

CHEMISTRY 638
Topics in Chemical Instrumentation: Introduction to Mass Spectrometry
1 credit

University of Wisconsin – Madison
Spring 2018

Description:

This course will introduce students to the theory and practice of mass spectrometry. It consists of 15 hours of lecture and discussion.¹

Requisites: Graduate or professional student standing or (CHEM 344 and CHEM 345)
Course Designations: Level – Advanced
L&S Credit – Counts as Liberal Arts and Sciences credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No

Instructional Mode: Classroom instruction.

Department: Chemistry

College: Letters and Science

Canvas Course URL: canvas.wisc.edu

Meeting time and location: 2017-2018 Spring (1184)
Chemistry Building 2311 R 9:55-10:45 AM
CRN: 224021210

How credit hours are met: This class meets one 50-minute class period each week over the semester and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc.) for about 2 hours out of the classroom for every class period. The syllabus includes additional information about meeting times and expectations for student work.

Instructor: Martha Vestling (vestling@chem.wisc.edu)

Office hours: Monday 10-12 AM and Friday 10-12 AM, room 2134 Chemistry

Course learning outcomes

- To read and interpret mass spectra.
- To match ionization methods to compound types.
- To understand the coupling of separation techniques to mass spectrometers.
- To learn how mass spectrometry could be used in one's own research.

¹ The official course description and requisites are currently being revised to match the text noted above. The official course description states: "This course will introduce students to the theory and practice of mass spectrometry. It is offered as a 7 week module, consisting of 15 hours of lecture and laboratory instruction." The official requisites are "None". The older description and requisites are no longer accurate and do not apply for this semester.

Grading

Half the grade: attendance

Half the grade: short paper

Final grades are not curved.

Required Textbook, Software, & Other Course Materials:

On-line access to UW-Madison's library for the semester.

Paper-Graded Work

Short paper (3-5 pages) that discusses the mass spectrometry of a particular group of compounds of interest to you (for example: phosphopeptides, disulfides, ruthenium compounds, yeast proteins, carbohydrates, polymers, drug metabolites). This assignment is NOT a research proposal. It is also not about your research group. No more than one paper from your lab may be used. Subsets of large general areas are needed. For example, proteins, peptides, polymers, metabolites are all too large. Cite at least four papers making sure that three have recent dates (2016-2018). Do not count review articles as part of the four. Each citation should include: authors, journal title, volume, pages, year, and title of the article. Often mass spectrometry is a technique that is used to support a research project, so the mass spec information you need to discuss may be only in a paper's experimental section and/or its supplemental information section. The challenge is to read experimental details and figure out what was used to obtain mass spectra for your particular group of compounds. Look at ionization methods, analyzers, solvents, calibrants, sensitivity, resolution, clean up and sample handling details. Your choice of a topic is due April 5, 2018 at 9:55 am. The paper is due April 26, 2018 at 9:55 am.

Class Schedule

<u>Week</u>	<u>Date</u>	<u>Topic</u>
1	January 25	Mass Spectra and Ions
2	February 1	EI and CI
3	February 8	MALDI
4	February 15	ESI
5	February 22	Ambient Ionization
6	March 1	MSMS
7	March 8	GCMS
8	March 15	LCMS
9	March 22	Bottom Up
	March 29 = Spring Break	
10	April 5	Top Down (topic due)
11	April 12	Surfaces and Imaging
12	April 19	Ion Mobility
13	April 26	Lab Tour (paper due)
14	May 3	New Developments