CHM 6159
MASS SPECTROMETRIC METHODS

Fall Semester 2011
3 Credits

Instructor: Rick Yost, C210 CLB, 392-0557, ryost@ufl.edu

Course Goals: To provide students a solid understanding of modern mass spectrometry, including fundamentals, instrumentation, and applications.

Lectures: M W F - 5th Period (11:45 am - 12:35 pm) Lei 104
Student participation and discussion will be encouraged in lectures. A tentative lecture schedule is attached, along with suggested back-up reading from the textbook that will parallel the lecture topics.

Office Hours: Drop by my office anytime, or see me after lecture, or call or email me to set a time to meet.

Text Book: "Introduction to Mass Spectrometry," 4th ed., JT Watson and OD Sparkman, Wiley (2007). $130 list, $84 @ Amazon. Note that the 3rd edition is very different!

Web Site: A web site including this syllabus and course materials will be maintained on the UF E-learning (Sakai) system. You may log on at http://lss.at.ufl.edu/ . Problem sets and keys, details about demonstration periods and student talks, and useful links will all appear there.

Exams: The midterm and final exams will cover material from lecture, related reading from the text and handouts, and problem sets. You may bring to each exam one help sheet (8½" x 11", double sided) with any information you feel might be helpful on the exam.

Projects: Each student will either make a short oral presentation (25 min) in class or prepare a short (8-10 pp) paper on some aspect of modern mass spectrometry. The deadline for topic approval and selection of oral/written format is October 28. Papers will be due November 30. Talks will be scheduled November 30-December 7. Talks and papers will include a 2-page abstract, including key references and key figures/tables.

Grading: Grades will be based on the two exams and the project (1/3 each).

Problem Sets: Problem sets will be assigned during the semester to aid you in your assimilation of the course material. They will not be collected nor graded, but answer keys will be posted.

Demonstration Periods: The course may include demonstration periods at mass spec laboratories on and near campus. During these "field trips", you will get to observe state-of-the-art mass spectrometric instrumentation and applications. Potential subjects/ laboratories include:

Protein Sequencing - ICBR
Isotope Ratio MS - Geology
ESI/TOF, MALDI TOF/TOF, FTMS, DART - Powell Lab
Fundamentals, IRMPD, Fourier Transform MS – Polfer Group
Ion Traps, MS/MS, Imaging, Ion Mobility - Yost Group

Course Policies: Attendance will not be recorded, but participation in lectures and demonstration periods is important in assimilating the course material. Any request for make-up exams should be made to Dr. Yost as far in advance as possible.

Students should familiarize themselves with the UF Student Honor Code posted on the web at www.chem.ufl.edu/~itl/honor.html.

Students with disabilities requesting classroom accommodation must first register with the Dean of Students Office; the Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation.

Tentative Lecture Schedule

Date		*Topic*	*Textbook*
M	08/22	Course Overview/Introduction to MS	Ch. 1
W	08/24	Mass Spectrometry - Principles and Instrumentation	Ch. 1, Ch.2 V and VI
F	08/26	What is Mass? *(Dave Powell)*	
M	08/29	Mass Spectrometry - Principles and Instrumentation	Ch. 1, Ch.2 V and VI
W	08/31	Mass Spectrometry - Principles and Instrumentation	Ch. 1, Ch.2 V and VI
F	09/02	Ionization Techniques - Gas Phase (EI)	Ch. 6
M	09/05	*No Lecture – Labor Day*	
W	09/07	Ionization Techniques - Gas Phase (EI)	Ch. 6, 5
F	09/09	Ionization Techniques - Gas Phase (CI, APCI)	Ch. 7
M	09/12	Ionization Techniques - Condensed Phase	Ch. 9
W	09/14	Ionization Techniques - Condensed Phase (MALDI) *(Dave Powell)*	Ch. 8
F	09/16	Ionization Techniques - Condensed Phase	Ch. 8
M	09/19	Ionization Techniques - Condensed Phase (ESI)	Ch. 8
W	09/21	Ionization Techniques - Condensed Phase (ESI)	Ch. 8
F	09/23	Mass Analyzers – Static	Ch. 2 III
M	09/26	Mass Analyzers – Dynamic, Ion Traps	Ch. 2 III
W	09/28	Mass Analyzers – Ion Traps	Ch. 2 III
F	09/30	High Resolution MS/Accurate Mass Assignment *(Dave Powell)*	Ch. 2 III
M	10/03	Mass Analyzers – Ion Traps , FTMS, Orbitrap	Ch. 2 III
W	10/05	Mass Analyzers – Ion Traps , FTMS, Orbitrap	Ch. 2 III
F	10/07	Trace Analysis by MS in Tandem with Chromatography or MS	
M	10/10	GC/MS	Ch. 10
W	10/12	GC/MS	Ch. 10
F	10/14	LC/MS	Ch. 11
M	10/17	**Midterm Exam (covers through GC/MS) - in class**	
W	10/19	LC/MS, CE/MS	Ch. 11
F	10/21	LC/MS, CE/MS-Bio Applications, Planar Chromatography/MS	Ch. 11
M	10/24	Tandem Mass Spectrometry (MS/MS) - Overview, Analytical Aspects	Ch. 3 I
W	10/26	Tandem Mass Spectrometry (MS/MS) - Overview, Analytical Aspects	Ch. 3 I, IV
F	10/28	MS/MS Instrumentation	Ch. 3 III
M	10/31	MS/MS - Fundamentals of Ion Activation and Alternatives	Ch. 3 II
W	11/02	MS/MS - Mixture Analysis and Structure Elucidation Applications	
F	11/04	*No Lecture – Homecoming*	
M	11/07	Ion Mobility	Ch. 2 III 7
W	11/09	Imaging Mass Spectrometry *(Tim Garrett)*	
F	11/11	*No Lecture – Veterans Day*	
M	11/14	Isotope Ratio MS, Accelerator Mass Spectrometry	
W	11/16	Elemental MS - GD/MS *(Will Harrison)*	
F	11/18	Elemental MS - ICP/MS *(Ben Smith)*	Ch. 4 V
M	11/21	Elemental MS - ICP/MS *(Ben Smith)*	Ch. 4 V
W	11/23	*No Lecture - Thanksgiving*	
F	11/25	*No Lecture - Thanksgiving*	
M	11/28	Mass Spectrometry of Proteins *(Nick Polfer)*	Ch. 12
W	11/30	Student Talks; papers and abstracts due	
F	12/02	Student Talks	
M	12/05	Student Talks	
W	12/07	Student Talks	
T	12/13	**Final Exam Scheduled 7:30 AM – 9:30 AM – Lei 104**	