



Natural Sciences and Mathematics
Division of Chemistry and Biochemistry

BC/BI/CH 360 Biochemistry I

Henry Hall, 107 Lecture MWF 11:30am-12:20pm

Credits: #3 Section: #1 Term: Fall 2025

Instructor Information

Instructor: Dr. Kelvin Frazier

Email: kelvin.frazier@chaminade.edu

Office Location: Henry Hall 206C

Office Hours: TR 11:30am-12:30pm and W 5:00-6:00 using Calendly

<https://calendly.com/kelvin-frazier>

Communication

Questions for this course can be emailed to the instructor at kelvin.frazier@chaminade.edu.

Online, in-person and phone conferences can be arranged. Response time will take place up to 48 hours.

School & Department Information

School of Natural Sciences and Mathematics

Office Location: Wesselkamper, Room 116

Phone: (808) 440-4204

If you have questions regarding the Division of Chemistry and Biochemistry, reach out to your instructor or the School of Natural Sciences and Mathematics.

Course Description & Materials

Catalog Course Description

BC/BI/CH 360 Biochemistry I (3)

This is the first part of a year-long course where the vast knowledge of biochemistry is filtered through a rational perspective guided by general chemical and biological principles. Following a

survey and review of common classes of biologically significant metabolites such as peptides, carbohydrates, lipids, nucleic acids, as well as equally important smaller molecules, the emphasis is shifted to biological thermodynamics and enzyme mechanisms. During the latter part of the course the broad spectrum of principles studies is utilized to cover individual metabolic pathways in detail.

Prerequisites: BC324 or CH 324, BC 324L or CH 324L , EN 102, COM 101

Corequisite: BC 360L

Offered **ONLY** in the Fall

Time Allocation

The unit of semester credit is defined as university-level credit that is awarded for the completion of coursework. One credit hour reflects the amount of work represented in the intended learning outcomes and verified by evidence of student achievement for those learning outcomes. Each credit hour earned at Chaminade University should result in a minimum of 45 hours of engagement, regardless of varying credits, duration, modality, or degree level. This equates to one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks for one semester. Terms that have alternative lengths, such as 10 week terms, should have an equivalent amount of faculty instruction and out-of-class student work to meet each credit hour. Direct instructor engagement and out-of-class work result in total student engagement time of 45 hours for one credit. The number of engagement hours may be higher, as needed to meet specific learning outcomes.

Specific Credit Situations

The minimum 45 hours of engagement per credit hour can be satisfied in fully online, internship, or other specialized courses through several means, including (a) regular online instruction or interaction with the faculty member and fellow students and (b) academic engagement through extensive reading, research, online discussion, online quizzes or exams; instruction, collaborative group work, internships, laboratory work, practica, studio work, and preparation of papers, presentations, or other forms of assessment. This policy is in accordance with federal regulations and regional accrediting agencies.

Credit Hours:

1 hour per class lecture.	(Subtotal = 45)
3 hour review/repeat review/memorization per class lecture.	(Subtotal = 135)
3 hour quiz preparation per quiz (6 quizzes)	(Subtotal = 18)
4 hour midterm exam preparation/practice per exam.	(Subtotal = 12)
6 hour final exam preparation/practice for the final exam.	(Subtotal = 6)
32 hour for Project	(Subtotal = 32)

Total Hours = 248

Required Materials

The following items should be brought to each class meeting.

- Reading materials will be referenced by the instructor. There is no book required for purchase for this course.
- Computer with online access and a Microsoft Office or its equivalent.
- Scientific Calculator.

Recommended Items

- Berg, J.M.; Gatto Jr., G.J.; Hines, J.; Tymoczko, J. L.; Stryer, L., *Biochemistry*, 10th ed., W.H. Freeman, **2023**
- Nelson, D.L.; Cox, M.M, *Lehninger Principles of Biochemistry*, 8th ed., W.H. Freeman, **2021**
- Ahern, K.; Rajagopal, I., *Biochemistry Free and Easy*, **2013**
(<https://oregonstate.app.box.com/s/i5zduolgda8snovflueqazdv4q4ikiw>)

Canvas (<https://chaminade.instructure.com>)

All course evaluations will be conducted via Canvas, so even if you are teaching face-to-face courses, your students will have to access the site.

Learning Outcomes

Program Learning Outcomes (PLOs)

Upon completion of the undergraduate program in Chemistry, students will have demonstrated the ability to:

1. Apply the scientific method as it is used in organic chemistry, inorganic chemistry, analytical chemistry, physical chemistry, and molecular sciences
2. Recognize and explain chemical theory as it applies to the physical world
3. Visualize, evaluate, validate and interpret results of chemical analyses
4. Solve problems using analytical reasoning, professional resources, professional conduct, and ethical behavior
5. Communicate chemical information effectively in oral and written formats

Course Learning Outcomes (CLOs)

By the end of our course, students will be able to:

Course Learning Outcomes (CLOs)	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5
1. Analyze the dynamics and functions of sugars and amino acids (and their polymers) at molecular and cellular levels.	x	x	x		
2. Describe the various types of metabolism and illustrate their molecular pathways.	x	x	x		
3. Explain the biological and synthetic techniques employed in protein synthesis.	x	x			
4. Interpret enzyme kinetics and calculate catalytic efficiency.	x	x	x	x	
5. Compare the structure and function of biomolecules in cellular systems.	x	x	x		
6. Evaluate metabolic regulation and predict the effects of pathway changes.	x	x	x	x	
7. Communicate biochemical concepts effectively in written formats.					x

Marianist Values

This class represents one component of your education at Chaminade University of Honolulu. An education in the Marianist Tradition is marked by five principles and you should take every opportunity possible to reflect upon the role of these characteristics in your education and development:

1. Education for formation in faith.
2. Provide an integral, quality education.
3. Educate in family spirit.
4. Educate for service, justice and peace, and integrity of creation.
5. Educate for adaptation and change.

Native Hawaiian Values

Education is an integral value in both Marianist and Native Hawaiian culture. Both recognize the transformative effect of a well-rounded, value-centered education on society, particularly in seeking justice for the marginalized, the forgotten, and the oppressed, always with an eye toward God (Ke Akua). This is reflected in the 'Ōlelo No'eau (Hawaiian proverbs) and Marianist core beliefs:

1. Educate for Formation in Faith (Mana) E ola au i ke akua ('Ōlelo No'eau 364) May I live by God.
2. Provide an Integral, Quality Education (Na'auao) Lawe i ka ma'alea a kū'ono'ono ('Ōlelo No'eau 1957) Acquire skill and make it deep.
3. Educate in Family Spirit ('Ohana) 'Ike aku, 'ike mai, kōkua aku kōkua mai; pela iho la ka nohana 'ohana ('Ōlelo No'eau 1200) Recognize others, be recognized, help others, be helped; such is a family relationship.
4. Educate for Service, Justice and Peace (Aloha) Ka lama kū o ka no'eau ('Ōlelo No'eau 1430) Education is the standing torch of wisdom.
5. Educate for Adaptation and Change (Aina) 'A'ohe pau ka 'ike i ka hālau ho'okahi ('Ōlelo No'eau 203) All knowledge is not taught in the same school

Alignment of Course Learning Outcomes

	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
Marianist & Native Hawaiian Values	1, 2 & 3	1, 2 & 3	1, 2 & 3	1, 2 & 3	1, 2 & 3
Program Learning Outcomes	1, 2 & 3	1, 2, 3	1, 2	1, 2 & 3	1, 2, 3

Course Activities

Discussions

Out of consideration for your classmates, please set your cell phone to silent mode during class. Students are encouraged to bring laptops or tablets to class as the instructor will assign online activities and readings that will require the use of a laptop or tablet. Laptops and tablets should not be misused, such as checking distracting websites. Use your best judgment and respect your classmates and instructor.

Quizzes

Literature Quiz should be sourced by ACS publications <https://pubs.acs.org/> (Class does not meet in-person on Literature Quiz Days).

Final Exams

The final exam is cumulative and will include concepts covered during the entire semester. The final exam can only be taken on its scheduled day and time. Do not schedule any travel, appointments, work, etc. that would conflict with the final exam.

Course Policies

Attendance

The following attendance policy is from the 2019-2020 Academic Catalog (p. 54-55). Faculty members should also check with their divisions for division-specific guidelines.

Students are expected to attend regularly all courses for which they are registered. Student should notify their instructors when illness or other extenuating circumstances prevents them from attending class and make arrangements to complete missed assignments. Notification may be done by emailing the instructor's Chaminade email address, calling the instructor's campus extension, or by leaving a message with the instructor's division office. It is the instructor's prerogative to modify deadlines of course requirements accordingly. Any student who stops attending a course without officially withdrawing may receive a failing grade.

Unexcused absences equivalent to more than a week of classes may lead to a grade reduction for the course. Any unexcused absence of two consecutive weeks or more may result in being withdrawn from the course by the instructor, although the instructor is not required to withdraw students in that scenario. Repeated absences put students at risk of failing grades.

Students with disabilities who have obtained accommodations from the Chaminade University of Honolulu Tutor Coordinator may be considered for an exception when the accommodation does not materially alter the attainment of the learning outcomes.

Federal regulations require continued attendance for continuing payment of financial aid. When illness or personal reasons necessitate continued absence, the student should communicate first with the instructor to review the options. Anyone who stops attending a course without

official withdrawal may receive a failing grade or be withdrawn by the instructor at the instructor's discretion.

Late Work

We recognize student's situation can change rapidly. It is important to communicate with your instructor so that they can help you to meet the learning objectives of the course.

0-24 hours late 5 points deduction

24-48 hours late 10 points deduction

48-72 hours late 15 points deduction

72-96 hours late 20 points deduction

96-120 hours late 25 points deduction

>120 hours late 30 points deduction

Please be sure to let your instructor know in advance if you cannot attend class for any reason. Unexcused absences for two consecutive weeks may result in being withdrawn from the course by the instructor. A planned, excused absence must be communicated to the instructor at least one week prior to the class. Necessary arrangements will be made to meet student learning objectives. An unplanned, excused absence must be communicated to the instructor within one week of the missed class. Necessary arrangements will be made to meet student learning objectives.

Determination of valid excuses for missed classes is at the sole discretion of the instructor.

Student athletes should communicate absences to the instructor with the earliest possible notice. Students are not allowed to miss class for practices.

Extra Credit

There is no "extra credit" for BC/CH 360 and no rounding of grade

Changes to the Syllabus

While the provisions of this syllabus are as accurate and complete as possible, your instructor reserves the right to change any provision herein at any time. Every effort will be made to keep you advised of such changes, and information about such changes will be available from your instructor.

Grades of Incomplete

Students and instructors may negotiate an incomplete grade when there are specific justifying circumstances. When submitting a grade the “I” will be accompanied by the alternative grade that will automatically be assigned after 90 days. These include IB, IC, ID, and IF. If only an “I” is submitted the default grade is F. The completion of the work, evaluation, and reporting of the final grade is due within 90 days after the end of the semester or term. This limit may not be extended.

Final Grades

Final grades are submitted to [Self-Service](#):

10%	Midterm Exam 1
10%	Midterm Exam 2
10%	Midterm Exam 3
30%	Final Exam
15%	Literature Quiz (x6)
15%	Project
10%	Attendance/Participation

Grades will strictly not be curved and letter grades will be assigned as follows:

<u>Grade</u>	<u>Percent</u>
A	90-100%
A-	88-89%
B+	86-87%
B	80-85%
B-	78-79%
C+	76-77%
C	70-75%
C-	68-69%
D+	66-67%
D	60-65%
F	0-59%

Important Information

Academic Honesty

Academic honesty is an essential aspect of all learning, scholarship, and research. It is one of the values regarded most highly by academic communities throughout the world. Violations of the principle of academic honesty are extremely serious and will not be tolerated.

Students are responsible for promoting academic honesty at Chaminade by not participating in any act of dishonesty and by reporting any incidence of academic dishonesty to an instructor or to a University official. Academic dishonesty may include theft of records or examinations, alteration of grades, and plagiarism, in addition to more obvious dishonesty.

Questions of academic dishonesty in a particular class are first reviewed by the instructor, who must make a report with recommendations to the Dean of the Academic Division. Punishment for academic dishonesty will be determined by the instructor and the Dean of Academic Division and may include an “F” grade for the work in question, an “F” grade for the course, suspension, or dismissal from the University.

For the most up to date information, please refer to the [Academic Honesty Policy](#) on the Chaminade University Catalog website.

TITLE IX AND NONDISCRIMINATION STATEMENT:

Chaminade University of Honolulu is committed to providing a learning, working and living environment that promotes the dignity of all people, inclusivity and mutual respect and is free of all forms of sex discrimination and gender-based violence, including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence, and stalking. As a member of the University faculty, I am required to immediately report any incident of sex discrimination or gender-based violence to the campus Title IX Coordinator. For pregnant and parenting students, I am also obligated to provide you with similar resources for support and protections available to you. My goal is to make sure that you are aware of the range of options available to you and have access to the resources and support you need.

Nondiscrimination Policy & Notice of Nondiscrimination

The university is committed to comply with all State and Federal statutes, rules, and regulations which prohibit discrimination. The university is committed to a policy of nondiscrimination on the basis of race, sex, gender identity and expression, age, religion, color, national origin (including shared ancestry and ethnic characteristics), ancestry, citizenship, disability, genetic information, marital status, breastfeeding, arrest and court record (except as permissible under State law), sexual orientation, or status as a covered veteran. Inquiries about Title IX or general Civil Rights concerns may be referred to the University’s Title IX Coordinator, the U.S. Department of Education’s Office for Civil Rights, or both and contact information may be found

[HERE](#). On-campus Confidential Resources may also be found here at [CAMPUS CONFIDENTIAL RESOURCES](#).

The University's Nondiscrimination Policy and Grievance Procedures can be located on the University webpage at:

<https://chaminade.edu/compliance/title-ix-nondiscrimination-policies-procedures/>.

To report information about conduct that may constitute sex discrimination or make a complaint of sex discrimination under Title IX, please refer to the [Campus Incident Report form](#). Chaminade University of Honolulu prohibits sex discrimination in any education program or activity that it operates.

The NOTICE of NONDISCRIMINATION can be found here: [Notice of Nondiscrimination](#).

Hazing Prevention Resources and Athlete Helpline:

Assists athletes, parents, coaches, and any allies interested in ensuring physical and mental safety for sports communities by offering confidential emotional support, crisis intervention, informational athlete-focused resources, and guidance related to concerns about any type of abuse—including hazing.

Chaminade University's Hazing Policy:

<https://catalog.chaminade.edu/studenthandbook/codeofconduct>

<https://hazingpreventionnetwork.org/athlete-helpline/>

<https://hazingpreventionnetwork.org/how-to-report-hazing/>

Basic Needs Resources: <https://chaminade.edu/basic-needs/>

Campus Safety/ SafeSwords

A program for students, faculty and staff, who may feel uncomfortable or unsafe walking alone on campus, at any time of the day. Call security, and a security professional will meet you at your location on campus. The security professional will escort you to your residence hall, car, etc. Students may utilize this when walking to and from night classes around campus or after late night events. [SafeSwords Webpage](#)

CUH Alert Emergency Notification

To get the latest emergency communication from Chaminade University, students' cell numbers will be connected to Chaminade's emergency notification text system. When you log in to the Chaminade portal, you will be asked to provide some emergency contact information. If you provide a cellphone number, you will receive a text from our emergency notification system asking you to confirm your number. You must respond to that message to complete your registration and get emergency notifications on your phone.

Assessment for Student Work

With the goal of continuing to improve the quality of educational services offered to students, Chaminade University conducts assessments of student achievement of course, program, and institutional learning outcomes. Student work is used anonymously as the basis of these assessments, and the work you do in this course may be used in these assessment efforts.

Student Conduct Policy

Campus life is a unique situation requiring the full cooperation of each individual. For many, Chaminade is not only a school, but a home and a place of work as well. That makes it a community environment in which the actions of one students may directly affect other students. Therefore, each person must exercise a high degree of responsibility. Any community must have standards of conduct and rules by which it operates. At Chaminade, these standards are outlined so as to reflect both the Catholic, Marianist values of the institution and to honor and respect students as responsible adults. All alleged violations of the community standards are handled through an established student conduct process, outlined in the Student Handbook, and operated within the guidelines set to honor both students' rights and campus values.

Students should conduct themselves in a manner that reflects the ideals of the University. This includes knowing and respecting the intent of rules, regulations, and/or policies presented in the Student Handbook, and realizing that students are subject to the University's jurisdiction from the time of their admission until their enrollment has been formally terminated. Please refer to the Student Handbook for more details. A copy of the Student Handbook is available on the Chaminade website under Student Life.

For further information, please refer to the Student Handbook.

<https://catalog.chaminade.edu/generalinformation/studentaffairs/studenthandbook2324/studenthandbook>

Student with Disabilities Statement

Chaminade University of Honolulu offers accommodations for all actively enrolled students with disabilities in compliance with Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act (ADA) of 1990, and the ADA Amendments Act (2008).

Students are responsible for contacting Kokua Ike: Center for Student Learning to schedule an appointment. Verification of their disability will be requested through appropriate documentation and once received it will take up to approximately 2–3 weeks to review them. Appropriate paperwork will be completed by the student before notification will be sent out to their instructors. Accommodation paperwork will not be automatically sent out to instructors each semester, as the student is responsible to notify Kokua Ike via email at ada@chaminade.edu each semester if changes or notifications are needed.

Kōkua 'Ike: Tutoring & Learning Services

Chaminade is proud to offer free, one-on-one tutoring and writing assistance to all students. Tutoring and writing help is available on campus at Kōkua 'Ike: Center for Student Learning in a variety of subjects (including, but are not limited to biology, chemistry, math, nursing, English, etc.) from trained Peer and Professional Tutors. Please check [Kōkua 'Ike's](#) website for the latest times, list of drop-in hours, and information on scheduling an appointment. Free online tutoring is also available via TutorMe. Tutor Me can be accessed 24/7 from your Canvas account. Simply click on Account > TutorMe. For more information, please contact Kōkua 'Ike at tutoring@chaminade.edu or 808-739-8305.

Technical Assistance for Canvas Users:

- Search for help on specific topics or get tips in [Canvas Students](#)
- [Live chat with Canvas Support for students](#)
- Canvas Support Hotline for students: +1-833-209-6111
- Watch this [video to get you started](#)
- [Online tutorials](#): click on "Students" role to access tutorials

Contact the Chaminade IT Helpdesk for technical issues: helpdesk@chaminade.edu or call (808) 735-4855

Course Schedule

(The Professor may modify elements of this syllabus according to the operational needs of the class)

DATE	TOPICS AND MODE OF LECTURE	
8/25	Course information	
8/27	Student Project Discussion	
8/29	Lecture: Foundation of Biochemistry/Water & Buffer	
9/1	No Class: Labor Day	
9/3	No Class: Fall Spiritual Convocation	
9/5	Foundation of Biochemistry/Water & Buffer Review	
9/8	Lecture: Amino Acid & Peptides	
9/10	Lecture: Amino Acid & Peptides	
9/12	Amino Acids/Peptides Review	
9/15	Amino Acids/Peptides Review	
9/17	Lecture: Protein Structures/Function/Composition/Purification	
9/19	Protein Structures/Function/Composition/Purification Review	
9/22	Protein Structures/Function/Composition/Purification Review	
9/24	Lecture: Enzymes	
9/26	Enzymes Review	
9/29	Midterm Exam 1 Review	
10/01	Midterm Exam I	
10/03	Literature Quiz 1: Drug interactions with Proteins (Due 11:59pm)	
10/06	Literature Quiz 2: Enzymes or peptides (Due 11:59pm)	
10/08	Lecture: Carbohydrates	
10/10	Lecture: Carbohydrates	
10/13	No Class: Indigenous Peoples' Day	
10/15	Carbohydrates Review	
10/17	Lecture: Nucleotides and Nucleic acids/Glycolysis	
10/20	Literature Quiz 4: Glycolysis (Due 11:59pm)	

10/22	Literature Quiz 3: Nucleotides and Nucleic acids (Due 11:59pm)	
10/24	Nucleotides and Nucleic acids/Glycolysis Review	
10/27	Lecture: The Citric Acid Cycle	
10/29	Literature Quiz #5: The Citric Acid Cycle (Due 11:59pm)	
10/31	Citric Acid Review	
11/03	Review Midterm Exam II	
11/05	Midterm Exam II	
11/07	Lecture: Photosynthesis/Calvin Cycle	
11/10	Literature Quiz #6: Photosynthesis (Due 11:59pm)	
11/12	Photosynthesis/Calvin Cycle Review	
11/14	Photosynthesis/Calvin Cycle Review	
11/17	Midterm Exam III Review: Q & A	
11/19	Midterm Exam III	
11/21	Student Project Work Day	
11/24	Student Project Work Day (Student Project Due by 11:59pm)	
11/26	No Class: Thanksgiving	
11/28	No Class: Thanksgiving	
12/01	Review for Final Exam	
12/03	Review for Final Exam	
12/05	Review for Final Exam	
12/9	Final Exam Tuesday 1:15 PM – 3:15 PM. Location: Lecture Room Please verify using the link https://catalog.chaminade.edu/academicaaffairs/undergraduate/academicinformation/fallfinalexamschedule	