

CHEM755
Mass Spectrometry
Spring Term 2006

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Class Meetings: M/W 7:30-8:50 pm
Class Room: LeBow 241
Office Hours: M 4:00-6:00 pm

Textbook (required):

Jürgen H. Gross, Mass Spectrometry: A Textbook, Berlin, Germany: Springer-Verlag, 2004.

List of Topics:

Introduction

See <http://www.asms.org/whatisms/index.html> for a brief introduction to MS.

Interpretation of mass spectra

interpretation strategies
isotope cluster analysis
electron impact fragmentation pathways/mechanisms

Instrumentation

vacuum systems (types of pumps, limitations)
basic ion optics (including computer visualization using SIMION v7.0)
ion separation (electric and magnetic sectors, quadrupoles, time-of-flight, ion cyclotron resonance, ion traps)
tandem mass spectrometry techniques
ion detection (electron multipliers, photon-based detectors, microchannel plates)

Methodology

survey of ion formation methods, including electron impact, chemical ionization, particle methods (FAB and SIMS), matrix-assisted laser desorption/ionization (MALDI) and electrospray ionization (ESI)

Biological Analysis by Mass Spectrometry

Proposed Schedule:

May 7	EXAM I (take-home)
May 30	Group Project Presentations
June 4, 6	No class (American Society of Mass Spectrometry Meeting)
Finals week	EXAM II (possibly including take-home section)

Course Grading: 2 Exams (30% each for a total of 60%)
Group presentation (25%)
Problem sets/quizzes (several of which will total 15%)

Group Presentations:

The class will be broken into several small groups each of which will be assigned a unique area of interest in mass spectrometry. The group will be responsible for researching their area and creating a ½ hour presentation for the class. Each group must produce a 250 word abstract for the presentation by May 10 which will be posted on WebCT. Handouts should be prepared that includes the material shown during the presentation; in addition, an annotated bibliography of the area **must** be included. Each presentation will receive two grades; one for content and one for presentation. Each group is responsible for equitably breaking down the workload; each member of the group will receive the same presentation grade.

Delaware Valley Mass Spectrometry Discussion Group Meetings:

There are two meetings of the Delaware Valley Mass Spectrometry Discussion Group (DVMSDG) that are scheduled for Monday nights during this quarter. The topics of the speakers are relevant to the course- you are encouraged to attend. Further information will be posted on the course calendar on WebCT or can be found directly at <http://science.widener.edu/svb/msdg/>.

Additional Texts:

J. Throck Watson, An Introduction to Mass Spectrometry, 3rd ed., Philadelphia, PA: Lippencott/Raven Publishers, 1997.

F.W. McLafferty, F. Turecek, Interpretation of Mass Spectra, 4th ed., Sausalito, CA: University Science Books, 1993.

J.H. Moore, C.C. Davis, M.A. Coplan, Building Scientific Apparatus, 2nd ed., New York: Addison-Wesley, 1989.

Web Resources

See the American Society of Mass Spectrometry (ASMS) web links page at <http://www.asms.org/links.php> for a variety of mass spectrometry resources.

WebCT

We will be using WebCT (Drexel's on-line course tool package) to enhance communication in CHEM755. The instructions below tell you how to log on and begin using WebCT.

- 1) Login through DrexelOne at <http://one.drexel.edu>.
- 2) Enter your Drexel domain ID and password, click on **Login**.
- 3) Click on the **Student Services** Tab.
- 4) Click on the **My Courses** link.

or

- 1) Enter the Drexel WebCT Vista website directly at <http://webct.drexel.edu>.
- 2) Enter your Drexel domain ID and password, click on **OK**.

If you enter these correctly you will now be at your MyWebCT Home Page in the WebCT area. Select **CHEM755** from the list of courses in the middle of the screen.