Abilene Approval Chart for Curriculum Changes

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

Course Number: CHEM 430 Medicinal Chemistry or Degree Plan(s):

	Campus-Level Academic Review[1]	Dept./School	Colleg	Dean	TEC	AIIAC/Grad	Provost
	Change to a Course Include signatures from all chairs/program directors for cross-listed courses.[1]						
1.	Title (description unchanged)	A	A	A	I	I	I
2.	Description (not affecting content)	A	A	A	I	I	I
3.	Course term(s)	A	I	A	I	I	I
4.	Content (change of course outcomes)	A	A	A	I	I	A
5.	Number of credit hours	A	A	A	A	A	A
6.	Course number within the hundred	A	A	I	I	I	I
7.	Course number beyond the hundred	A	A	A	A	A	A
8.	Prerequisites	A	A	A	I	I	I
9.	Course restriction (e.g., majors only, junior standing)	A	A	A	A	A	A
10.	Level change (U to G *or* G to U)	A	A	A	A	A	A
11.	Cross list course	A	A	A	A	A	A
12.	Department of record	A	A	A	A	A	A
13.	Open or close a course	A	A	A	A	A	A
	Change to a Degree Plan						
14.	Educational Program — Revise	A	A	A	A	A	A
15.	Educational Program — Adopt/revise admission requirements	A	A	A	A	A	A
16.	GPA — Revise program-required GPA	A	A	A	A	A	A
17.	Minor — Revise	A	A	A	A	A	A

	Full Review	Dept./School	College	Dean	TEC	AUAC/G	Provost	Campus	Senior VPAA	President
	Change to Catalog Information (for Campus)									
18.	General requirements for Bachelor's and Associate Degrees	–	–	–	–	A	A	A	A	I
19.	Policies governing academic probation and suspension	–	–	–	–	A	A	A	A	I
20.	Requirements for graduating with honors	–	–	–	–	A	A	A	A	I
	Change to a Degree Plan									
21.	Educational Program — Add or Discontinue[2 3]	A	A	A	A	A	A	A	A	I
22.	Educational Program — Discontinue (Provost-proposed)	R	–	R	A	A	A	A	A	I
23.	Minor — Add or Discontinue	A	A	A	A	A	A	–	A	I
24.	Minor — Discontinue (Provost-proposed)	R	–	R	A	A	A	–	A	I
25.	Degree — Add or Discontinue	A	A	A	A	A	A	A	A	I
26.	Degree — Discontinue (Provost-proposed)	R	–	R	A	A	A	A	A	I

	Change to General Education Requirements for Undergraduates (System)	Dept./School	College	Dean	AUAC	Provost	UGEC	University Faculty	Senior VPAA	President
27.	Change course outcomes of an included course	A	A	A	A	A	A	–	A	I
28.	Add or drop a required course from the General Education Requirements	A	–	A	–	A	A	A	A	I
29.	Add or drop a course from a menu within the General Education Requirements	A	–	A	–	A	A	–	A	I
30.	Comprehensive revision of General Education Requirements	–	–	–	–	A	A	A	A	I

Notes

[2] Any change to a cross-listed course requires the signature of both department chairs or program directors overseeing the course to ensure that the courses stay in sync. This includes courses taught at other campuses (e.g. BIBL 101 and BIBO 101).

[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. Master's programs must include a minimum of 30 hours, and doctoral programs must include a minimum of 30 hours beyond the master's.

[4] When a department/school or dean proposes closing a program, approval routing follows the typical process beginning with the department/school. An administrative proposal by the provost or senior vice president for academic affairs would follow the "provost-proposed" routing on the chart.

Updated 8/1/2023

Department/School(s)

11/1/23

Chair Signature | Date

Chair/Program Director Signature | Date

College Academic Council(s)

1/2/2024

Chair Signature | Date

Chair Signature | Date

Dean(s)

1/2/2024

Signature | Date

Signature | Date

Teacher Education Council

Signature | Date

Campus Academic Council:
Abilene Undergraduate or Abilene Graduate

Signature | Date

Provost

Signature Date

University General Education Council

Signature Date

University Faculty

Abilene Faculty Senate Chair signature Date

Dallas Faculty Council Chair signature Date

Senior Vice President for Academic Affairs

Signature Date

President

Signature Date

Abilene New Course Application

Course ID (*Subject Code and Number)*	CHEM 430

1. Systems and Catalog Information Complete each item.

A	Course Developer	Kathleen Lee, Ph.D.
B	Course Instructor	Kathleen Lee, Ph.D.
C	Course Title	Medicinal Chemistry
D	Course Abbreviation for Banner if title is more than 30 characters	Medicinal Chemistry
E	College	OSE - Onstead Science and Engineering
F	Department	C&BC - Chemistry & Biochemistry
G	Number of credit hours	3
G1	Number of lecture contact hours	3
G2	Number of lab contact hours	0
H	Is the course for a fixed or variable number of credit hours?	Fixed If variable, explain rationale:
I	Is the course repeatable for additional credit?	No
J	Maximum total number of credit hours a student can earn for this course	3
K	Course schedule type	Lecture (LEC)
L	Number of faculty workload hours	3

M	Grade mode	Standard
N	Maximum Enrollment	20
O	**Catalog Description** (50 words or less)	Introduction to design and development of small molecule drug candidates. Focuses on structure-activity relationship, types of drug targets, pharmacokinetics and pharmacodynamics, and optimization of lead drug candidates. Special attention will be paid to synthesis and synthetic strategies. Prerequisite: a grade of "C" or better in CHEM 324.
P	List any prerequisites (course/s, test scores, class standing, major, etc.)	A "C" or better in CHEM 324 Organic Chemistry II
Q	List any corequisites (these *must* be taken at the same time; note that a single requirement cannot be both a prerequisite *and* a corequisite)	N/A
R	If the course is cross-listed, specify the subject code and course number of the other course	N/A
S	Does this course require any additional student course fees?	No If yes, attach a completed course fee form.
T1	Will the course be offered in **fall** terms?	Yes, odd years
T2	Will the course be offered in **spring** terms?	No
T3	Will the course be offered in **summer** terms?	No
U	First semester this course will be offered under new Course ID. *May not be earlier than the coming fall semester.*	Likely Fall 2025

V	Is this course required for a program(s)?	Yes If yes, attach a completed curriculum proposal to change the program(s).
W	Should the addition of this course be retroactively applied to the degree plan it supports? *This is rare, and rationale should explain compelling extenuating circumstances.*	No If yes, provide rationale:
X	Has this course been offered as a Special Topics course? *New courses are not required to be taught as Special Topics courses prior to approval.*	No If yes, provide course ID, term, and enrollment: Medicinal Chemistry is a redesign of the Advanced Organic Chemistry special topics course that was offered Fall 2022 (CHEM 440; 6 students enrolled). Half of the Advanced Organic topics will be removed, and the remaining topics will be expanded and added to new topics in the Medicinal Chemistry curriculum.
Y	List any courses in which the content overlaps the proposed course. (Course ID and Name). *Attach a statement from the instructor/dept chair of the existing course justifying the new offering.*	

2. Curriculum

A. Explain any effects of this course on any degree plans. If the addition of the course alters program requirements, submit a separate Approval Chart for Curriculum Change to update the program.

CHEM 430 will be added as an upper-level elective to the existing Chemistry & Biochemistry degrees: B.S. Chemistry, B.S. Biochemistry-Biomedical Sciences track, and B.S. Biochemistry-ACS track. CHEM 430 will also be listed on two proposed B.S. Chemistry tracks. It will be a required course in the ACS Medicinal Chemistry track (CHMM), and it will be an upper-level elective for the ACS Research track (CHMR).

B. Justify the addition of this course to the current curriculum, explaining the gap it meets.

Many of our prospective and current students are interested in medically related careers, with the most common career goals of becoming a physician, dentist, or pharmacist. The next most common career goal of prospective students is in drug design. This is also true of our current students. Each of these career goals requires an interdisciplinary foundation of

chemistry and biology. This course will be the centerpiece of a new chemistry degree track that will help better prepare students for careers ranging from research and development of new drugs to patient care. The course will appeal to students within not only the Chemistry and Biochemistry Department but also the Biology Department.

3. Course Design

A. Audience and Course Goal

1. Describe the intended audience, including prerequisite skills.

   The intended audience for CHEM 430 is juniors and seniors majoring in chemistry, biochemistry, or biology who are interested in careers involving research or healthcare. Students must have a passing understanding of the structure and reactivity of organic compounds as these are the types of molecules discussed in Medicinal Chemistry.

2. State the overarching course goal(s) in performance terms.

   The goal of this course is to provide an overview of the foundational concepts related to the chemical structure of drugs and how that structure influences biological activity and availability.

B. Student Learning Outcomes and Measurements

	Student Learning Outcome	**Measurement**
1	Describe interactions of small molecules with enzymes, receptors, nucleic acids, and other drug targets	Homework, Exam 1
2	Explain process of identifying a lead compound	Quizzes, Group Presentation
3	Propose structural changes to small molecules and predict their effect on biological activity	Homework, Quizzes, Group Presentation
4	Describe factors involved in drug absorption, distribution, metabolism, and excretion	Homework, Exam 2
5	Explore various synthetic strategies to access small molecules	Quizzes, Journal Investigation, My Favorite Drug Paper
6	Communicate effectively using scientific terms and language	My Favorite Drug Paper, Group Presentation
7	Access, read, and critique primary scientific literature	Journal Investigations, My Favorite Drug Paper, Group Presentation

C. **Text and Resources**

Give the full publication information of the textbook/s and other required resources and outside readings. For **combined undergraduate/graduate** courses, make two lists:

A. full publication information; label **Undergraduate**.

Required text: *An Introduction to Medicinal Chemistry*, 6th ed by Graham L. Patrick, Oxford University Press (2017), ISBN 978-0-19-874969-1

Selected journal articles from: Journal of the American Chemical Society, Journal of Medicinal Chemistry, Nature Reviews Drug Discovery, Journal of Natural Products

B. full publication information; label **Graduate**.

N/A

4. Supporting Documentation

Required of all applications	
1	**Approval Chart for Curriculum Changes**
2	**Syllabus** — **Attach** the syllabus for the course based upon the anticipated first-semester offering.
4	**Library** — Submit new course application and syllabus to the Library dean's office. **Attach** the Library's memo.
Attach if applicable	
5	**Content Overlap** — Include one document for each course you listed in Section 1Y. **Attach** statement from instructor/dept chair of existing course justifying the new offering.
6	**Departmental Resources** — List the resources that support the course and are available only through the department, if applicable. **Attach** the list of the holdings and the location(s).
7	**Resources** — List resources (other than library or departmental resources) that are needed to support this course (computers, lab equipment, other technology, etc.). **Attach** a complete list of all items and indicate possible sources or estimated cost of each. List the sources of any needed funds.

8	**Expenses** — List additional expenses needed to implement this course (full-time or part-time faculty, graduate or lab assistants, student employees, travel, special student costs, room renovation, storage facility, etc.). **Attach** a complete list of all items, the estimated cost of each and the source of the funds.
9	**Justification** — **Attach** any documents to which you refer in Section 2B.

CHEM 430: Medicinal Chemistry

Abilene Christian University
Fall 2025

Section: 01		Days/Times:	MWF 1-1:50 pm
3 Credit Hours		Location:	HAL 303A

Instructor:	Dr. Kathleen Lee Associate Professor	Email:	Kathleen.Lee@acu.edu
Office:	Halbert-Walling Research Center 326	Office Phone:	(325) 674-2020
Office Hours:	Tues 2:00-4:00 pm Wed 1:00-4:00 pm Thurs 9:30-11:00 am	Chem/Biochem Dept:	(325) 674-2176

Course Information

Course Description

Introduction to design and development of small molecule drug candidates. Focuses on structure-activity relationship, types of drug targets, pharmacokinetics and pharmacodynamics, and optimization of lead drug candidates. Special attention will be paid to synthesis and synthetic strategies. Prerequisite: a grade of "C" or better in CHEM 324.

Intended Audience

Juniors and seniors majoring in chemistry, biochemistry, or biology who are interested in careers involving research or healthcare.

Mission Statements

ACU Mission

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

Onstead College of Science and Engineering Mission

To be added when OCSE finalizes a mission statement.

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 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

An Introduction to Medicinal Chemistry, 6th edition by Graham L. Patrick, Oxford University Press (2017) ISBN 978-0-19-874969-1

Required Materials

- Canvas and email
- Select journal articles posted to Canvas
- SciFinder^{n} account (available through the ACU Library website)

Course Content and Calendar

Unit	Topic	Minor Assessments	Major Assessment	Major Assessment Date
Unit 1	Drug Targets and Common Mechanisms of Action	Homework, Journal Investigation	Exam 1	Sept 22
Unit 2	Drug Discovery and Lead Optimization	Homework, Quizzes, Journal Investigation	Group Presentation	Week of Oct 20
Unit 3	Pharmacokinetics and Access to Targets	Homework, Journal Investigation	Exam 2	Nov 17
Unit 4	Synthesis	Homework, Quizzes, Journal Investigation	My Favorite Drug Paper	Dec 10

Dates shown above are tentative. The instructor reserves the right to change due dates as necessary.

Learning Objectives

At the end of the course, students should be able to:

Objective	Measurements
Describe interactions of small molecules with enzymes, receptors, nucleic acids, and other drug targets	Homework, Exam 1
Explain process of identifying a lead compound	Quizzes, Group Presentation
Propose structural changes to small molecules and predict their effect on biological activity	Quizzes, Group Presentation
Describe factors involved in drug absorption, distribution, metabolism, and excretion	Homework, Exam 2
Explore various synthetic strategies to access small molecules	Quizzes, Journal Investigation, My Favorite Drug paper
Communicate effectively using scientific terms and language	My Favorite Drug paper, Group presentation
Access, read, and critique primary scientific literature	Journal Investigations, Group presentation, My Favorite Drug paper

Course Format

Class meetings will vary based on the topic and unit. Some days will consist of lectures with in-class practice problems. Other class periods will include active-learning techniques such as the Journal Investigations. Students are strongly encouraged to ask questions and contribute to group discussions as such participation provides valuable feedback to the instructor about your understanding and comprehension of the material.

Course Policies

Grading

Grades are assigned on a 100-point scale. (A = 90-100, B = 80-89, C = 70-79, D = 60-69, F = Below 60). Extra credit will not be offered. For any assignment not completed, a grade of "0" will be given.

Exams: 20%

Two exams will be given during class this semester. Each exam counts for 10% of the course grade. Exams may not be taken early or made up except in the case of a documented emergency or illness. It is the student's responsibility to contact the instructor within 24 hours of a missed exam. Absences on exam dates require a note from a healthcare provider's office.

Journal Investigations: 20%

These assignments provide opportunities to explore the scientific literature and practice critical reading skills. Grades will be based on pre-activity questions, participation in and contribution to group discussion, and activity write-ups. Assignment materials may be found on Canvas. Students who are absent on Journal Investigation days will be expected to complete the activity on their own and submit work on time.

Quizzes: 10%

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

Homework: 10%

Homework assignments will come from either the textbook or worksheets provided on Canvas. Late assignments will not be accepted, but the lowest homework score will be dropped.

Group Presentation: 20%

Students will give one 15-minute group presentation on an assigned topic. Details for the assignment will be posted to Canvas. Grades will be based on content, contribution, peer assessments, and delivery.

My Favorite Drug: 20%

The topics discussed throughout the semester will culminate in this research assignment. Students will choose one prescription drug to investigate. Details of the assignment will be posted to Canvas. Grades will be based on rough drafts of individual sections, thoroughness, grammar and writing mechanics, and content.

Late work policy: Every effort should be made to submit work on time. Late work will NOT be accepted for homework assignments or quizzes. The lowest homework assignment and quiz score will be dropped. Late work will be accepted for the journal investigations, group presentation, and My Favorite Drug paper, but a 20% deduction will be taken for each day past the due date. Exams may not be taken late without an excused absence; no grade penalty will be applied.

Attendance

Students are expected to attend every 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 with 9 or more absences may be dropped from the course by the instructor. Students who miss a class period due to an emergency must notify the instructor as soon as possible. Students are responsible for any material covered on missed days. The final day to withdraw from the course is Friday of the twelfth week of the semester.

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.

Agree Not to Share

Class materials are not to be shared electronically or in any form with anyone outside the current class roster. Students agree not to share photos, notes, screenshots of student-submitted comments or work, examples, course materials, discussion threads, etc. Additionally, photos taken during class, and more, are not to be shared. Canvas course materials are copyrighted, and classmates' work, images, etc., are similarly protected. Therefore, we agree to demonstrate respect for one another's privacy and work by not sharing materials.

Use of Generative Artificial Intelligence

Generative AI is a rapidly evolving tool that produces information as text or images in response to a prompt. As with any tool, generative AI can either benefit the user when handled appropriately or cause damage when misused.

Use of generative AI poses some significant risks to the student who chooses to use it indiscriminately. First, the learning process often requires students to grapple with ideas and information over time; this process is undermined when AI assembles and organizes information within minutes. By employing generative AI, the student inhibits higher-order thinking and the internalization of knowledge. Second, output from generative AI may include inaccurate or false statements, which undermine the author's reliability. The quality of the output may be poor or generic, failing to meet the standards expected of graduating college seniors. In the end, the student is responsible for both the accuracy and quality of the work he or she submits. Third, as they employ generative AI to accomplish short-term goals, students may lose motivation to attempt the work themselves and become overly dependent on AI for larger and more significant tasks. Ultimately, misuse of generative AI undermines the purpose of this course and negatively impacts a student's preparedness for his or her future career.

In CHEM 430, use of generative AI is inappropriate on assignments such as those involving reflection or sharing one's beliefs, perspectives, or experiences; summarization of scientific work as in annotated bibliographies or abstracts; analysis and assimilation of relevant facts into an organized written document. These uses undermine personal academic growth. Use of AI is permissible under certain circumstances such as using generative AI as one might a search engine or other office aid software (i.e. citation software or grammar and spelling checkers). When in doubt, the student is responsible for confirming with the instructor whether AI is permitted for specific functions. Should a student choose to use AI to complete an assignment, the student must disclose how AI contributed to the work.

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.

Anti-Harassment Policy

As a professor, one of my responsibilities is to help create a safe learning environment on our campus. I also have a mandatory reporting responsibility related to my role as a professor. It is my goal that you feel able to share information related to your life experiences in classroom discussions, in your written work, and in our one-on-one meetings. I will seek to keep the information you share private to the greatest extent possible. When I am not able to keep your information confidential, I will only share it with responsible administrators on campus who can provide you with services and resources. I am required to share with the Title IX Coordinator information regarding sexual misconduct or harassment, dating or domestic violence or stalking that you report to me. If you would prefer to share information in a confidential setting, I encourage you to speak with someone in the ACU Counseling Center. All of your options are available for review in ACU's policy: https://cdn01.acu.edu/community/offices/hr-finance/hr/title-ix/anti-harassment-policy.html.

ABILENE CHRISTIAN UNIVERSITY

LIBRARY

M E M O R A N D U M

DATE: October 26, 2023

TO: Dr. Kathleen Lee

CC:

FROM: Mark McCallon, Associate Dean for Library Services

RE: New Course Proposal – CHEM 430 – Medicinal Chemistry

After reviewing the course application and syllabus, the Library should be able to support the proposed course as long as we can maintain subscriptions to existing resources, including SciFinder. Please let us know if additional resources are needed to support the proposed course. Thank you for letting us review the course application and syllabus.

10.26.23

Dr. Kathleen Lee, Associate Professor
Department of Chemistry and Biochemistry
Halbert-Walling Research Center (HAL) 326
(325) 674-2020

Re: Review of CHEM 430: Medicinal Chemistry

Dear Dr. Lee,

Thank you for the submission of CHEM 430: Medicinal Chemistry. I reviewed the syllabus based on the ACU application requirements and the syllabus meets those requirements The syllabus meets the guidelines outlined for the university.

The syllabus is exemplary! However, this letter is not meant to be a final approval in the course application process. Instead, it is intended as a reference, which will be read by your department chair and council members, who may also have questions or comments. Thank you for allowing the Adams Center team to review your course application. If there is anything else we can do to help you, please let me know.

On behalf of the Adams Center for Teaching & Learning,

Dr. Scott E. Hamm,
Assistant Director