



## Course Syllabus

[Chaminade University Honolulu](http://www.chaminade.edu)

3140 Waialae Avenue - Honolulu, HI 96816

[www.chaminade.edu](http://www.chaminade.edu)

**Course Number:** BC/CH 362

**Course Title:** Biochemistry II

**Department Name:** Biochemistry/Chemistry

**College/School/Division Name:** School of Natural Sciences and Mathematics

**Term:** Spring 2025

**Course Credits:** 3

**Class Meeting Days:** MWF

**Class Meeting Hours:** 11:30am – 12:20pm

**Class Location:** Hale Hoaloha, 102

**Instructor Name:** Dr. Kelvin Frazier

**Email:** [kelvin.frazier@chaminade.edu](mailto:kelvin.frazier@chaminade.edu)

**Office Location:** Henry Hall 206C

**Office Hours:** TWF 1:00pm-2:00pm using Calendly <https://calendly.com/kelvin-frazier>

**Instructor Website:** CANVAS BC/CH 362-01

**Other Professional Contact Information** (Skype, Twitter, Blog, etc.): <https://www.linkedin.com/in/kelvinfrazier/>

## University Course Catalog Description

### CH 362 Biochemistry II (3)

This is the second part of the year-long biochemistry course, which starts with photosynthesis, giving students a chance to review topics discussed during the previous semester, such as oxidative phosphorylation and carbohydrate metabolisms. Continuing with individual metabolic pathways, lipids and amino acids are explored. The second half of the semester is mostly dedicated to nucleic acids, starting with nucleotide metabolism followed by a detailed study of information flow involving DNA and RNA. The course will conclude with a discussion of some contemporary techniques used in recombinant DNA technology. *Prerequisite: CH 360/CH 360L. Cross-listed with BC 362. Offered in the Spring*

### Course Overview

Biochemistry II (BC 362) is the second part of a year-long biochemistry course targeting students with an interest in the field of biomedical research and/or education, as well as those intending to specialize in medicine. The course will expand on topics covered in Biochemistry I (BC 360) and continue with in-depth analyses of biological information flow, emphasizing related systems from a molecular point of view. Biochemistry II is required for a BS degree in Biochemistry.

## **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
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 'Olelo No'eau (Hawaiian proverbs) and Marianist core beliefs:

1. Educate for Formation in Faith (Mana) E ola au i ke akua ('Olelo 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 ('Olelo 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 ('Olelo 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 ('Olelo 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 ('Olelo No'eau 203) All knowledge is not taught in the same school

## **Program Learning Outcomes (PLOs) in Chemistry**

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**

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

1. of photosynthesis at the molecular level.
2. of the various types of metabolism and their molecular pathways.
3. of molecular differences between the various nucleic acids in order to recognize their distinguishing structural features.
4. of the DNA replication pathway and repair mechanisms at the chemical level.
5. of the biological and synthetic techniques employed in protein synthesis.

## Alignment of 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 & 4	1, 2 & 5	1, 2 & 3	1, 2, 3 & 5

### Course Prerequisites

- Concurrent registration in BC 362L.
- Completion of BI 360/360L or equivalent with a grade of C or better.

### Required Learning 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.

### Course Website:

<https://chaminade.instructure.com/courses/37581/>

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.

### 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](mailto:helpdesk@chaminade.edu) or call (808) 735-4855

### Tutoring and Writing 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 (<https://chaminade.edu/advising/kokua-ike/>) for the latest times, list of drop-in hours, and information on scheduling an appointment. Free online tutoring is also available via Smarthinking.

Smarthinking can be accessed 24/7 from your Canvas account. Simply click Account – Notifications – Smarthinking. For more information, please contact Kōkua `Ike at [tutoring@chaminade.edu](mailto:tutoring@chaminade.edu) or 808-739-8305.

## Assessment

See below for grading scale.

### Grading Scale

10%	Midterm Exam 1
10%	Midterm Exam 2
10%	Midterm Exam 3
30%	Final Exam
15%	Literature Quiz (x5)
15%	Oral Presentation
10%	Attendance

### Points Scale (total 100 points)

10	Midterm Exam 1
10	Midterm Exam 2
10	Midterm Exam 3
30	Final Exam
15	Literature Quiz (x5)
15	Oral Presentation
10	Attendance

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

<u>Grade</u>	<u>Percent</u>
A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

There is no “extra credit” for BC/CH 362 and no rounding up on Final Grades.

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

*-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.*

#### Supplement Books:

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

#### Course Policies

##### **Late Work Policy**

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

##### **Instructor and Student Communication**

Questions for this course can be emailed to the instructor at [kelvin.frazier@chaminade.edu](mailto:kelvin.frazier@chaminade.edu). Online, in-person and phone conferences can be arranged. Response time will take place up to 3 days.

##### **Cell phones, tablets, and laptops**

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.

##### **ADA Policy**

Statement from the [New Student Handbook](#)

Pursuant to federal and state laws, including the Americans with Disabilities Act of 1990 as amended by the ADA Amendments Act of 2008 and Section 504 of the Rehabilitation Act of 1973, all qualified students with disabilities are protected from discrimination on the basis of disability and are eligible for reasonable accommodations or modifications in the academic environment to enable them to equal access to academic programs, services, or activities. If a student would like to determine if they meet the criteria for accommodations, they should contact the Counseling Center in the Student Support Services Building, Room 101, by phone at (808) 735-4845 or email: [counselingcenter@chaminade.edu](mailto:counselingcenter@chaminade.edu) for further information. Web: [studentaffairs.chaminade.edu/counseling-center/counseling-services](http://studentaffairs.chaminade.edu/counseling-center/counseling-services)

##### **Title IX Compliance**

Chaminade University of Honolulu recognizes the inherent dignity of all individuals and promotes respect for all people. Sexual misconduct, physical and/or psychological abuse will NOT be tolerated at CUH. If you have been the victim of sexual misconduct, physical and/or psychological abuse, we encourage you to report this matter promptly. As a faculty member, I am interested in promoting a safe and healthy environment, and should I learn of any sexual misconduct, physical and/or psychological abuse, I must report the matter to the Title IX Coordinator. If you or someone you know has been harassed or assaulted, you can find the

appropriate resources by visiting Campus Ministry, the Dean of Students Office, the Counseling Center, or the Office for Compliance and Personnel Services.

### **Attendance Policy**

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.

### **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>

### Schedule Spring 2025

Week	Date	Topics
1	1/6	Course Introduction
	1/8	Review Working with Lipids (Lipid Extraction and Chromatography)
	1/10	Lipid Biosynthesis
2	1/13	Lipid Biosynthesis
	1/15	Lipid Biosynthesis
	1/17	Literature Quiz 1. Lipid synthesis
3	1/20	<b><i>Fr. Chaminade/Dr. Martin Luther King Jr Day (No Classes)</i></b>
	1/22	Fatty Acids and Triacylglycerol Metabolism
	1/24	Fatty Acids and Triacylglycerol Metabolism
4	1/27	Fatty Acids and Triacylglycerol Metabolism
	1/29	Protein Turnover and Amino Acid Catabolism
	1/31	Protein Turnover and Amino Acid Catabolism
5	2/3	Protein Turnover and Amino Acid Catabolism
	2/5	Review
	2/7	<b>Exam I</b>
6	2/10	Amino Acid Biosynthesis
	2/12	Amino Acid Biosynthesis
	2/14	Literature Quiz 2. Amino Acid Biosynthesis
7	2/17	<b><i>President's Day (No Classes)</i></b>
	2/19	Amino Acid Biosynthesis
	2/21	Nucleotide Biosynthesis
8	2/24	Nucleotide Biosynthesis
	2/26	Nucleotide Biosynthesis
	2/28	Literature Quiz 3. Nucleotide Biosynthesis
9	3/3	Literature Quiz 4. Sandwich ELISA
	3/5	DNA Metabolism
	3/7	DNA Metabolism

Week	Date	Topics
10	3/10	RNA Metabolism
	3/12	Review
	3/14	<b>Exam II</b>
11	3/17	<b><i>Spring Break (No classes)</i></b>
	3/19	<b><i>Spring Break (No classes)</i></b>
	3/21	<b><i>Spring Break (No classes)</i></b>
12	3/24	Literature Quiz 5. Drug Discovery
	3/26	<b>Prince Kuhio Holiday (No Classes)</b>
	3/28	Protein Synthesis (Oral Presentation Topic Selection DUE)
13	3/31	Protein Synthesis
	4/2	Principles of Drug Discovery and Development
	4/4	Principles of Drug Discovery and Development
14	4/7	Review
	4/9	<b>Exam III</b>
	4/11	Oral Presentation Assignment
15	4/14	Oral Presentation Assignment
	4/16	Oral Presentation Assignment DUE
	4/18	<b><i>Holiday: Good Friday (No Classes)</i></b>
16	4/21	Final Review
	4/23	Final Review
	4/25	Final Review

**Final Exam**      **Wednesday, April 30th    11 AM – 1 PM**      **Hale Hoaloha, 102**  
<https://catalog.chaminade.edu/generalinformation/academicaffairs/undergraduate/academicinformation/springfinalexamschedule>

### **Credit Hour Policy**

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 is 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 a 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 = 23)
3 hours of review/repeat review/memorization per class lecture.	(Subtotal = 69)
3 hours of quiz preparation per quiz (5 quizzes)	(Subtotal = 15)
4 hours of midterm exam preparation/practice per exam.	(Subtotal = 12)
6 hours of final exam preparation/practice for the final exam.	(Subtotal = 6)
9 hours for Oral Presentation preparation and recording	(Subtotal = 9)

Total Hours = 134