



School of Natural Sciences and Mathematics  
Chemistry

## BC/CH 430L: Instrumental Analysis

Term: Fall 2025

Section 01    Thursday 2:30 – 5:20 PM    Henry Hall Lab 01

### Instructor Information

**Instructor:** David Shinsato

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**Office Location:** Eiben 207D

**Office Hours:** Online/In Person TBD

### Communication

The best way to contact me is by email. When contacting me, please use your CUH (chaminade.edu) email account and indicate which class you are inquiring about. I will reply to emails within 24 hours during the week, and within 48 hours on weekends and holidays. Feel free to contact me at any time if you have any questions or concerns.

### Course Description & Materials

#### Catalog Course Description

This is a lab course during which students are expected to get hands-on experience with modern instrumentation, including but not limited to UV/VIS, FT IR, LC-MS, GC-MS. Following a discussion on the basic principles of each instrument, students will perform specific experiments and gather data from each instrument. Experiments during part of the course designated for topics in NMR spectroscopy will mostly be simulated. Prerequisites: BC 324/BC 324L, BC 334/BC 334L.

## Course Overview

Instrumental analysis laboratory (BC/CH 430L) is a one-semester course targeting students with an interest

in the field of biomedical research and/or education, as well as those intending to obtain a graduate level of science degree. The laboratory course will cover topics from the theoretical background of electrical theory, spectrometer devices, to hands-on application utilizing advanced instrumentation.

## Time Allocation

This is a one credit hour course requiring 45 clock hours of engagement, per the official CUH Credit Hour Policy. Students enrolled in this course are expected to spend about 25 hours in class, 15 hours completing lab notebooks, reports, and other assignments, and 5 hours reviewing and studying for in class assessments.

## Required Materials

- Safety glasses and covered footwear
- Laboratory coat
- Bound laboratory notebook (composition book)
- Computer and/or mobile device with internet access
- Scientific calculator

Canvas (<https://chaminade.instructure.com/courses/37596>)

## Learning Outcomes

### 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

### Program Learning Outcomes (PLOs)

Upon completion of the B.S. degree in Biochemistry, the student will be able to:

1. Appraise and articulate biochemical processes based on the fundamentals of organic chemistry, inorganic chemistry, analytical chemistry, physical chemistry, and biology as part of their integral and quality education.
2. Construct and employ effective and safe laboratory skills using modern scientific instrumentation and techniques.
3. Analyze, compare, and formulate an interpretation of biochemical data and problems as applied to living organisms and environment.
4. Assemble and assess biological data and compose a scientific analysis report or presentation.

### Course Learning Outcomes (CLOs)

Upon completion of CH 430L, the student will be able to:

Course Learning Outcomes	PLO 1	PLO 2	PLO 3	PLO 4
1. Explain how chemicals interact with energy for the purpose of characterization and measurement.	X			X
2. Collect and evaluate information related to current trends in chemical analysis	X		X	
3. Outline steps that should be taken with instrumentation regarding installation, calibration, maintenance, quality assurance, and quality control.	X	X		
4. Apply data analysis and visualization of chemical data to solve problems that are important to society			X	
5. Explain information about the utility of chemical instrumentation.		X		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 lapa 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

## Course Activities

### Laboratory Notebooks, Reports, and Assignments (40% of total grade)

There will be weekly assignments for this class including prep-work, review questions, lab reports, etc. The lab reports will be evaluated for completion and accuracy of the information required. They should be brief and concise, and contain the following:

- An abstract describing the purpose of the experiment, the method used, and the results obtained
- Any relevant chemical equations
- Sample calculations
- Sources of error and statistical treatment of data

The lab notebook is where all notes, raw data and calculations for experiments will be documented as well as who participated in the experiment and when the experiment occurred. Lab notebooks must be bound, written in blue or black ink, and have pages numbered. Mistakes happen and are expected; however, they still need to be readable, thus mistakes are only to be crossed out with a single line and NO correction tape/white out should be used. Lab

notebooks should not be rewritten to make it look prettier. Notebooks will be checked at the beginning and end of each lab meeting to assess completion and accuracy.

The first page of your lab notebook should be a table of contents that include the following information: [date(s) of experiment, experiment title, page number]

Each entry for a LAB experiment should include:

- Title
- Purpose
- Introduction (some key points/equations)
- Procedure Notes / Data Collected (actual data recorded from instruments)
- Calculations (show your work for any calculations here)
- Results/Conclusion

### Quizzes (30% of total grade)

There will be quizzes scheduled this semester based on the materials covered. More details will be discussed during our class meetings.

### Instrumentation Methodology Presentation (20% of total grade)

Towards the end of the semester you will be giving a presentation introducing the theory and application of a scientific instrumental method. More details will be discussed during class.

### Participation and Attendance (10% of total grade)

Chemistry is, by its nature, a participatory science – you need to participate in the lab work! You will also be assessed on following instructions, safety precautions, preparedness, participation, etc.

## Course Policies

### Attendance

The following attendance policy is from the [2025-2026 Academic Catalog](#). 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 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.

### [Late Work](#)

All overdue assignment not completed or anticipated to be late must have approval from the instructor along with a valid excuse and documentation when applicable.

### [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. This grade is appropriate only if extraordinary conditions beyond the control of the student have led to an inability to complete course requirements. When submitting a grade the "I" will be accompanied by the alternative grade that will automatically be assigned after 30 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 30 days after the end of the semester or term. This limit may not be extended.

### [Final Grades](#)

Final grades are submitted to [Self-Service](#). Letter grades are given in all courses except those conducted on a credit/no credit basis. Grades are calculated from the student's daily work,

class participation, quizzes, tests, term papers, reports and the final examination. Final letter grades are interpreted as follows with the tentative percentage cutoffs:

Grade	Percentage	
A	90 – 100 %	A Outstanding scholarship and an unusual degree of intellectual initiative
B	80 – 89 %	B Superior work done in a consistent and intellectual manner
C	70 – 79 %	C Average grade indicating a competent grasp of subject matter
D	60 – 69 %	D Inferior work of the lowest passing grade, not satisfactory for fulfillment of prerequisite course work
F	Below 60 %	F Failed to grasp the minimum subject matter; no credit given

### 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.

## 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.

### **Student Conduct**

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 student 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 within the campus residence halls are adjudicated by the Housing & Residence Life professional staff; alleged violations of the community standards within the greater campus community are adjudicated by the Director of Student Conduct & Title IX. The university has 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 (available on the Chaminade website under Student Life).

For further information, please refer to the [Student Conduct](#) section 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.



### [Nondiscrimination Policy & Notice of Nondiscrimination](#)

Chaminade University of Honolulu does not discriminate on the basis of sex and prohibits sex discrimination in any education program or activity that it operates, as required by Title IX and its regulations, including in admission and employment. Inquiries about Title IX 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 at the [Chaminade University Title IX Office Contact Information and Confidential Resources website](#). 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](#).

### [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 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 Kōkua 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 Kōkua Ike via email at [ada@chaminade.edu](mailto: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](mailto:tutoring@chaminade.edu) or 808-739-8305.

## Tentative Course Schedule

The following schedule is subject to change based on the operational needs of the course. Should changes occur, you will be notified by CANVAS announcement and email.

Week	Dates	Topics/Experiments
1	29-Aug	Lab Check-In: Syllabus and Safety Information
2	5-Sep	Introduction to Instrumental Analysis
3	12-Sep	Introduction: UV-VIS Spectrometry
4	19-Sep	UV-VIS Experiment
5	26-Sep	UV-Vis Demonstration
6	3-Oct	Introduction: IR Spectrometry
7	10-Oct	IR Experiment
8	17-Oct	Introduction: NMR Spectrometry
9	24-Oct	NMR "Experiment"
10	31-Oct	Introduction: Separations and Mass Spectrometry
11	7-Nov	LC-MS Experiment
12	14-Nov	GC-MS Experiment
13	21-Nov	Presentation Preparation
14	28-Nov	No Class Meeting (Thanksgiving Holiday) – continue Presentation Prep.
15	5-Dec	Final Presentations

## Division of Natural Sciences and Mathematics Laboratory Safety Policies

### Laboratory Usage Policy

<https://naturalsciences.chaminade.edu/> Wesselkamper Science Center 808.440.4204

### Introduction

The following guidelines are established to provide instructions in maintaining safety for students, staff, and faculty while using any of the science laboratories at Chaminade University. The Division of Natural Sciences and Mathematics (NSM), along with the University Environmental Safety Office are responsible for enforcing the regulations set forth in this manual.

### General Guidelines

- All faculty, staff, and students must know and practice the safety guidelines at all times while using the science laboratories at Chaminade University. Failure to adhere to general guidelines will result in disciplinary action including, but not exclusive to, fines, removal from the laboratory, and academic sanctions.
- Students should be knowledgeable of the care, handling, and proper use of equipment prior to using it in the laboratory.
- Students are requested to report pregnancies, physical handicaps, recent injuries, illnesses, surgeries, or communicable diseases to their instructors as soon as possible so that necessary precautions may be taken. A medical clearance from a physician is required before student with physical injuries, illness, surgery, pregnancy, or who has a reported communicable disease will be allowed to participate in a laboratory setting. It is the right of the instructor to determine whether a student in any of the situations above is capable of safely performing the necessary tasks in a laboratory.
- Working alone in the lab can be unsafe and should be avoided whenever possible. Undergraduate students are not permitted to work alone with hazardous materials (chemical or biological) or equipment. When this cannot be avoided someone else with required safety training (Principal Investigator, Lab Assistant, Lab Manager) must be in the lab or adjacent to the lab and be able to check on their safety.
- Access to the doorway in the labs will be evident at all times. Furniture will not be placed to obstruct the exits. All doors and cabinets shall remain closed when not in actual use.
- Children or unauthorized personnel may visit laboratories only with advance permission of the Dean of NSM. Injury to unauthorized personnel in the lab will not be considered the responsibility of Chaminade University or its employees.
- Students should report any misconduct occurring in the laboratories and may be held responsible if misconduct is not reported.

### Physical Safety

- There shall be no eating, drinking, or smoking in the labs at any time under any circumstances. Food and drink must not be visible at any time while in a lab. There shall be no application of makeup while in the laboratory at any time.
- Cell phones are not to be used in laboratories while hazardous chemicals or materials are present, as they are both a distraction to general safety, and can become contaminated with hazardous materials. Cell phones may be used when instructors authorize for pedagogical

reasons or in-class activities. They may not be used to make or receive personal calls or messages during a class, as a matter of safety and courtesy.

- Closed-toed shoes are required to be worn prior to entering any Chaminade University Laboratory, regardless of the duration or content of the class/use. Proper personal protective equipment (PPE) must be worn before entering a laboratory.
- Gloves are to be worn by students and faculty during any potential contact with hazardous materials. Gloves are utilized for safety and practice for application in a professional setting. Gloves for student use will be provided by the University at no additional cost.
- Remember that if you are wearing gloves, there is a reason for it, and it is not permissible to go outside of the lab with them on. Likewise, wearing gloves during an experiment and then continuing to wear them while using a phone or eating or drinking is a direct safety violation and a health hazard. If you need to leave, please discard your gloves before exiting the lab and then reapply upon reentering.
- Lab coats worn in lab are not to be worn outside of the laboratories under any circumstances unless a specific experiment requires it, which will be designated by your instructor. This is both for your safety and the safety of others on campus.

*Failure to adhere to these policies will result in disciplinary action, including but not limited to, monetary fines, immediate removal from the laboratory until the violation is amended, and/or academic sanctions. Citations will be given for each violation regardless of the ability to amend the situation. Multiple citations will include escalated and multiple sanctions.*

#### Schedule of Fines

First Violation: \$25

Second Violation: \$25 and mandatory meeting with NS&M Dean

Third Violation: \$100 and withdrawal from class

*Fines will be assessed to the student's account and unpaid fines may result in delay of registration, graduation, and processing of transcripts.*

Students may appeal the fine in writing to the Dean of Natural Sciences and Mathematics within 15 days of receipt of the citation. The Dean of Natural Sciences and Mathematics will review the appeal and provide a written decision within 30 days of receipt of the appeal. All correspondence will take place between the Administration and students via email using only the student's Chaminade University email account. In case of appeals, after the Dean of Natural Sciences and Mathematics has been approached, final appeals will be evaluated and ruled upon by the Executive Director for Compliance and Personnel Services. Final appeals must be made within 30 days of receipt of a decision by the Dean of Natural Sciences and Mathematics.

#### Reporting of an Injury/Incident

Any injury/incident occurring in the laboratories must be reported to the faculty, Lab Manager (if appropriate), University Safety Officer, and Department Head immediately.

An incident report (located in each laboratory) must be filled out for the injury. The report must be signed by the faculty member and the student involved as soon as possible after the incident.

The faculty/staff/student will be assisted to the appropriate facility, or personal physician depending upon the nature of the injury. Campus Security may be called to assist in facilitating a 911 response depending on the severity of the injury. When in doubt, always call 911 first.