CH 334L Analytical Chemistry Laboratory

Spring 2018

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Office Hours: T 11:30 AM-1:30 PM, F 9:00 AM–11:00 AM and by appointment

Section 01: Monday 2:30 PM – 5:20 PM, Henry Hall Lab 8
Section 02: Friday 2:30 PM – 5:20 PM, Henry Hall Lab 8

CH 334L Analytical Chemistry Laboratory (1 credit)

One three-hour laboratory period per week to accompany CH 334. Separation techniques and quantitative identifications of chemical entities are discussed, including gravimetric, volumetric, and spectrophotometric analyses. Students will gain an understanding of many chemical techniques used in the qualitative and quantitative analysis of a variety of samples. In addition to learning basic analytical laboratory skills, students will become familiar with sampling techniques, statistical treatment of data, propagation of error, maintenance of a laboratory notebook, and the use of software to manage chemical data. *Prerequisites: CH 204, CH 323. Concurrent registration in CH 334L required.*

Course Learning Objectives

After completion of this course, the student will demonstrate the ability to:

- Distinguish between qualitative and quantitative chemical analysis
- Interpret experimental results to draw reasonable conclusions and communicate those results in appropriate scientific writing
- Perform accurate and precise quantitative measurements while maintaining laboratory safety procedures
- Identify and calculate sources of error in chemical experiments
- Record legible and complete experimental notes
- Collaborate with peers in obtaining and interpreting data

Required Materials

- No laboratory manual is required. Experimental procedures will be posted on Canvas prior to the scheduled lab meetings. It is your responsibility to read this material prior to class and be prepared for upcoming experiments.
- Students are required to wear fully enclosed shoes, laboratory coats and safety glasses in lab at all times. Long pants are also highly recommended underneath laboratory coats.
- A laboratory notebook (composition book) and scientific calculator are required and should be brought to each class. You will not be permitted to use your cell phone as a calculator.
- A mobile device (phone, tablet, or laptop) is required for quizzes.
- A tablet or laptop are recommended to be brought to class during each period to use spreadsheet functions.

Grading

40% = Reports
20% = Final
15% = Quizzes
10% = Self-Assessment
10% = Professional Practice (Preparedness, safety, teamwork, notebook, etc.)
5% = Pre-laboratory assignments

The following percentages will be used to determine the final course grades:

A	90 – 100 %
B	80 – 89 %
C	65 – 79 %
D	45 – 64 %
F	< 44 %

Canvas

All course communication will be done through Canvas. All experimental procedures, course resources, grades, and announcements will be found there. It is your responsibility to check Canvas regularly for material and announcements. If you are not aware of where to find material within the Canvas page, please ask one of your peers or contact your instructor immediately.

Attendance

Attendance is important in laboratory courses. The benefit of laboratory courses is to participate in active, hands-on learning that will prepare you for laboratory work in your future career. No make-up laboratories will be administered in this course, so it is important to communicate with the instructor in the event of an absence. Excused absences that are communicated to the instructor in writing in advance of the laboratory may be rescheduled into another laboratory session if possible. Alternative assignments may also be assigned. Unexcused absences will incur a grade of zero on associated quizzes, self-assessments, and reports if no attempt to communicate with the instructor is made. Written requests for alternative assignments in the event of unexpected absences will be considered on a case-by-case basis at the discretion of the instructor; however, these requests must be made in a timely manner so as not to delay the return of graded work to the remaining students in the class.

In-class quizzes **cannot** be made up at a later time. Quizzes are administered at the beginning of class so it is important to be punctual. Approved written requests for absences will be excused from missed quizzes. Unexcused absences or late arrivals will result in a score of zero for that quiz.

Safety Requirements

Laboratory work is often associated with risks, which are managed by appropriate safety gear and an understanding of safe practices. This laboratory will involve working with hazardous materials, and as such, safety must be considered at all times. Students are ***required*** to practice safety precautions while performing experiments. You will be required to sign a safety contract in the first laboratory, and safety will contribute to your professional practice marks. Long pants should be worn under laboratory coats and long hair must be tied back at all times. Only registered students present for the safety discussion at the beginning of each laboratory will be permitted to attend the laboratory. Food and drink, including chewing gum or candy, is prohibited in the laboratory.

Laboratory Notebooks

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. Pre-laboratory flow charts and questions 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. Pre-laboratory work will be checked each lab period. Laboratory notebooks will be spot-checked periodically and contribute to your professional practice points.

Laboratory Quizzes

Laboratory quizzes will be administered at the beginning of each laboratory period to evaluate your preparation and comprehensive of the experiment. It is important to read your procedure and complete the pre-laboratory work prior to attending class. Quizzes will be administered using Kahoot, so you will be required to bring a mobile device, laptop or tablet to enter the quiz.

Laboratory Reports

Reports will be due at the beginning of the following experiment and will be evaluated for completion and accuracy. Instructions are posted in Canvas for tips to submit a complete and successful laboratory report. They should be brief and concise, and contain the following:

1) An abstract describing what you did, how you did it and the results obtained
2) Recorded data from your experiment
3) Relevant chemical equations and sample calculations

Laboratory Final

The course will culminate in a final exam during the last week of instruction. You will be permitted to use your laboratory notebook, previous reports, and spreadsheets to assist in completion of the laboratory final. It is important to review feedback provided by the instructor on these different components through the semester to have a complete set of notes to use.

Course Schedule

*Schedule is subject to change based on the availability of materials. Any changes and additional instructions for laboratory preparation will be announced using Canvas.

Lab Meeting	Dates	Topic
1	12 Jan, 15 Jan	Lab Introduction, Safety, Pre-test
2	19 Jan, 22 Jan	Excel Workshop
3	26 Jan, 29 Jan	Exp 1: Acid-base titration
4	2 Feb, 5 Feb	Exp 1: Acid-base titration data analysis
5	9 Feb, 12 Feb	Exp 2: Gravimetric analysis of Calcium
6	16 Feb, ~~19 Feb~~	S02 Exp 2: EDTA titration of Calcium, **S01 No Laboratory**
7	~~23 Feb~~, 26 Feb	S01 Exp 2: EDTA titration of Calcium, **S02 No Laboratory**
8	2 Mar, 5 Mar	Exp 3: Spectrophotometric analysis of Iron
9	9 Mar, 12 Mar	Exp 3: Iron data analysis
10	16 Mar, 19 Mar	Exp 4: External standards calibration using GC-MS
11	~~23 Mar~~	**No Laboratory**
12	~~26 Mar~~, ~~30 Mar~~	**Spring Recess – No Laboratory**
13	2 Apr, 6 Apr	Exp 4: GC-MS data analysis
14	9 Apr, 13 Apr	Exp 5: Iodometric titration of Vitamin C
15	16 Apr, 20 Apr	Exp 5: Vitamin C data analysis
16	23 Apr, 27 Apr	Post-test, Review
17	30 Apr, 4 May	Lab Final, Course Evaluations

Additional Departmental and University Policies

You are expected to follow the Laboratory Usage Policy in the Student Handbook. A copy of the 2017-2017 Student Handbook can be found at https://studentaffairs.chaminade.edu/. Below is a summary of some important points.

1. Electronic Devices

Cell phones and other electronic devices 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. Students who cannot comply with this rule will be asked to leave class and may be subject to laboratory safety violation fines. You will be asked to leave class and marked absent if you do not comply. This will negatively affect your grade. Please refer any questions to the Dean of Natural Sciences and Mathematics.

2. ADAA Statement

Pursuant to several 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 basis of disability and are eligible for reasonable accommodations or modifications in the academic environment to enable them to enjoy 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 at 808-735-4845 for further information.

3. Attendance & Tardiness

Students are expected to attend regularly all courses for which they are registered. Students 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 (Natural Science and Math 1 (808) 440-4204). 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.

5. Policy on Communication

The University provides a Chaminade email address for all students. Official Chaminade communications will be sent to the students' Chaminade email address and instructors will use only this email to communicate with students. 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.

6. Laboratory Safety Information

Students are required to adhere to the Laboratory Usage Policy - Physical Safety Guidelines outlined in the Student Handbook. A safety talk will be given in the first laboratory period and students will be required to sign a safety contract. 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. The Division of Natural Sciences and Mathematics (NSM), along with the University Environmental Safety Office are responsible for enforcing the regulations set forth in the current Student Handbook. Queries should be

addressed to: Dean of Natural Sciences and Mathematics (808) 440-4204; Environmental Safety Officer (808) 739-4811.

7. Title IX Declaration

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. Should you want to speak to a confidential source you may contact the following:

- Chaminade Counseling Center| 808 735-4845.
- Any priest serving as a sacramental confessor or any ordained religious leader serving in the sacred confidence role. | 808-735-4774 |

8. Academic Honesty

Students are expected to have read and to abide by the "Student Rules of Conduct" which are available in your copy of Chaminade University's Student Handbook. Cheating in the form of plagiarism, collusion, deception and will not be tolerated and will negatively affect your grade.