

Intro to Mass Spectrometers

INSTRUCTOR

Dr. Benjamin Brunner
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MEETING PATTERN & LOCATION

Monday 12:30pm-1:20pm Geology Building 404, 1 credit

MS students (GEOL 5115, CRN 17412)

Interested undergraduates: please ask about a directed study

COURSE DESCRIPTION

Compounded with a striking flair for outrageous acronyms chosen by producers and users, the amazing variety of mass spectrometers leads to a seemingly un-penetrable jungle, where new-comers get lost when they try to find a simple answer to the question “what instrument is good for what application”. This course will provide students with a basic understanding of what mass spectrometers and their many relations do.

REQUIRED TEXTBOOK

none

RECOMMENDED READING

Watson J.T. & Sparkman O.D. *Introduction to Mass Spectrometry (4th Ed)*. Wiley 2007

de Hoffmann E. & Stroobant V. *Mass Spectrometry – Principles and Application (3rd Ed)*. Wiley 2007

Both books are available at the office of B. Brunner

COURSE OBJECTIVES

- 1) Learn the basics of how a mass spectrometer works and of what main parts a mass spectrometer consists of.
- 2) Get acquainted with the language of mass spectrometry.
- 3) Understand why there are so many different mass spectrometers and what they are good for.
- 4) Learn what is “out there” besides mass spectrometers and how these instruments complement what can be analyzed by mass spectrometry
- 5) Apply learned concepts to chosen examples (*potential themes* – but there are many more: in-house instruments that you are using/going to use, data processing: from the mass spectrum to a meaningful number, other measuring devices: e.g. Laser/Raman Techniques, ICP-OES, Gas or Liquid Chromatography)

PARTICIPATION IS ESSENTIAL (SEE GRADES)

Please contact Dr. Brunner about any concerns, schedule conflicts, etc. in advance or otherwise as soon as possible! A significant portion of your grade is based on participation, so any missed classes and assignments must have proper documentation or your grade will drop. Valid excuses include illness, absence with the instructor's prior approval, official University business, etc.

Accommodations are possible for active duty military and others, but arrangements must be made in a timely manner. If you are in the military with the potential of being called to military service and /or training during the course of the semester, you are encouraged to contact the instructor as soon as possible.

If you think you may have a disability or if you are experiencing learning difficulties, please contact the Disabled Student Services Office (DSSO) at (915) 747-5148. They are located in Union East room 106 or you can reach them by email at dss@utep.edu. The student is responsible for presenting to the instructor any DSS accommodation letters and instructions.

SCHEDULE OF TOPICS – *subject to change!*

Date:	Topic:	Reading
<i>Week 1-7</i>	Part 1. Introduction to Mass Spectrometers	
Week 1	Rocks, Water, Cheese, Drugs, Perfume and you? Introduction of participants, discussion of syllabus and course evaluation.	
Week 2	Monday September 1: Labor Day – No Classes	Wikipedia: In many other countries, "Labour Day" is synonymous with, or linked with, International Workers' Day, which occurs on May 1. – Lucky us!
Week 3	<ul style="list-style-type: none"> • Tour de force of Mass Spectrometers: Overview I • Evaluation of to-be-selected topics/examples with course participants 	Handouts
Week 4	Quiz 1. <ul style="list-style-type: none"> • Tour de force of Mass Spectrometers: Overview II • Evaluation of to-be-selected topics/examples with course participants 	Handouts
Week 5	Quiz 2. <ul style="list-style-type: none"> • Tour de force of Mass Spectrometers: Overview III • Evaluation of to-be-selected topics/examples with course participants 	Handouts
Week 6	Analyzers and Detectors	Handouts
Week 7	Introduction Systems	Handouts
<i>Week 8-16</i>	Part 2. Selected topics	
Week 8	Radiogenic & stable isotopes	B. Brunner
Week 9	Consider a scintillation counter	B. Brunner
Week 10	Data, Standards, and Corrections	<i>Student 1 & BB</i>
Week 11	MC-ICPMS: The curse of the double spike	<i>Student 2 & GLA</i>
Week 12	XRD	<i>Student 3 & MP</i>
Week 13	Gas-source IRMS	<i>Student 4 & BB</i>
Week 14	Laser / Raman Methods	<i>Student 5 & BB</i>
Week 15	Ion Probe	<i>Student 6 & MP</i>
Week 16	Course review	

Grades: Quiz Part 1 (30%), Participation in discussion (30%), Project presentation and handout (40%)