

Department of Chemistry

SULTAN QABOOS UNIVERSITY

Chemistry 4426: Spectroscopic Structure Determination SP2024

Course Instructor: Prof. Raid Abdel-Jalil
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Lectures: Sunday & Tue (14:15-15:35)
Place: E-11
Section: 10/11

Teaching Textbook:

- 1) Spectrometric Identification of Organic Compounds, Silverstein & Webster, Seventh Edition, John Wiley and Sons. [Chapters 1-5]
- 2) Organic Structures from Spectra (L.D. Field, S.Sternhell and J.R. Kalman, Fourth Edition, John Wiley and Sons) [Chapter 6: UV]

Objectives: On successful completion of this course, students should be able to

- Understand the basic principles and applications of MS, IR, NMR, and UV techniques.
- Develop Interpretational skills in individual spectroscopic methods.
- Use combined application of different spectroscopic data in structure analysis
- Acquire hands-on experience in sample preparation and spectrum acquisition.

Course Description:

This course will cover the commonly used spectroscopic techniques in organic structure elucidation. Thus, the basic principles and applications of mass spectrometry (MS), Infrared spectroscopy (IR), ultraviolet spectroscopy (UV), nuclear magnetic resonance spectroscopy (NMR) and 2-D NMR will be covered. The vast majority of course time will be spent on NMR, its practical applications, and interpretation of data generated. In this class we will focus heavily on spectral interpretation by covering basic principles, looking at examples, and working problems. The demonstration sessions (approximately 2) are designed to help the students get a hands-on experience in sample preparation and acquiring a spectrum. The tutorial sessions are designed to develop the interpretational skills in individual and combined techniques.

Assignments and Quizzes: Your success in this course is related to your ability to interpret different spectra. In this regard, you will be given four quizzes and one assignment throughout the course. These assignment and quizzes will be graded.

Assessment & Grading: Your final grade in this course will be based on the following assessment scheme:

Test 1:	20%	Test 2:	20%
Assignments /Quizzes:	10%	Final Examination:	50%

Lecture, examination, and quizzes dates shown in the following table are tentative. Dates will change according to holiday leave and will be adjusted as the semester progresses. You will be informed about the exact examination date and time within examination week.

Topics and Sequence

Week & Month	Day	Chapters	Notes
1	S/T	Introduction	Theoretical Aspects
2	S/T	1: Mass Spectrometry (MS)	Tutorial
3	S/T	1: Mass Spectrometry (MS)	Tutorial
4	S/T	2: Infrared Spectroscopy (IR)	Theoretical Aspects
5	S/T	2: Infrared Spectroscopy (IR)	Tutorial
6	S/T	3: ^1H -NMR Spectroscopy	Theoretical Aspects 1 st Exam: Week 7
7	S/T	3: ^1H -NMR Spectroscopy	Tutorial
8	S/T	3: ^1H -NMR Spectroscopy	Tutorial
9	S/T	3: ^1H -NMR Spectroscopy	Tutorial
10	S/T	4: ^{13}C -NMR Spectroscopy	Theoretical Aspects
11	S/T	4: ^{13}C -NMR Spectroscopy	Tutorial
12	S/T	4: ^{13}C -NMR Spectroscopy	Tutorial 2 nd Exam: Week 13
13	S/T	4: ^{13}C -NMR Spectroscopy	Tutorial
14	S/T	5: 2D-NMR Spectroscopy	Theoretical Aspects Tutorial
15	M/W	Revision	

