50pm

3 credit hours

Course Description

From the Course Catalog: "Continuation of [CHEM 113](#). Study of organic compounds of carbon: hydrocarbons and those functional groups of importance to living systems. Biochemistry of carbohydrates, fats and proteins. Can be credited without [CHEM 112](#). Prerequisite: [CHEM 113](#). Not for majors in the Department of Chemistry and Biochemistry. May be used to satisfy University Requirements."

Intended Audience

Students in the Departments of Agriculture & Environmental Science, Kinesiology & Nutrition, or Biology and in the School of Nursing

Mission Statements

ACU Mission

To educate students for Christian service and leadership throughout the world.

College of Arts & Sciences Mission

To engage students with humanity's greatest ideas to create understanding, apply insights, and serve the world as Christian thinkers and problem solvers.

Department of Chemistry & Biochemistry Mission

To prepare students for careers in chemistry, biochemistry, chemical education, and health professions by displaying high professional standards and by modeling Christian values, leadership, and service.

Unique Christian Perspective

I believe the study of organic and biological chemistry ties into the Christian faith in two important ways. First, when we study science, we study God's creation. We discover the laws which govern the physical world through observation and experimentation. We find incredibly detailed forces at work holding together even the smallest subatomic particles. We find beauty in the complex patterns in nature. Surely creation reflects the qualities of its Creator. Our appropriate response is to stand in awe of the incomparable imagination and power of the Creator.

Second, Christ calls us to serve by taking care of the sick, the hungry, and the thirsty. This drives many to pursue careers in medicine because of the direct interaction with the sick. However, chemists have unique opportunities to discover materials that improve access to clean water and nutritious food, to identify new compounds to treat diseases, and to sustainably use the earth's resources. In these ways and in many more, chemists can demonstrate a love for Christ and service to others.

Course Materials

Required Text and Materials

Timberlake, Karen C. *General, Organic, and Biological Chemistry: Structures of Life*, 6th Ed., Pearson Education, Inc., 2019. (eBook or hardback)

Mastering Chemistry with Canvas integration—the online homework program

Canvas access and the Canvas App

LockDown Browser—required for taking exams and quizzes online

Webcam—required for taking exams and quizzes online. Computers with webcams are available in the ACU Library.

myACU email access

Course Content

Unit	Topic	Text Chapters
Unit 1	Introduction to Organic Chemistry	12
Unit 2	Oxygen-containing Compounds and Carbohydrates	13, 14, & 15
Unit 3	Carboxylic Acids and their Derivatives	16 & 17
Unit 4	Biological Building Blocks	18, 19, & 20

Course Format

Most class periods will consist of lectures. Participation and questions are welcome and encouraged as they provide valuable feedback to your instructor about your understanding and comprehension of the material. A few periods will be devoted to group work on Guided Inquiry Worksheets.

Learning Objectives

Objective	Measurement
Identify organic functional groups and name organic compounds containing them	Homework, Quizzes, Exams
Predict products of select transformations	Guided Inquiry worksheets, Homework, Exams
Analyze trends in the physical properties of organic and biological compounds	Guided Inquiry worksheets, Homework, Exams
Classify biological compounds as proteins, carbohydrates, lipids, or nucleic acids based on their structure	Homework, Exams
Relate chemical behavior to chemical structure	Guided Inquiry worksheets, Quizzes, Exams
Understand the use and impact of organic and biological molecules on daily life.	Homework, Exams

Course Policies

Grading

Grades are assigned on a 100-point scale. (A = 90-100, B = 80-89.4, C = 70-79.4, D = 60-69.4, F = Below 60). Extra credit will not be offered.

Exams: 55%

Four exams will be given throughout the semester. Students will have 50 minutes to complete each exam. The highest 3 exams each count for 15% of the overall semester grade, while the lowest exam is worth 10%. Exams may not be taken early or made up except in the case of a documented emergency. It is the student's responsibility to contact the instructor within 24 hours of a missed exam. Absences from test days due to illness will only be excused with a doctor's note from an in-person consultation; Wildcat Care is not sufficient to make up a test.

Quizzes: 10%

Short quizzes take place during class time. Quizzes may not be made up, but the lowest quiz score will be dropped. Quiz dates and content will be announced at least one class period before the quizzes are given.

Homework: 10%

Homework will be assigned and completed within Mastering Chemistry, an online program, which must be accessed through Canvas. One homework score will be dropped.

Participation, Reflection, Guided Inquiry: 10%

Assignments may include in-class games and activities, watching content videos, and practice problems. Guided Inquiry Worksheets will be due at 10:00 am the following class period and are graded on completion and effort. In order to receive full credit, you must work with your group the entire class period. GI worksheets will be posted on and submitted through Canvas.

Comprehensive Final Exam: 15%

The comprehensive final exam will be given during the assigned time during finals week.

Attendance

Attendance will be taken each class period. Absences due to school-sponsored events will be excused with a signed Dean's form provided to the instructor 7 days prior to the absence. Students who miss a class period due to an emergency must notify the instructor as soon as possible. Students with 9 or more absences, including school-sponsored absences, may be dropped from the course by the instructor. Students are responsible for any material covered on missed days.

Communication

Content for the course will be shared via Canvas in the form of handouts and assignment details. Students are expected to regularly check their ACU email account for communication between the instructor and the class as a whole or between the instructor and individual students. Students should use proper grammar and English when corresponding with the instructor via email as practice corresponding with a supervisor.

I will do my best to respond to emails sent before 3pm on the same business day. Do not expect responses after 5pm—that time is reserved for my family. However, my cell phone number is listed above. Please use it if you have an emergency or need help unrelated to the course.

Classroom Expectations

The classroom is a training space for you as you prepare for your future careers. Employers will have expectations that you will arrive on time, dress appropriately, and be productive with your time. As such, I expect students to come to class prepared, submit work on time, and be respectful of their classmates and instructor.

Tardiness limits your hearing and understanding of the course material and distracts your peers and professor. As such, students who habitually arrive after the lesson has begun will be required to meet with the instructor to discuss commitment to the course and future consequences.

Clothing choices communicate a variety of messages. For example, wearing pajama pants to class conveys a desire to be comfortable but also a readiness for sleep—not work. Students should dress in a manner that promotes attentiveness and reflects their God-given worth. Students who arrive dressed in revealing clothing (including midriffs, tube tops, short skirts or shorts with less than a 3-inch inseam) may be asked to leave until

they are dressed according to the ACU Dress Code, which may be viewed at <https://www.acu.edu/community/offices/administrative/dean-of-students/policies/general-university-policies.html>.

ACU Policies

Academic Integrity

Academic integrity is defined as academic work completed as assigned for each class by the individual or group responsible for the work. Violations of academic integrity and other forms of cheating involve the intention to deceive, mislead, or misrepresent and therefore, are a form of lying. Such actions are contrary to behavioral norms that flow from the nature of God. Academic misconduct includes, but is not limited to, the following: 1) Failure to give credit to sources used in a work in an attempt to present the work as one's own, 2) Submission of papers or projects obtained from another source (e.g., research service or club paper file) as one's own, and 3) Falsifying information orally or in writing. Academic misconduct may result in, but is not limited to, a zero on the assignment and/or an F in the course. Additionally, the department chair, Dean of your school, and the Dean of Student Life will be notified. See the full university policy, including how to appeal a decision, on the Provost's website (<http://www.acu.edu/community/offices/administrative/office-of-the-provost/academic-integrity-policy.html>).

ADA Compliance

Abilene Christian University is dedicated to removing barriers and opening access for students with disabilities in compliance with ADA and Section 504 of the Rehabilitation Act. The Alpha Scholars Program facilitates disability accommodations in cooperation with instructors. In order to receive accommodations, you must be registered with Alpha Scholars Program, and you must complete a specific request for each class in which you need accommodations. If you have a documented disability and wish to discuss academic accommodations, please email alpha@acu.edu call their office directly at 325-674-2667.

Application for Life and Physical Sciences Menu

Guidelines For All General Education Courses

1. All general education courses must be 100-level or above.
2. General education courses should present a breadth of knowledge, not focusing on skills, techniques, and procedures specific to a particular occupation or profession.
3. Individual courses will fulfill only a single general education requirement.
4. Courses free of prerequisites are preferred. Applications to add courses with prerequisites must provide additional evidence that the course contributes to a student's breadth of knowledge and is not specific to a particular occupation or profession.
5. Each course may appear on a maximum of two menus that accept applications (arts and humanities, cultural literacy, life and physical sciences, and social and behavioral sciences).

Life and Physical Sciences Description

Courses within this domain use the methods and models of the natural sciences to describe, explain, and predict phenomena in the physical world; they employ empirical evidence, scientific principles, and interactions among natural phenomena to understand the world around us.

Instructions

Complete this form and submit it with a course syllabus and approval chart to the University General Education Council. Faculty submitting an application should be prepared to perform annual assessment for their course. The assessment will be conducted with the rubric included in this course application.

Subject code, course number, and title of course:	CHEM 114, Introductory Organic and Biological Chemistry
Terms offered:	Spring
Catalog description:	Continuation of CHEM 113. Study of organic compounds of carbon: hydrocarbons and those functional groups of importance to living systems. Biochemistry of carbohydrates, fats and proteins.
Course prerequisites:	CHEM 113
Cross-listed courses: *Note: Many gen ed courses are cross-listed between the Abilene and Dallas campuses.	N/A
Other general education menus on which the course appears or you are applying for:	N/A

Prerequisites

The council understands that many of the courses on this menu will have corequisites and that the second course in a sequence may also have a prerequisite.

1. Is the course a lower-division (100- to 200-level) course in astronomy, biology, chemistry, physics, agricultural science, environmental science, or geology?

☒ Yes ☐ No

If yes, continue to 2. If no, please explain how this course meets the description of life or physical sciences above. Applications for courses originating in other disciplines will be considered.

2. Does the course have more than one prerequisite and/or more than one corequisite?

☐ Yes ☒ No

If no, continue to 3. If yes, please explain why an exception should be made to include this course in the Life and Physical Sciences menu.

3. If the course has prerequisites, provide evidence that the course contributes to a student's breadth of knowledge. Also provide evidence that the course content is not specific to a particular occupation or profession (200 words or less).

This course is a continuation of Chem 113, Introductory Chemistry. It presents a broad overview of the subjects of organic and biochemistry and how they can be applied to everyday life.

Relevant Outcomes

- C2: Analyze quantitative data, published writing, or observable phenomena to draw informed conclusions.
- C3: Interpret mathematical and/or logical models such as formulas, graphs, tables and schematics, and draw inferences from them; and
- C4: Integrate new data into their existing knowledge.

Describe how the course meets the C2 outcome (100 words or less).

Students learn how physical and chemical properties relate to the structure of organic compounds. Physical properties such as boiling point and melting point are informed by the shape of molecules and the types of intermolecular forces at work. Students may draw conclusions about the strength of the intermolecular forces based on the physical properties of a compound.

Describe how the course meets the C3 outcome (100 words or less). Interpret mathematical or logical models such as formulas, graphs, tables, and schematics, and draw inferences

Organic and biological molecules are too small to be viewed even with the aid of a microscope, requiring the use of models and symbolic representations. These models use a system of lines and dots to represent bonds between atoms or unbonded electrons. Students draw inferences from the representations about the three-dimensional structure of the molecules. The representations of individual compounds combine with other compounds in schemes to describe chemical reactions.

Describe how the course meets the C4 outcome (100 words or less). Integrate new data into their existing knowledge

Students are encouraged to reflect on how the course information relates to their own field of study. Some course concepts align with concepts students have encountered in other courses, but CHEM 114 adds new details to enhance their existing knowledge. For example, students may have some knowledge of simple and complex carbohydrates from biology or nutrition courses, and this course illustrates the arrangement of atoms within such molecules. Furthermore, much of the course material involves the application of concepts from Introductory Chemistry such as electronegativity, bonding, and intermolecular forces.

Outcomes assessment should occur within one or two exams/assignments. Please indicate which exams or assignments will be used for each outcome. Provide assignment prompts if available.

Area to Be Assessed	Assessment Artifact
Outcome C2	Final exam
Outcome C3	Final exam
Outcome C4	Final exam

Please use the following rubric to perform assessment each year.

Student Learning Outcome C2

Students will be able to:	Shortcomings	Meets Expectations	Points of Excellence
Analyze data to draw conclusions	Lacks sufficient analysis of data or published writing.	Analyzes data and/or published writing in an effective manner.	Analyzes data and/or published writing in an exemplary manner.

Student Learning Outcome C3

Students will be able to:	Shortcomings	Meets Expectations	Points of Excellence
---------------------------	--------------	--------------------	----------------------

Interpret mathematical and/or logical models such as formulas.	Little to no demonstrated ability to interpret relationships and/or data in models.	Demonstrates ability to interpret relationships and/or data in models.	Exceptional ability to interpret relationships and/or data in models.
---	---	--	---

Student Learning Outcome C4

Students will be able to:	Shortcomings	Meets Expectations	Points of Excellence
Integrate new data into their existing knowledge	Shows little to no grasp of new information and/or does not demonstrate adequate connection to previous learning.	Grasps new information and makes connections to previous learning.	Exceptional grasp of new information and/or demonstrates outstanding ability to connect to previous learning.