



Chaminade
University
OF HONOLULU

Course Syllabus

Chaminade University Honolulu

3140 Waialae Avenue - Honolulu, HI 96816

www.chaminade.edu

Course Number: CH 324L (*Cross-listed with BC 324L*)

Course Title: Organic Chemistry II

Department Name: Natural Sciences and Mathematics

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

Term: Spring 2023

Course Credits: 1

Class Meeting Days/Location/Time for each section:

Section 01	Tuesday	Henry Lab 7	2:30–5:20 PM
Section 02	Wednesday	Henry Lab 7	2:30–5:20 PM

Instructor Name: Duk Hwan Kim

Email: duk.kim@chaminade.edu

Office Location: Henry lab 7/8

Office Hours:

Tuesday and Wednesday 1:30 – 2:30 PM
OR by appointment

1. University Course Catalog Description

Students are trained to carry out more complex reactions using sensitive reagents. Most of the semester is used to learn to determine partial and full structures of organic compounds utilizing qualitative chemical and spectroscopic analyses. Hands- on training with the actual instruments and with computerized simulations is offered. Students are also introduced to micro- scale reaction techniques and apparatus.

Course Prerequisites

Prerequisites: CH 323/323L. Concurrent registration in CH 324 required. Cross-listed with BC 324L.

2. Course Overview

CH 324L is a one-credit laboratory course that accompanies the CH 324 lecture. As a continuation of CH 323L, students will perform experiments in the lab with discussion of the techniques used and the expected results. The goal is to develop the knowledge and skills to setup organic reactions. In addition, the students will learn to interpret spectroscopic data to elucidate chemical structure of organic compounds.

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

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 'OleloNo'eau (Hawaiian proverbs) and Marianist core beliefs:

1. Educate for Formation in Faith (Mana) E ola au ike akua ('OleloNo'eau 364) May I live by God
2. Provide an Integral, Quality Education (Na'auao) Lawei ka ma'alea a kũ'ono'ono ('Olelo No'eau 1957) Acquire skill and make it deep
3. Educate in Family Spirit ('Ohana) 'Ikeaku, 'ikemai, kōkuaakukōkuamai; pela iho la ka nohana'ohana ('OleloNo'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 kũ o ka no'eau ('OleloNo'eau 1430) Education is the standing torch of wisdom
5. Educate for Adaptation and Change (Aina) 'A'ohe pau ka 'ikei ka hālauho'okahi ('OleloNo'eau 203) All knowledge is not taught in the same school

Program Learning Outcomes

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	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5
1. Distinguish between qualitative and quantitative chemical analysis.	x		x	x	
2. Interpret experimental results and draw reasonable conclusions. Identify sources of error in chemical experiments.	x	x	x	x	
3. Perform accurate and precise quantitative measurements and keep legible and complete experimental records.	x	x	x	x	x
4. Collaborate with peers in obtaining and interpreting data.			x	x	x

3. Assessment

Grading Scale

The course grade will be based on the following score and scale:

30% = Lab reports

20% = Lab notebook

20% = Quizzes

20% = Spectroscopy worksheets

10% = Attendance and Attitude

(Following safety precautions, participation, and preparedness)

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

Lab Notebooks

The lab notebook is where all notes, raw data and calculations for experiments will be documented. Pre-laboratory information and reaction mechanisms should be recorded in the laboratory notebook. Lab notebooks must be bound, and pages numbered, must include a title page [Date(s) of Experiment, Description of Experiment, Page Number(s)] and written in blue or black permanent ink. Pencil must not be used. Mistakes happen and are expected; however, they still need to be readable. Mistakes are only to be crossed out with a single line and NO correction tape/white out can be used. Laboratory notebooks should not be rewritten to make it look prettier. Any changes to the prescribed procedure should be documented clearly in your laboratory notebook, and each step you complete should be written down in past tense. Thorough documentation of all steps taken, observations, and data are required.

Lab Report

You are required to write-up in a formal scientific format your experiments and turn them in at the beginning of the next laboratory class for grading. You must include the following sections in chronological order for each experiment:

- Title
- Name(s) of Scientist
- Date Experiment Performed
- Objective(s)
- Physical Constant
- Data
- Results
- Discussion
- Conclusion

Quizzes

There will be give quizzes scheduled this semester. You will be allowed to use your lab notebooks during the quiz, so please be sure to take organized and high-quality notes for every lab.

4. Course Policies

Attendance and Late Work Policy

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.

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.

Instructor and Student Communication

Questions for this course can be emailed to the instructor. I respond to student emails by the next school day in most cases. Typically, this will be within 24 hours, but response time may be longer for e-mails sent during the evening, weekend, or holidays. It is the responsibility of the student to check their email frequently.

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

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.

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>

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 verified by evidence of student achievement for those learning outcomes. Each credit hour earned at Chaminade University should result in 45 hours of engagement. 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, 10-week term, or equivalent amount of work over a different amount of time.

Direct instructor engagement and out-of-class work result in total student engagement time of 45 hours for one credit.

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, practical, studio work, and preparation of papers, presentations, or other forms of assessment. This policy is in accordance with federal regulations and regional accrediting agencies.

Course Schedule Spring 2023

The schedule is tentative and it may be modified according to the operational needs of the class.

Week	Dates	Topic
1	1/9 – 1/13	Check-in and laboratory safety
2	1/16 – 1/20	Spectroscopy: Mass spectrometry and infrared spectroscopy
3	1/23 – 1/27	Spectroscopy: Proton nuclear magnetic resonance spectroscopy
4	1/30 – 2/3	Spectroscopy: ^1H NMR cont.
5	2/6 – 2/10	Spectroscopy: Carbon nuclear magnetic resonance spectroscopy
6	2/13 – 2/17	TBA
7	2/20 – 2/24	Spectroscopy: Structure determination
8	2/27 – 3/3	Experiment 1: Laboratory analysis of organic compounds
9	3/6 – 3/10	Experiment 2: Oxidation
10	3/13 – 3/17	TBA
	3/20 – 3/24	SPRING BREAK
11	3/27 – 3/31	Experiment 3: Reduction
12	4/3 – 4/7	Experiment 4: Electrophilic aromatic substitution
13	4/10 – 4/14	Experiment 5: Esterification
14	4/17 – 4/21	Experiment 6: Grignard Reaction
15	4/24 – 4/28	LAST DAY OF INSTRUCTION

NOTES

Chemiluminescence?

Grignard reaction (benzophenone and bromobenzene. Mg)

Dibenzylacetone?

Esterification (benzoic acid, also have salicylic acid + whatever alcohol)

FC (got 4-methylanisole, ferric chloride, need t-butyl chloride, p-methoxyanisole)

Oxidation? (2-methyl-cyclohexanol, bleach)

Anhydride (succinic acid)

Look for stains:

p-anisaldehyde (got it)

KMnO₄

Need:

t-butylchloride