

CHEM 782: Course Syllabus

Liquid Chromatography-Mass Spectrometry Fundamentals and Applications (3 units; G)

Instructor: Dr. Shama P. Mirza

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Office hours: By appointment

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Class Schedule: Lecture W 11:00 AM to 11:50 AM; Room: KEN 1180

Lab: T 12:30-3:20 PM; Room KEN 2076

Description: This course is designed for graduate students who wish to acquire a better understanding of fundamental concepts of mass spectrometry (MS), and use the technique independently to achieve their research goals. It covers discussion and hands on practice of modern mass spectrometry techniques. The lectures will cover basic mass spectrometry techniques, liquid chromatography mass spectrometry (LC-MS) and other MS applications. A tentative schedule of topics to be discussed is provided below. If the students are interested in any specific topics that come under mass spectrometry based applications, we will try to include those in the lectures. The changes will be discussed during the class.

Student Learning Objectives/Outcomes: Students are expected to get familiarized with the techniques involving mass spectrometry with special emphasis on using liquid chromatography based separations before MS. Students should be able to design, carry out and interpret simple to moderately complex experiments and should have a solid background for investigating more complex procedures on their own.

Suggested reading: Lecture notes will be provided on each topic to be discussed. Literature articles and application notes on lab protocols may be assigned for further reading.

Textbook: Liquid Chromatography-Mass Spectrometry: An Introduction; by Robert E. Ardrey.; John Wiley & Sons, Ltd. – This textbook is available online for free.

Other required course materials:

a) Student lab notebook: (100 carbonless duplicate sets; spiral-bound), Hayden-McNeil (2015) [ISBN-10: 9781930882744] or similar

b) A scientific electronic calculator (you cannot use the calculator on your phone)

c) Approved safety goggles in the lab

Attendance: Students are highly encouraged to attend all the lectures and lab. Absence of any of the class/lab should be discussed with the instructor in advance, and approved by the student advisor. Absence due to illness should be notified to the instructor as soon as possible after recovery.

Course Structure and Expectations: The course meets twice per week for one hour lecture followed by Q&A discussion session, and two hour lab. Students are highly encouraged to participate in the discussion. Lecture and lab assignments given should be turned in within the given due date. Delays in submitting the assignments will have an effect on grades. At the end of the course, students should give a presentation, choosing a topic related to their research using MS application. Part of the course grade is based on the presentation. A final examination will be conducted at the end of the course.

Grading Policy:

Lab: 20%
Class assignments: 10%
Presentation: 20%
Final exam: 50%

In addition, frequent absence from the class without prior approval by the instructor will have a significantly negative impact on the grades.

Tentative schedule of topics:

This is a tentative schedule of the lectures. Some alterations in the schedule is possible based on the student interest and needs in research. Changes in the topics will be discussed in class.

Day	Topic
1/24/2018	Introduction to Mass Spectrometry
1/31/2018	Basic principles in MS
2/7/2018	MS components and their characteristics
2/14/2018	Rules of mass spectral interpretation -I
2/21/2018	Rules of in mass spectral interpretation -II
2/28/2018	Separation Techniques - LCMS
3/7/2018	LCMS – Qualitative and Quantitative Strategies
3/14/2018	Sample Preparation Strategies for MS analysis
3/21/2018	Spring Break
3/28/2018	Mass Spectrometry-based Proteomics - I
4/4/2018	Mass Spectrometry-based Proteomics - II
4/11/2018	ICP-MS and MALDI-MS
4/18/2018	Other applications by MS

4/25/2018	Other applications by MS – as requested
5/2/2018	Student Presentations
5/9/2018	Student Presentations
5/16/2018	Final Exam
Lab Hours	Every week TBA – after discussion in class

Disclaimer:

Teaching policies and regulations for this course are not open for discussion or negotiation. This syllabus has been constructed to be as complete as possible but is by no means a binding document. I reserve the right to alter policies and regulations as needed.