

SYLLABUS**Chem 09-543 Mass Spectrometry****Instructor:** Prof. Mark Bier**Office:** MI860 **Office Hours:** Tuesday 10:30 AM – 11:30 PM**Text book:** "Mass Spectrometry, Principles and Applications", by Edmond de Hoffman & Vincent Stroobant (2002, 2nd edition)**Teaching Assistant:** **Email:****Lecture:** T, Th 9:00 - 10:20 AM**Room:** MI348 (Conference Room)**Laboratory:** Friday 1:30 – 3:00 PM**Room:** MI860 Lab or TBA**October**

T	25	Introduction, Why MS?, terminology, definitions -- mass range, mass accuracy, dynamic range, sensitivity, detection limit, resolution, isotope abundance, interpretation, EI source
Th	27	ion sources, EI, positive rays, JJ Thomson,
F	28	Laboratory 1: EI/CI GC-MS - Pesticide analysis

November

T	1	ionization sources: EI, CI, ion chemistry, GC/MS
Th	3	ionization sources: MALDI, ESI, DESI, mass analyzers: TOF, methods and theory
F	4	Laboratory 2: MALDI TOF MS and MW determinations -- peptides, proteins, polymers.
T	8	mass analyzers: TOF, ion trap –2D and 3D quadrupole fields
Th	10	mass analyzers: quadrupole, magnetic & electrostatic, QTOF, FTMS
F	11	Laboratory 3: Electrospray MS, MW determinations -- peptides, proteins, polymers.
T	15	Protein identification Take home EXAM 1 VMSL Protein identification by the VMSL
Th	17	Various MS scan modes: tandem MS, SIM, MRM, MS ⁿ with applications
F	18	Laboratory 4: QTOF and BE and <i>de novo</i> peptide sequencing
T	22	In Class EXAM 1, Take home EXAM 1 due.
Th	24	Thanksgiving Holiday , No Class
F	25	Thanksgiving Holiday , No Class

T	29	MS of proteins, peptide sequencing and protein identification
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December

Th	1	Detectors, vacuum pumps, ion gauges.
F	2	Laboratory 5: VMSL Protein Identification
T	6	Sample preparation, capillary LC MS/MS
Th	8	RRKM, QET theory Take home FINAL EXAM
F	9	NO LAB
T	13	In Class FINAL EXAM 1:00-4:00p.m. MI355
Th	15	Take home FINAL EXAM due by noon

VMSL= Virtual Mass Spectrometry Laboratory <http://sVMSL.chem.cmu.edu/VMSL/>

Grade: 30% Exam 1
 30% Combined lab/problem sets
 40% Final Exam