# CHEM4780 Mass Spectrometry

## Course Description:

This course aims to provide undergraduate students with the fundamental concepts and applications of mass spectrometry. It consists of several core modules including ionization (desorption/ionization) techniques, ion activation methods, mass analysers and ion detectors. The use of mass spectrometry methods for structural elucidation of small organic and large biomolecules will also be covered. Theory of unimolecular decomposition and simple mass spectral interpretation will be taught.

## Main Course Outline (for reference only):

### *Part A: Introduction to mass spectrometry*

- Basic principles, instrumental components and their functions
- Mass spectrometric information
    - Accurate mass measurement
    - Relative isotopic abundance
    - Fragmentation pattern
- General interpretation of electron impact (EI) mass spectra

### *Part B: Other ion generation methods*

- Chemical ionization
- Atmospheric pressure ionization
- Matrix-assisted laser desorption / ionization
- Ambient ionization methods

### *Part C: Mass analyzers*

- Quadrupole mass analyzer
- Time-of-flight mass spectrometer
- Fourier transform ion cyclotron resonance mass spectrometer
- Orbitrap mass analyzer

### *Part D: Mass spectrometry of biomolecules*

- Qualitative and quantitative proteomics
- Nucleic acid analysis
- Structural characterization of oligosaccharides and glycoconjugates