SYLLABUS

Chem 09-543  Mass Spectrometry

Instructor: Prof. Mark Bier  Office: MI860  Office Hours: Tuesday 10:30 AM – 11:30 PM
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 de novo 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

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