

Chemistry 458/658
Organic Spectroscopy
Fall, 2011

Class Meetings:

Tuesdays and Thursdays, 9:30 am – 10:50 pm, Small 111

Instructor:

Elizabeth J. Harbron, ISC 2047, x12557, ejharb@wm.edu

Office Hours:

Office hours will be held on Wednesdays, 2:30 - 3:30 pm. Other hours are available by appointment; please email times when you are available to meet.

Required Text:

“Spectrometric Identification of Organic Compounds, 7th Ed.” by R.M. Silverstein, F.X. Webster, and D.J. Kiemle. (abbreviated SWK on course schedule)

Other required readings will be distributed in class.

Course Overview

This course will cover the theory and application of spectroscopic methods to the analysis of organic compounds. We will study absorption, fluorescence, infrared, proton and carbon nuclear magnetic resonance, and electron paramagnetic resonance spectroscopies with an emphasis on structure elucidation and other practical applications.

Assignments and Assessment

You will be required to complete 10 weekly problem sets, which will involve spectral analysis and interpretation of data from the literature. As this is an advanced organic chemistry elective, you will be expected to apply your knowledge of organic chemistry from previous courses to answer problem set questions. You are expected to work independently on these assignments unless otherwise instructed.

Each exam will have two parts, an in-class exam (100 pts.) and a take-home exam (100 pts). The take-home portion of each exam will emphasize interpretation of literature data while the in-class portion will focus on fundamental concepts.

You will also complete one paper involving a review of primary literature. Further information will be distributed in class.

Grading

Your grade will be computed from total points in the course, which are earned as follows:

Problem Sets:	10 x 50 pts. each	500
Exams	2 x 200 pts. each	400
Literature Review	1 x 100 pts.	100
		total: 1000

Final letter grades will be assigned according to the following scale:

A/A ⁻	90 – 100%
B ⁺ /B/B ⁻	80 – 89.9%
C ⁺ /C/C ⁻	70 – 79.9%
D ⁺ /D/D ⁻	55 – 69.9%
F	< 55%

Course Schedule and Information

Dates	Class Topics	Reading	Due
Aug. 25	Intro to spectroscopy and absorption spectroscopy	PLK Ch. 7	
Aug. 30 Sept. 1	absorption spectroscopy and applications	PLK Ch. 7	
Sept. 6 Sept. 8	finish absorption spectroscopy, begin fluorescence spectroscopy	Lak. Ch. 1	Problem Set 1, Fri., 9/9
Sept. 13 Sept. 15	fluorescence applications, begin infrared spectroscopy	Lak. Ch. 1	Problem Set 2, Thurs., 9/15
Sept. 20 Sept. 22	infrared spectroscopy continued	SWK Ch. 2	Problem Set 3, Thurs., 9/22
Sept. 27 Sept. 29	IR applications	SWK Ch. 2	Problem Set 4, Thurs., 9/29; Exam 1 take-home distributed Thurs.
Oct. 4 Oct. 6	NMR: theory and practice	SWK Ch. 3	Exam 1 in-class Thurs. 10/6; Exam 1 take-home due Fri., 10/7 by 12 pm
Fall Break Oct. 13	Proton NMR: chemical shifts	SWK Ch. 3	
Oct. 18 Oct. 20	Proton NMR: spin-spin coupling, coupling constants	SWK Ch. 3	Problem Set 5, Thurs., 10/20
Oct. 25 Oct. 27	Proton NMR: spectral analysis	SWK Ch. 3	Problem Set 6, Thurs., 10/27
Nov. 1 Nov. 3	Carbon NMR: chemical shifts and experiments	SWK Ch.4	Problem Set 7, Thurs., 11/3
Nov. 8 Nov. 10	Carbon NMR, begin 2-D NMR	SWK Ch. 4, 5	Problem Set 8, Thurs., 11/10
Nov. 15 Nov. 17	Continue 2-D NMR, begin EPR spectroscopy	SWK Ch. 5	Problem Set 9, Thurs., 11/17
Nov. 22 Thanks.	EPR Spectroscopy	TBA	Lit Review due Tues., 11/22
Nov. 29 Dec. 1	Literature Examples	TBA	Problem Set 10, Thurs., 12/1; Exam 2 take-home distributed Thurs., 12/1
Dec. 7	Exam 2 in-class Wednesday, Dec. 14, 9 am - 12 pm (covers NMR onwards)		
Dec. 10	Exam 2 take-home exam due Wednesday, Dec. 14, at 9 am		