

**UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF CHEMISTRY
COURSE OUTLINE
WINTER 2019**

1. Course: Course ID and number, Course Title: **ADVANCED ORGANIC SPECTROSCOPY**

LEC	DAYS	TIME	ROOM	INSTRUCTOR	OFFICE	EMAIL	OFFICE HOURS
L01	TR	15:30-16:45	ENF334	Dr. Chang-Chun Ling	SB235	ccling@ucalgary.ca	Open Office

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

2. Course Description: *Lectures:* Advanced spectroscopic techniques for the determination of complex organic structures. Emphasis will be on NMR methods and mass spectroscopy, practical aspects of acquiring spectra, advanced interpretation and reporting spectral data.

3. Recommended/ Required Textbook(s): No textbook

SUGGESTED READING:

- (1) "Spectroscopic Methods in Organic Chemistry." 2nd ed, by M. Hesse, H. Meier and B. Zeeh.
- (2) "Spectrometric Identification of Organic Compounds", 7th ed, by Robert M. Silverstein.

4. Topics Covered and Suggested Readings:

Course Content

(not all sections will be covered)

Introduction to Organic Spectroscopy and Structural determination

Nuclear Magnetic Resonance spectroscopy

- Review of basic NMR principles
- Factors that influence chemical shift
- NMR homo- and heteronuclear coupling and splitting
- Instrumentation and experimental principles
- Interpretation of ¹H, ¹³C, ¹⁹F, ³¹P NMR spectra
- Common pulse sequences
- Basic 1D techniques for ¹H and ¹³C NMR
- NOE and ROE
- Advanced 2D techniques for ¹H and ¹³C NMR (COSY, TOCSY, HMQC, HSQC, DOSY etc)
- Advanced 1D techniques for ¹H and ¹³C NMR (T1 and T2, 1D ROESY, 1D TOCSY, etc)
- Solid state NMR
- Applications of NMR spectroscopy to research.

Mass Spectrometry

- Review of basic mass spectrometry principles
- Isotope patterns
- Ionization techniques
- Analysis and interpretation of mass spectra including high-resolution mass spectra
- Applications of mass spectrometry in research

4. Laboratory Experiments: No laboratory component

Department Approval _____ Approved by Department Head _____ Date _____ January 7, 2019 _____