CHM 6159: Mass Spectrometry Methods

Fall Semester 2016 (3 credits)

Instructor:	Nicolas Polfer, CLB 311C, polfer@chem.ufl.edu
Office hours:	**M 9 (4:05-4:55 pm)**, **W 4 (10:40-11:30 am)** & **F 7 (1:55-2:45 pm)**
Lectures:	**M W F 3rd** period (9:35 am – 10:25 am) **Leigh 104**
Aims:	To provide students with a solid understanding of modern mass spectrometry, including fundamentals, instrumentation and applications.
Text book:	Mass Spectrometry: A Textbook by Jürgen H. Gross; Springer (2011), 2nd Edition. $105.26 (Amazon)
Exams:	The **mid-term** exam takes place on **Oct 19st** in class. The contribution to the grade is **20%**. The **final** exam takes place on **Dec 15th 3-5 pm**. The contribution to the grade is **40%**.
Presentation:	Each student is expected to give a presentation on either (a) a ***research proposal*** involving mass spectrometry, or (b) a ***review*** of an area of mass spectrometry not covered in class. The research proposal is evaluated based on originality and feasibility. The review should cover a number of research papers, and is evaluated based on thoroughness, and ability in communicating and critiquing the material. A choice of the topic of the presentation should be made by **Nov 9** in consultation with Dr Polfer. The oral presentations will take place at the end of the semester (28th Nov – 7th Dec). The presentation counts **30%** towards the overall grade.
Problem sets:	**Problem sets** will be made available throughout the semester. These count **10%** towards the overall grade.
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. Polfer as far in advance as possible. Students should also familiarize themselves with the UF Student Honor Code posted on the web at www.chem.ufl.edu/~itl/honor.html. Students with disabilities must first register with the Dean of Students Office, see

http://www.chem.ufl.edu/~itl/disabilities.html; the Dean of the Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation.

For counseling, students should consult the webpage:
http://www.chem.ufl.edu/~itl/counseling.html

Grading: The grade consists of three different types of assessments: exams (**mid-term** and **final**), **problem sets**, and a **presentation**.
Total = **20** + **40** + **10** + **30** = 100%

Proposed Grade Levels:

A:	92-100
A-:	88-91.9
B+:	84-87.9
B:	80-83.9
B-:	76-79.9
C+:	72-75.9
C:	68-71.9
C-:	64-67.9
D+:	60-63.9
D:	56-59.9
D-:	52-55.9
E:	< 52

Tentative Lecture Schedule CHM 6159

Date	Lecture #	Topic	Textbook
M 08/22	1	Brief history of MS and overview	
W 08/24	2	Fundamentals of ions	**G** Ch. 2.1-2.5.4
F 08/26	3	Mass spectra and isotopes	**G** Ch. 3
M 08/29	4	SIMION tutorial	
W 08/31	5	Instrumentation: time-of-flight	**G** Ch. 4.2
F 09/02	6	Instrumentation: magnetic sector	**G** Ch. 4.3
M 09/05		*No lecture: Labor Day*	
W 09/07	7	Instrumentation: quadrupole mass analyzer	**G** Ch. 4.4
F 09/09	8	SIMION workshop	
M 09/12	9	Instrumentation: Ion traps	**G** Ch. 4.4-5
W 09/14	10	Instrumentation: FTMS and	**G** Ch. 4.6

		orbitrap	
F 09/16	11	Detectors and vacuum technology	**G** Ch. 4.8-9
M 09/19	12	Commercial instruments	
W 09/21	13	Ionization: EI/CI	**G** Ch. 5,6,7
F 09/23	14	Ionization: FD, FAB, SIMS	**G** Ch. 8-9
M 09/26	15	Ionization: MALDI	**G** Ch. 10
W 09/28	16	Ionization: ESI	**G** Ch. 11
F 09/30	17	Ionization: DESI & DART	
M 10/03	18	High-resolution MS	
W 10/05	19	Fundamentals of reactions	**G** Ch. 2
F 10/07	20	Tandem mass spectrometry	**G** Ch. 12.3
M 10/10	21	Separation: GC & LC	**G** Ch. 12.1
W 10/12	22	Separation: CE & SDS-PAGE	**G** Ch. 12.3
F 10/14		*No lecture: Homecoming*	
M 10/17	23	Proteomics (*Dr Kari Basso*)	
W 10/19		**Mid-term exam (up to 10/12)**	
F 10/21	24	Metabolomics (*Dr Tim Garrett*)	
M 10/24		Exam review	
W 10/26	25	Critical review of a paper, proposal	
F 10/28	26	DNA, sugars, lipids	
M 10/31		Tandem MS workshop	
W 11/02	27	Imaging MS (*Dr Tim Garrett*)	
F 11/04	28	Ion mobility	
M 11/07	29	Quantitative, top down proteomics	
W 11/09	30	Crosslinking MS	
F 11/11		*No Lecture - Veterans' Day*	
M 11/14	31	H/D exchange	
W 11/16	32	Protein assemblies	
F 11/18	33	Ion spectroscopy	
M 11/21	34	New developments	
W 11/23		*No Lecture - Thanksgiving*	
F 11/25		*No Lecture - Thanksgiving*	
M 11/28		Student talks	
W 11/30		Student talks	
F 12/02		Student talks	
M 12/05		Student talks	
W 12/07		Student talks	

G refers to the Mass Spectrometry textbook by Jurgen Gross