CHEM 316: Instrumental Analysis
Iowa State University
Fall 2023

Instructor: **Dr. Jared Anderson**
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Class Meeting Time: MW 11:00 - 11:50 AM in Gilman 2205

Office Hours: MW 2:00 AM - 3:00 PM; other times by appointment

Course Description

This course provides students an introduction to instrumental methods of analysis. This course will expand on knowledge accumulated in Chem 211 (Quantitative Analysis) and discuss a wide range of analytical instrumentation that is typically used by analysts to solve complex analytical problems. Students will learn about the components and function of these components within instrumentation. By the end of the semester, students will be equipped with knowledge on instrumental techniques in analytical molecular and atomic spectroscopy, mass spectrometry, chromatographic separations, sample preparation, and electrochemical methods of analysis. This extensive knowledge can be used in the design of experimental methods by understanding the strengths and limitations of various instrumental methods.

Required Text

The following textbook is required for this course:

Principles of Instrumental Analysis
7th Edition
Authors: Skoog, Holler, Crouch

Lecture and Attendance

Lecture attendance is required in this course. Since a number of subject areas and topics are covered in this course, it is important to be actively engaged in the course by attending lecture, participating in classroom discussions, and working assigned problems.

Students with Disabilities

Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. All students requesting accommodations are required to meet with staff in Student Disability Resources (SDR) to establish eligibility. A Student Academic Accommodation Request (SAAR) form will be

provided to eligible students. The provision of reasonable accommodations in this course will be arranged after timely delivery of the SAAR form to the instructor. Students are encouraged to deliver completed SAAR forms as early in the semester as possible. SDR, a unit in the Dean of Students Office, is located in room 1076, Student Services Building or online at www.dso.iastate.edu/dr/. Contact SDR by e-mail at disabilityresources@iastate.edu or by phone at 515-294-7220 for additional information.

Academic Dishonesty

The university's policy on Academic Dishonesty can be found within the university catalog. Any form of academic misconduct such as cheating and forgery will result in a course grade of F and immediate dismissal from the course. In addition, the instructor will provide a letter documenting the misconduct, which can become part of the student's academic file.

Free Expression

Iowa State University supports and upholds the First Amendment protection of freedom of speech and the principle of academic freedom in order to foster a learning environment where open inquiry and the vigorous debate of a diversity of ideas are encouraged. Students will not be penalized for the content or viewpoints of their speech as long as student expression in a class context is germane to the subject matter of the class and conveyed in an appropriate manner.

Discrimination and Harassment

Iowa State University does not discriminate on the basis of race, color, age, ethnicity, religion, national origin, pregnancy, sexual orientation, gender identity, genetic information, sex, marital status, disability, or status as a U.S. Veteran. Inquiries regarding non-discrimination policies may be directed to Office of Equal Opportunity, 3410 Beardshear Hall, 515 Morrill Road, Ames, Iowa 50011, Tel. 515-294-7612, Hotline 515-294-1222, email eooffice@iastate.edu

Canvas

All course information (including grades) and assignments will be provided through Canvas. It is important to check Canvas often and be familiar with where information and assignments can be found.

Absence Policy

There will be absolutely no make up exams, quizzes, or other assignments this semester. Only valid absences will be excused within the semester and will result in adjustment of the remaining score. It is the student's responsibility to contact the instructor (by phone or e-mail) as soon as possible. All documentation provided to prove the excused absence is subject to approval by the instructor.

Grading

Exams (3)	100 points each	300 points
In-class quizzes (3)	25 points each	75 points
Assignments/Homework		50 points
Final exam (cumulative)		150 points
		Total: 575 points

Grading will be based on a straight 90, 80, 70, 60 scale

Class Schedule*

Week 1 (August 21): Sample preparation methods; Measurement basics; Signals and noise. (Chapters 1-4 will not be discussed in lecture. However, these chapters do contain important concepts that should be reviewed. Please read through these chapters)

Week 2 (August 28): : Sample preparation methods; Measurement basics; Signals and noise.

Week 3 (September 4): Atomic Spectroscopy (Quiz 1)

Week 4 (September 11): Atomic Spectroscopy (Exam 1)

Week 5 (September 18): Atomic Spectroscopy/Molecular Spectroscopy

Week 6 (September 25): Molecular Spectroscopy

Week 7 (October 2): Molecular Spectroscopy

Week 8 (October 9): Molecular Spectroscopy/Mass Spectrometry (Quiz 2)

Week 9 (October 16): Mass Spectrometry (Exam 2)

Week 10 (October 23): Mass Spectrometry

Week 11 (October 30): Mass Spectrometry/Electrochemistry

Week 12 (November 6): Electrochemistry

Week 13 (November 13): Electrochemistry (Quiz 3)

Week 14 (November 27): Separations (Exam 3)

Week 15 (December 4): Separations

Week 16 (December 11): Separations

FINAL EXAM: Thursday, December 14 from 7:30 AM – 9:30 AM

*Course schedule subject to change. All updates will be provided through announcements in class and on Canvas.