CHM 3120 INTORUCTION TO ANALYTICAL CHEMISTRY Spring Semester 2025, 3 Credits

Couse Objectives

In this course, you will be introduced to the basics of analytical chemistry and how analytical techniques are used to make quantitative measurements. Lectures will emphasize both classical and modern techniques, with a greater focus on modern methods and recent developments. Included in this will be discussions of statistical analyses and data interpretation. Some aspects of quantitative analysis will also be covered

The objectives of the course are

- 1. Learn how to apply the *analytical approach* to answer scientific questions.
- 2. Learn how to evaluate confidence through statistical and error analysis methods.
- 3. Understand the principles and use of the instruments of chemical analysis.

Instructor

Fan Hong, Office: CLB 210C, Email: fanhong@ufl.edu

Teaching assistant: Cong Sun, sun.cong@ufl.edu

Class Periods M/W/F 3:00 – 3:50 PM, Location: PUG 170

Office hours

Office hours: Tuesdays: 8:30 - 10:00 AM

Textbook

"Quantitative Chemical Analysis" 10th Edition, Daniel C Harris, Freeman, 2020. The book is required because suggested readings and problem sets will facilitate comprehension of course material in preparation for exams. However, these problem sets will not be graded.

Grading criteria

Grades will be based on four in-semester exams and a cumulative final exam grades will be determined on the scale below and posted in Canvas. A curve may be applied at the end of the term at the professor's discretion.

Scheme

100-95%(A+), 95-92%(A), 92-90%(A-) 89-87% (B+), 87-84% (B), 83-80% (B) 79-77% (C+), 77-74% (C), 73-70% (C) 69-67% (D+), 67-64% (D), 63-60% (D) <60% (F)

If you believe there was an error in grading, please see Prof. Hong or the TA within 1 week of having the exam returned to you. We do our best to ensure that the grading is fair for all students. Re-takes of exams are not offered.

Course policies:

Attendance will not be recorded, but attendance at lectures is important for assimilating the course material. PowerPoint lectures will be available on Canvas, but may not contain 100% of the information provided in class. Lectures will NOT be recorded. Any request for make-up exams for absences due to sporting events, family matters, religious obligations, etc. should be made to Prof. Prentice as far in advance as possible. If you are

absent for an exam due to an unpredicted documented medical reason or family emergency, please have the reason for your absence verified by the UF Dean of Students Office (DSO). You can access that system here: https://care.dso.ufl.edu/instructor-notifications/. I will follow UF academic regulations in evaluating the notification and/or documentation received by the DSO. Once the validity of your exam absence has been verified, a make-up exam will be scheduled after a reasonable amount of time. Make-up exams will only be given if appropriate 3 documentation is provided. Late exams will not be permitted otherwise. To alleviate stress with potential issues and grades, the lowest of five exams for the course is dropped.

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, https://disability.ufl.edu/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

UF Honor Code: We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

All work submitted by students at the university must adhere to the following pledge: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The university demands honesty in all academic endeavors, as cheating, plagiarism, and other dishonest acts undermine the learning process and harm the academic community. Such actions will not be tolerated; consequences include a minimum penalty of a zero on the assignment and possible suspension. Plagiarism, defined as presenting someone else's ideas, words, or work as your own, is strictly prohibited.

See: https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/

Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class." Violations of the Honor Code will be reported to the Dean of Students Office.

Feedback of the course

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <u>https://evaluations.ufl.edu/results/</u>.

For counseling the following resources are available to students: U Matter, We Care: If you or a friend is in distress, please contact umatter@ufl.edu or 352-392- 1575. Counseling and Wellness Center: https://counseling.ufl.edu/, 352-392-1575; the University Police Department: 352-392-1111 or 911 for emergencies. Sexual Assault Recovery Services (SARS): Student Health Care Center, 352-392-1161.

TENTATIVE LECTURE SCHEDULE

Dates	Topics	Book Chapters
13-Jan	Introduction and Overview	Ch. 0,1
15-Jan	Units and Chemical Measurements	Ch. 1,2
17-Jan	Units and Chemical Measurements	Ch. 1,2
20-Jan	Holliday	
22-Jan	Tools	Ch. 2,3
24-Jan	Error and Significant Figures	Ch. 2,3
27-Jan	Significant Figures Continued	Ch. 3,4
29-Jan	Statistics	Ch. 3,4
31-Jan	Statistics	Ch. 3,4
3-Feb	Quality Assurance and Calibrations	Ch. 5
5-Feb	Quality Assurance and Calibrations	Ch. 5
7-Feb	Sampling	Ch. 28
10-Feb	Exam 1 Preparation	
12-Feb	Exam 1 (Ch. 0,1,2,3,4,5)	
14-Feb	Chemical Equilibrium and titration	Ch. 6,7
17-Feb	Chemical Equilibrium and titration	Ch. 6,7
19-Feb	Chemical Equilibrium and titration	Ch. 6,7
21-Feb	Acid Base Equilibria	Ch.8,9
24-Feb	Acid Base Equilibria	Ch. 8,9
26-Feb	Acid Base Equilibria	Ch.10,11
28-Feb	Acid Base Equilibria	Ch. 10,11
3-Mar	Introduction to Spectroscopy	Ch. 18
5-Mar	Exam 2 (6,7,8,9,10,11)	
7-Mar	Fundamentals of Spectroscopy	Ch. 18
10-Mar	Fundamentals of Spectroscopy	Ch. 18
12-Mar	Applications of spectroscopy	Ch. 19
14-Mar	Applications of spectroscopy	Ch. 19
17-Mar	Spring break	
19-Mar	Spring break	
21-Mar	Spring break	
24-Mar	Applications of spectroscopy	Ch. 19
26-Mar	Spectrometers	Ch. 20
28-Mar	Fundamentals of Electrochemistry	Ch. 14, 15
31-Mar	Electrodes and Potentiometry	Ch. 14, 15
2-Apr	Electrodes and Potentiometry	Ch. 14, 15
4-Apr	Exam 3 (18,19,20, 14,15)	
7-Apr	Introduction to Analytic Separations	Ch. 23
9-Apr	Introduction to Analytic Separations	Ch. 23
11-Apr	Gas Chromatography	Ch. 24

14-Apr	Gas Chromatography	Ch. 24
16-Apr	HPLC	Ch. 24
18-Apr	HPLC	Ch. 24
21-Apr	Capillary and other separation methods	Ch. 26
23-Apr	Capillary and other separation methods	Ch. 26
25-Apr	Reading days	
28-Apr	Final Exams (Cumulative)	