



Chaminade University OF HONOLULU

Course Syllabus

Chaminade University Honolulu

3140 Waialae Avenue - Honolulu, HI 96816

www.chaminade.edu

Course Number: CH 360 (*Cross-listed with BI 360 and BC 360*)

Course Title: Biochemistry I

School Name: Natural Sciences and Mathematics

College/School/Division Name: NSM, Division of Chemistry and Biochemistry

Term: Fall 2021

Course Credits: 3

Class Meeting Days/Location/Time for each section:

Section 01 Monday, Wednesday, Friday Henry Hall 223 11:30–12:20 PM

Instructor Name: Francis Sakai-Kawada

Email: francis.sakai-kawada@chaminade.edu

Phone: 808-735-4868

Office Location: Eiben 207D

Office Hours:

Monday, Wednesday, Friday 10:30 – 11:20 AM

OR by appointment

1. University Course Catalog Description

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. *Cross-listed with BI 360 and BC 360.*

2. Course Overview

The course starts with a discussion of familiar topics and principles in a qualitative fashion, emphasizing their applicability to biological systems. What follows is a more descriptive study of well-known metabolic pathways while questioning all possible variations in an attempt to understand each mechanism. The final perspective is in line with the “holistic” nature of biochemistry, where the links and relationships of individual metabolic pathways with one another are elucidated when biosynthetic origins of well-known biological metabolites are investigated. During the semester brief journeys into molecular biology will help to illustrate the enormous potential of the field. Further principles of nucleic acid chemistry will be introduced during the lab course. *3 credits*

3. Course Prerequisites

- Completion of CH 324, CH 324L
- Concurrent registration in CH 360L required

4. Required Learning Materials

- Moran, L.A.; Horton, R.H.; Scrimgeour, K.G., and Perry M.D. *Principles of Biochemistry*, 5th Ed., Prentice-Hall, Inc., Upper Saddle River, NJ, **2012**.

5. Technical Assistance for Canvas Users:

- Search for help on specific topics at help.instructure.com
- [Chat live with Canvas Support 24/7/365](#)
- Watch this [video to get you started](#) with online guides and tutorials
- Contact the Chaminade IT Helpdesk for technical issues: helpdesk@chaminade.edu, or call (808) 735-4855

6. Assessment

The course grades will be based on the following point total and scale. Any changes will be announced in class.

In-Class Participation	50 pts
Midterm Exams	300 pts (100 pts x 3 exams)
Final Exam	150 pts
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	500 total points

Students can expect timely and regular feedback on homework, quizzes, and exams.

Grading Scale

GRADE	Total Points	Percentage	
A	450 – 500	90 – 100%	Outstanding scholarship and an unusual degree of intellectual initiative
B	400 – 449	80 – 89%	Superior work done in a consistent and intellectual manner
C	325 – 399	65 – 79%	Average grade indicating a competent grasp of subject matter
D	225 – 324	45 – 64%	Inferior work of the lowest passing grade, not satisfactory for fulfillment of prerequisite course work
F	Below 225	Below 45%	Failed to grasp the minimum subject matter; no credit given

Midterm Exams: There will be three midterm exams given this semester. Each will be worth 100 points and you will be responsible for all lecture material covered up to the exam dates. These exams are tentatively scheduled on **September 20th**, **October 25th**, and **November 24th**. More information about these exams will be given in class.

Final Exam: The final exam is on **Wednesday, December 8th from 11:00am – 1:00pm**. This exam will be cumulative and will be worth 150 points.

7. Program Learning Outcomes

A) Chemistry Mission Statement

Chemistry has justifiably been labeled 'The Central Science'. Training in this discipline is therefore beneficial for all citizens of the modern world. All materials in the universe are made up of chemicals; a knowledge of chemistry is indeed a knowledge of ourselves.

The mission of this program is to:

- Promote molecular literacy (i.e. awareness of the importance of physical, chemical, and biological changes on the atomic and molecular scale)

- Provide hands-on laboratory training using modern chemical techniques and instrumentation
- Engage students in an undergraduate research program
- Enable students to integrate knowledge of the physical world
- Educate about the entry requirements, career pathways, and progression into advanced education in the chemical sciences

B) Program Learning Outcomes in Chemistry

Upon completion of the undergraduate program in Chemistry, students will be able 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 as part of an integral and quality education (This PLO is a link to our Marianist Values of to provide an integral, quality education)
4. Solve problems using analytical reasoning, professional resources, professional conduct, and ethical behavior
5. Communicate chemical information effectively in oral and written formats

C) Program Learning Outcomes in Chemistry

Upon completion of the undergraduate program in Chemistry, students will be able to:

Course Learning Outcomes	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5
1. To characterize the properties of water and understand how they apply in a biological model	X	X			X
2. To identify the chemical structure of various macromolecules and understand their function	X	X	X		X
3. To understand the mechanism of enzymes and enzyme kinetics	X	X	X		X
4. To describe different metabolic pathways and their relationship with bioenergetics: glycolysis, citric acid cycle, and electron transport	X	X	X	X	X

D) Marianist Values (MVs) and Native Hawaiian Values (NHVs) for CH 360

The Natural Sciences Division provides an *integral, quality education*: sophisticated integrative course content taught by experienced, dedicated, and well-educated instructors.

- *We educate in family spirit* – every classroom is an *Ohana* and you can expect to be respected yet challenged in an environment that is supportive, inclusively by instructors who take the time to personally get to know and care for you.
- *We educate for service, justice, and peace*, since many of the most pressing global issues (climate change, health inequity, poverty, justice) are those which science and technology investigate, establish ethical parameters for, and offer solutions to.
- *We educate for adaptation and change*. In science and technology, the only constant is change. Data, techniques, technologies, questions, interpretations, and ethical landscapes are constantly evolving, and we teach students to thrive on this dynamic uncertainty.

The study of science and technology can be formative, exploring human creativity and potential in the development of technologies and scientific solutions, the opportunity to engage in the stewardship of the natural world, and the opportunity to promote social justice. We provide opportunities to engage with the problems that face Hawai'i and the Pacific region through the Natural Sciences curriculum, in particular, those centered around severe challenges in health, poverty, environmental resilience, and erosion of traditional

culture. The Marianist Educational Values relate to Native Hawaiian ideas of *mana*, *na'auao*, *ohana*, *aloha* and *aina*. We intend for our Natural Sciences programs to be culturally-sustaining, rooted in our Hawaiian place, and centered on core values of *Mai'au*, be neat, prepared, careful in all we do; *Makawalu*, demonstrate foresight and planning; *'Ai*, sustain mind and body; *Pa'a Na'au*, learn deeply

8. Course Policies

Late Work Policy

Requests for extensions due to extenuating circumstances (documented computer or medical problems, for example) will be considered but in general work received after the deadline will not be graded. Students should notify their instructors when illness or other extenuating circumstances prevents them from attending class and make arrangements to complete missed assignments. Tardiness – failure to be on time for class may result in loss of participation points and even quiz/exam points as additional time will not be given.

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.

Writing Policy

Plagiarism will not be tolerated and will be checked.

Instructor and Student Communication

Questions for this course can be emailed to the instructor at [francis.sakai-kawada@chaminade.edu]. Online, in-person and phone conferences can be arranged. Response time will take place up to [1-12 hours].

Cell phones, tablets, and laptops

Music Devices and Cellular Phones: Unless specifically permitted by your instructor, use of music devices and cell phones is prohibited during all Natural Science and Mathematics classes, as it is discourteous and may lead to suspicion of academic misconduct. Students unable to comply will be asked to leave class.

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

Chaminade University of Honolulu is committed to providing reasonable accommodations for persons with documented disabilities. If you need individual accommodations to meet course outcomes because of a documented disability, please speak with me to discuss your needs as soon as possible so that we can ensure your full participation in class and fair assessment of your work. Students with special needs who meet criteria for the Americans with Disabilities Act (ADA) provisions must provide written documentation of the need for accommodations from Kōkua 'Ike by the end of week three of the class, in order for instructors to plan accordingly. If a student would like to determine if they meet the criteria for accommodations, they should contact the Kōkua 'Ike Coordinator at (808) 739-8305 for further information (ada@chaminade.edu).

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.

Flexible Absence Policies

Normal policies around student absences will be flexible and adjusted to accommodate sick students and adhere to CDC and local public health guidance. Students will not be penalized due to absences related to illness or suspected illness.

Students should not come to campus when ill or potentially ill. Accommodations, including extended due dates and online instruction will be provided for anyone unable to attend class due to restrictions placed on them due to possible exposure to COVID-19.

Any student required to self-isolate should follow the CDC self-isolation recommendations and the directions of their health care provider. Students who are required to self-isolate should contact their faculty member.

In case of self-isolation for potential COVID-19 exposure or symptoms, students and faculty should use and complete the [CDC Symptom Monitoring Worksheet](#)

Students with disabilities who have obtained accommodations from the Chaminade University of Honolulu ADA 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.

Academic Conduct Policy

From the 2020-2021 Undergraduate Academic Catalog (p. 13):

Campus life is a unique situation requiring the full cooperation of each individual. For many, Chaminade is home, school, recreation center, and work, all in one. That makes it a community environment in which the actions of one student may directly affect other students. Therefore, each person must exercise a high degree of responsibility. The university expects students to remain in good conduct standing, which is defined as not currently being under a resolution status (i.e., student conduct probation, suspension, or expulsion). Please refer to the Student Handbook for more details. A copy of the Student Handbook is available on the Chaminade website.

For further information, please refer to the Student Handbook: <https://chaminade.edu/wp-content/uploads/2021/04/NEW-STUDENT-HANDBOOK-20-21-Final-3.31.2021.pdf>

Course Schedule Fall 2021

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

Week	Date	TOPICS (Tentative Schedule)
1	08/23	Course Introduction: Syllabus
	08/25	Ch 1 Introduction to Biochemistry (Part I)
	08/27	Ch 1 Introduction to Biochemistry (Part II)
2	08/30	Ch 2 Water (Part I)
	09/01	Ch 2 Water (Part II)
	09/03	Ch 3 Amino Acids and Primary Structures of Proteins (Part I)
3	09/06	HOLIDAY: LABOR DAY
	09/08	Ch 3 Amino Acids and Primary Structure of Proteins (Part II)
	09/10	Ch 4 Proteins: Three-Dimensional Structure and Function (Part I)
4	09/13	Ch 4 Proteins: Three-Dimensional Structure and Function (Part II)
	09/15	Ch 4 Proteins: Three-Dimensional Structure and Function (Part III)
	09/17	Review: Exam 1 Chapters 1 – 4
5	09/20	Midterm Exam 1: Chapters 1 – 4
	09/22	Ch 5 Properties of Enzymes (Part I)
	09/24	Ch 5 Properties of Enzymes (Part II)
6	09/27	Ch 6 Mechanisms of Enzymes (Part I)
	09/29	Ch 6 Mechanisms of Enzymes (Part II)
	10/01	Ch 7 Coenzymes and Vitamins (Part I)
7	10/04	Ch 7 Coenzymes and Vitamins (Part II)
	10/06	Ch 7 Coenzymes and Vitamins (Part III)
	10/08	Ch 8 Carbohydrates (Part I)
8	10/11	HOLIDAY: DISCOVERER'S DAY
	10/13	Ch 8 Carbohydrates (Part II)
	10/15	Ch 9 Lipids and Membranes (Part I)
9	10/18	Ch 9 Lipids and Membranes (Part II)
	10/20	Ch 9 Lipids and Membranes (Part III)
	10/22	Review: Exam 2 Chapters 5 – 9
10	10/25	Midterm Exam 2: Chapters 5 – 9
	10/27	Ch 10 Introduction to Metabolism (Part I)
	10/29	Ch 10 Introduction to Metabolism (Part II)
11	11/01	Ch 10 Introduction to Metabolism (Part II)
	11/03	Ch 11 Glycolysis (Part I)
	11/05	Ch 11 Glycolysis (Part II)
12	11/08	Ch 11 Glycolysis (Part III)
	11/10	Ch 13 The Citric Acid Cycle (Part I)
	11/12	Ch 13 The Citric Acid Cycle (Part II)
13	11/15	Ch 13 The Citric Acid Cycle (Part III)
	11/17	Ch 12 Gluconeogenesis, the Pentose Phosphate Pathway, and Glycogen Metabolism (Part I)
	11/19	Ch 12 Gluconeogenesis, the Pentose Phosphate Pathway, and Glycogen Metabolism (Part II)
14	11/22	Review: Exam 3 Chapters 10 – 13
	11/24	Midterm Exam 3: Chapters 10-13

11/26 HOLIDAY: THANKSGIVING RECESS

15 11/29 Ch 14 Electron Transport and ATP Synthesis (Part I)

12/01 Ch 14 Electron Transport and ATP Synthesis (Part II)

12/03 Ch 14 Electron Transport and ATP Synthesis (Part III)

16 12/08 FINAL EXAM: Wednesday, December 8 (11:00am – 1:00pm)