



# Chaminade University OF HONOLULU

## Course Syllabus

### CH 480 Analytical Instrumentation

Fall 2022

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**Office:** Eiben 207C

**Office Hours:** By Zoom appointment only. Appointments can be made on my [YouCanBookMe page](#).

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**E-mail** is the best way to contact me. 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.

**Department Name:** Natural Sciences and Mathematics

**College/School/Division Name:** Chaminade University of Honolulu

**Course Credits:** 1

**Class Meeting:** Monday 2:30 – 5:20 PM, Henry Lab 1

#### University Course Catalog Description

Advanced and specialized chemistry topics. *Prerequisites:* CH 323/L, CH 334/L

This course will cover the theory and application of instrumentation commonly found in modern laboratories, including microscopy, spectroscopy, chromatography, and mass spectrometry. Instruction will focus on instrumental analysis as a tool to serve society and to address complex problems related to different fields of life sciences.

#### Program Learning Outcomes

Upon completion of the B.S. in Forensic Sciences, students will be able to:

1. Apply the scientific method in an adaptive and mindful manner
2. Use techniques for recognition, documentation, analysis, and interpretation of physical evidence
3. Implement quality assurance programs, incorporating ethics and professional practice, to act as stewards of justice and peace throughout the broader community
4. Communicate disciplinary knowledge to diverse audiences

#### Course Learning Outcomes and Linkage to Program Learning Outcomes

Students who successfully complete this course will be able to:

Course Learning Outcomes	PLO 1	PLO 2	PLO 3	PLO 4
1. Communicate knowledge of how chemicals interact with energy for the purpose of characterization and measurement		X		
2. Research and evaluate information related to current trends in chemical analysis			X	X

3. Recommend 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. Communicate information about the utility of chemical instrumentation.				X

### Recommended Learning Materials

There is no required text for this class.

### Course Website:

Students are required to use the canvas course for this class where all course materials will be provided.

### 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 (808) 735-4855

### Assessment

#### *Assignments*

In the laboratory, interactive experiments or assignments will be required each week. These assignments will be due by the end of the day each Friday.

#### *Research Experience*

A group research experiment will be conducted through the semester that will involve several activities and result in a final group presentation to an audience.

#### *Professional Practice*

Attendance, Discussions, Preparedness, Communication

<u>Activity</u>	<u>Weight</u>
Assignments	50%
Research Experience	25%
Professional Practice	25%

### Grading Scale

The grading scale is:

100% - 90%	A
89% - 80%	B
79% - 70%	C
69% - 60%	D
≤ 59%	F

## Course Schedule

Week	Date	Subject
1	Aug 22	PREP WEEK – Read online materials
2	Aug 29	Introduction to Research Project – Guest Speaker
3	Sept 5	Holiday
4	Sept 12	1. Analytical Microscopy
5	Sept 19	2. Molecular Spectroscopy
6	Sept 26	3. Atomic Spectroscopy
7	Oct 3	4. Mass Spectrometry
8	Oct 10	Holiday – Research Check-in with your group
9	Oct 17	5. Gas Chromatography
10	Oct 24	6. Comprehensive 2D GC
11	Oct 31	7. Other Separation Techniques
12	Nov 7	Research Projects
13	Nov 14	Research Projects
14	Nov 21	Research Projects
15	Nov 28	Research Presentation

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### Course Functioning

I will post in Canvas about what you need to do to prepare for each class (or I will state if nothing is required before coming). Always check canvas in advance to be sure you are prepared for the week.

**Assignments** will accompany the topics for each week. Some of these activities will happen in class, and some of them will require you to complete work outside of class. They will be due by the end of the day on Friday every week.

You will work in groups to complete a research project this semester. At the end of the semester, you will give a **presentation** with your group on the outcomes of your research project.

### 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

As a student in this class, you will learn to consider how measurement science can help the world around you. In this way, you'll learn ways to apply your expertise in chemistry to **serve society** by solving critical challenges. You have already obtained a foundation in chemistry during your degree; in this class we will build on this foundation by allowing you to **integrate** your previous knowledge into real-world solutions. We will also teach you *how to learn* to use new instrumentation. Our world is rapidly evolving, and no matter which science career you enter, you will probably need to learn to use new equipment. We will teach you to learn those skills by **adapting and changing** foundational knowledge to suit these opportunities. Finally, we will work as a team to generate data through research. In these group projects, you will need to work in the **family spirit** to obtain the most from the results of your experiment.

### 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

### Alignment of Natural Sciences Courses with Marianist and Hawaiian values of the University

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 *Maiau*, be neat, prepared, careful in all we do; *Makawalu*, demonstrate foresight and planning; *Ai*, sustain mind and body; *Pa`a Na`au*, learn deeply.

## Late Work and Course Absence Policy

We recognize that we are living in extraordinary times and that each 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.

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.

Late assignments will have 10% per day deducted from the total score.

## Academic Integrity

You are required to sign and follow the Forensic Sciences Code of Conduct. Violation of the Code of Conduct will result in a hearing in front of the Forensic Sciences Ethics Committee. In addition, students are expected to read and abide by the Student Rules of Conduct, which are available in your copy of the Student Handbook. A link to the Student Rules of Conduct will be made available on the home page of the canvas course. Cheating in the form of plagiarism, collusion, deception and will not be tolerated.

## Grades of "Incomplete"

Students and instructors may negotiate an incomplete grade when there are specific justifying circumstances. An Incomplete Contract (available from the Divisional Secretary and the Portal) must be completed. 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.

## Instructor and Student Communication

Questions for this course can be emailed to the instructor, sent in Canvas, or addressed during office hours as noted on the first page of this syllabus. Online, in-person and phone conferences can be arranged. It is the responsibility of the student to check their email frequently. Report email-related problems to the Helpdesk at 808-735-4855 or helpdesk@chaminade.edu.

The instructors may post images or products from this class to social media. A photo release form will be provided if you have not already signed one in another course. Please inform the instructor in the first week of the class if you do not want to appear in these communications.

## Cell phones, tablets, and laptops

Out of consideration for your classmates, please set your cell phone to silent mode during class, unless you are instructed to use them directly. Students are encouraged to bring laptops or tablets to class if they will aid in the learning process. Laptops and tablets should not be misused, such as checking distracting websites. Use your best judgment and respect your classmates and instructor.

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

### **Disability Access**

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: Center for Student Learning 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](mailto: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.

### **University Attendance Policy**

The following attendance policy is from the 2019-2020 Academic Catalog (p. 54-55).

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.

### **Academic Conduct Policy**

From the 2019-2020 Undergraduate Academic Catalog (p. 39):

Any community must have a set of rules and standards of conduct 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.

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

### **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, 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.

*The instructor may modify elements of this syllabus according to the operational needs of the class.*