



Instrumental Analysis

CHEM 221

Instructor Info —

- David Punihaole, PhD
- Office Hours: TBD
- Innovation Hall E352

Prereqs: Quantitative Analysis (CHEM 121)

Mon/Wed/Fri

08:30 - 09:20

L/L Commons 315

Overview

This 3-credit course presents a survey of instrumental methods of chemical analysis. We will focus on understanding the fundamental principles underlying instrumental methods and their realization in modern instrumentation for chemical analysis. We will focus on the following broad methodological areas:

- Spectroscopy
- Chromatography
- Mass Spectrometry
- Electrochemistry

This is not a "how-to" course; you will not learn how to operate analytical instruments nor will we cover specific analytical "recipes." These change (sometimes quite quickly) with time as the discipline grows, so our focus on principles and concepts of implementation should provide greater insight both into how current instruments work as well as the basis for your understanding how they will work a decade from now. Lastly, these methods are applicable and how best to obtain the chemical information desired using the most appropriate instrumental methods.

You should develop an understanding of the analytical capabilities of a number of



- Inter-collegiate Athletics: Members of UVM varsity and junior varsity teams are responsible for documenting in writing any conflicts between their planned athletic schedule and the class schedule by the end of the 2nd full week of classes. You will be permitted to make up work within a mutually agreed-upon time frame.
- Medical and Emergency Absences: Absences due to sickness, as well as medical and family emergencies, should be brought to my attention as soon as possible. You will be permitted to make up work within a mutually agreed-upon time frame.
- Other Absences: Absences due to extracurricular or other activities not specified above should be brought to my atten-

Apr 2	Lecture 24	Magnetic Resonance Methods Field Trip
Apr 5	Lecture 25	Surface Characterization Techniques
Apr 7	Lecture 26	Molecular Mass Spectrometry (Part 1)
Apr 9	Lecture 27	Molecular Mass Spectrometry (Part 2)
Apr 12	Lecture 28	Introduction to Chromatographic Separations
Apr 14	Lecture 29	Gas Chromatography
Apr 16	Lecture 30	HPLC Chromatography

MODULE 4: Electroanalytical Chemistry Methods

Apr 19	Lecture 31	Capillary Electrophoresis
Apr 21	Lecture 32	Introduction to Electroanalytical Chemistry (Part 1)
Apr 23		Exam 3 (module 3)
Apr 26	Lecture 33	Introduction to Electroanalytical Chemistry (Part 2)
Apr 28	Lecture 34	Potentiometry (Part 1)
Apr 30	Lecture 35	Potentiometry (Part 2)
May 3	Lecture 36	Coulometry
May 5	Lecture 37	Voltametry (Part 1)
May 7	Lecture 38	Voltametry (Part 2)
May 10		Class Discussion
May 12		Final Review
TBD		Exam 4 (module 4)
