

**UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF CHEMISTRY
COURSE SYLLABUS
FALL 2019**

1. Course: CHEMISTRY 619.09, Selected Topics in Analytical Chemistry: Advanced Mass Spectrometric Techniques

LEC	DAYS	TIME	ROOM	PROFESSOR	OFFICE	EMAIL	OFFICE HOURS
L02	TuTh	9:30-10:45	ST 027	Dr. Yujun Shi	SB 301	shiy@ucalgary.ca	TBA

To avoid IT problems, it is recommended that the students use their U of C account for all course correspondence.

Desire 2 Learn (D2L): CHEM 619.9 L02-(Fall 2019)-Selected Topics in Analytical Chemistry

Departmental Office: Room SA 229, Tel: (403) 220-5341, e-mail: uginfo@chem.ucalgary.ca

2. Course Description: Lectures: Theoretical and practical aspects of mass spectrometric techniques; instrumentation design, method development, instrument maintenance and troubleshooting aspects; operation of different types of instruments and hands-on experience in mass spectra acquisition; analysis and Interpretation of experimental data; applications in identification of unknown chemical compounds; recent developments in the field of mass spectrometry instrumentation including hyphenated techniques and their applications in multi disciplinary fields.

3. Recommended Textbook: Jurgen H. Gross, *Mass Spectrometry: A Textbook*: Springer-Verlag

4. Topics Covered:

Course Contents

IONIZATION METHODS

Electron Ionization
Chemical Ionization
Fast Atom Bombardment
MALDI
ESI

INTERPRETATION of MASS SPECTRA

Identifying the Mass of an Analyte
Determining the Elemental Composition of an Ion
Obtaining Structural Information
Library Search and EI Mass Spectral Databases

VACUUM TECHNIQUES

Vacuum Systems
Vacuum Gauges
Vacuum Pumps

SAMPLE INTRODUCTION

Batch Inlets
Atmospheric Pressure Solid Analysis Probe

MASS ANALYZERS

Time-of-flight Mass Analyzers
Transmission Quadrupole Mass Filters
Fourier Transform Ion Cyclotron Resonance (FT-ICR) Mass Spectrometer

DETECTORS

Faraday Cups
Electron Multipliers (EM)
Electro-optical Detectors (EOD)

TANDEM MASS SPECTROMETRY – A HYPHENATED TECHNIQUE

General Introduction

Tandem-in-space and Tandem-in-time MA

Tandem MS Scan Mode

Application of Tandem MA

Department Approval _____ Electronically Approved _____ Date _____ Sept 4, 2019 _____