

**CONCORDIA UNIVERSITY
DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY**

**CHEM 393
SPECTROSCOPY AND STRUCTURE OF ORGANIC COMPOUNDS**

SYLLABUS – Summer 2015

GENERAL INFORMATION

Spectroscopy and Structure of Organic Compounds (CHEM 393) is a three-credit, one-term course required for all degree programs in chemistry and biochemistry. CHEM 393 requires CHEM 222 (Introductory Organic Chemistry II). This one-term organic chemistry course will introduce you to basic concepts used in the identification of organic compounds with methods based on electronic, vibrational, and nuclear magnetic resonance spectroscopies as well as mass spectrometry.

INSTRUCTORS	Professor Heidi M. Muchall Office LOY SP 275-15 Tel. 848-2424 x3342 (I will not return calls.) heidi.muchall@concordia.ca	Professor Sébastien Robidoux Office LOY SP 201-15 Tel. 848-2424 x3377 sebastien.robidoux@concordia.ca
COURSE FORMAT	Lectures and Laboratory	
LECTURE HOURS	Monday/Wednesday 10:15 – 11:30	
LOCATION	LOY CC-204	
TEXTBOOK	<i>Pavia, Lampman, Kriz, Vyvyan</i> , Introduction to Spectroscopy, 5th Edition	
COURSE WEBSITE	Muchall: http://faculty.concordia.ca/muchall/chem393/ Robidoux: Moodle	
OFFICE HOURS	Muchall: Mon 14:30 – 15:30, plus drop-in “anytime” Robidoux: Wed 13:00 – 15:00	

COURSE WITHDRAWAL

If you withdraw from the course, you must also check-out from your lab section. Only students registered in the course may attend the lab and receive a grade for lab work.

LECTURES AND READING

Classroom time is devoted to lectures, which may follow the textbook. The lectures are designed to reinforce and clarify the textbook material. You are responsible for all the material in Chapters 1 to 10. You do not have to memorize numbers, but you have to be familiar with them.

It is impossible to describe and explain everything you will learn in this class during the lecture period. Come to class prepared: it is suggested that you complete reading the relevant textbook material *before* the lecture. Take lecture notes and work through them *after* the lecture. Reread the textbook material and add key ideas to your notes.

Remember that reading a chemistry text is not like reading a novel. In particular, even though the textbook is excellent, it may contain mistakes you should correct. Remember, the Midterm and Final Exams are **open book!** Have pencil and paper ready to take notes as you read the chapters. This course particularly requires that you work through problems and spectra time and again. You cannot succeed in this course without practice!

COURSE OBJECTIVES

- To provide students with an introduction to the spectroscopic methods used in (organic) chemistry, their theory and instrumentation.
- To provide students with the necessary tools for the interpretation of spectra of organic compounds.
- To enable students to identify organic compounds from their spectra.

COURSE OUTLINE

Chapters 1 to 10 from the textbook will be covered, and lectures are arranged into 5 sections:

- | | |
|---|---|
| 1 | Molecular Formula and Molar Mass |
| 2 | Ultraviolet Spectroscopy |
| 3 | Infrared Spectroscopy |
| 4 | Mass Spectrometry |
| 5 | Nuclear Magnetic Resonance Spectroscopy |

Sections 1-4 will be taught by Dr. Robidoux (May 4 to June 17), Section 5 by Dr. Muchall (June 29 to August 12). See attached schedule for details. The exact topic taught per day is subject to change.

EXAMINATIONS

There will be four (4) formal examinations:

1. In-class Exam 1 on Sections 1-4 (Robidoux, textbook allowed) on **June 17, 2015**.
2. In-class Lab Exam on **August 3, 2015** (see below).
3. In-class Exam 2 on Section 5 (Muchall, textbook allowed) on **August 5, 2015**.
4. Cumulative Final Exam (textbook allowed) after the end of classes, arranged by the Examinations Office.

In-class Exams 1 and 2, and the Final Exam are “**open book**”. You are allowed to bring the textbook, **only** (!). You are allowed and even required to annotate the textbook, but you must not add any pages to it. You are not allowed to bring a collection of loose pages. Photocopies of the textbook must be in a binder or otherwise bound.

If you are absent from an in-class examination, you must produce a written excuse appropriately signed (i.e. by a doctor or an employer) on the appropriate letterhead paper. This letter must be delivered to the instructor as soon as possible but **no later than one (1) week after the Exam**. The Department determines the validity of the absence. A make-up exam will **only** be offered for the Lab Exam, and only if the absence is valid. If you lack an excuse or if your excuse is not valid, you will receive a mark of zero for the Exam. In case of a valid absence for in-class exams 1 and/or 2, the percentage will be transferred on the final exam.

SURPRISE QUIZZES AND ATTENDANCE

3 or 4 surprise quizzes will be given during the first part of the term (Robidoux). Each quiz will include 1 or 2 simple questions related to previous week's material. The worst grade will be dropped in order to count the best 2 or 3. No absence will be accounted for. Attendance will be judged on the number of quizzes completed.

PROBLEM SETS

There will not be formal problem sets or assignments. However, problem sets from previous years and their answers are posted on the course website (Muchall: <http://faculty.concordia.ca/muchall/chem393/>; Robidoux: Moodle). Work through the problems and pay particular attention to how the information is given in the answers.

LABORATORY INFORMATION

The laboratory coordinators are **Rita Umbrasas (SP 330-01, Tel. 848-2424 x3354)** and **Vincent Lau (SP 234-01, Tel. 848-2424 x3358)**. All questions on matters related to the labs should be addressed to them.

The CHEM 393 laboratory is located at SP S114-01. **Laboratories start the week of Monday, May 4, 2015**. You must attend the section for which you are registered during this week, and a copy of documentation of enrolment in that section must be submitted to the demonstrator or staff member on duty. Changes will be considered only in exceptional circumstances (e.g. course conflict). All requests for changes must be made to Mrs. Umbrasas.

The laboratories are supposed to enhance the lecture material and provide hands-on experience. Laboratory performance is graded on the quality of the experimental/computational work (where applicable), the report and the final lab exam.

FINAL LABORATORY EXAM

Your lab knowledge will be tested in a lab exam that is not open-book. The exam will be given in a regular lecture period on

August 3, 2015

The passing mark for the lab exam is 50 %. **You will receive an R as course grade should your lab exam be below 50 %.** A passed lab exam counts for 10 % of the final course grade.

The lab exam is an integral part of the laboratory portion of CHEM 393. As such, it is linked to the labs, i.e., you will write the lab exam in the term you take the lab.

LABORATORY MANUAL AND MATERIALS

The lab manual is

Spectroscopy and Structure of Organic Compounds, Department of Chemistry and Biochemistry.

The manual is available from the University Bookstore, as are other items such as lab coats and safety glasses which are mandatory.

LABORATORY EXEMPTION

If you are repeating the course and have passed the lab component **within the past two (2) years**, you may request a lab exemption. Applications for the exemption (form available in SP 201.01) must be completed by the end of the first week of term, **no later than noon, Friday, May 8, 2015**. Late applications will not be accepted. Signed and completed forms must be returned to **Mrs. Hilary Scuffell, SP 275.01**. You **must** register for the appropriate lab exemption section (56); if you are registered in any other lab section, you will be required to complete the lab portion of the course. If you apply late or are denied exemption, you must repeat the lab portion. Partial exemptions will not be given, in particular, lab (reports) and lab exam are linked. If an exemption is granted, your previous lab mark (lab reports and lab exam) will be carried forward.

LABORATORY INSTRUCTORS (DEMONSTRATORS)

Each laboratory section will have one or two demonstrators who are graduate students or staff members of the department. You must know their names and the location of their rooms. You may need to contact them for matters related to your labs.

ACADEMIC INTEGRITY (*Source: <http://www.concordia.ca/students/academic-integrity.html>*)

Go to the link above and familiarize yourself with what you are supposed to do and what you are supposed to avoid doing.

The most common offense under the Academic Code of Conduct is plagiarism, which the Code defines as “the presentation of the work of another person as one's own or without proper acknowledgement.”

“Work” here could be material copied word for word from books, journals, internet sites, professor's course notes, etc. It could be material for which the words have been changed but whose phrasing still closely resembles that of the original source. It could be the work of a fellow student, e.g., a lab report completed by another student, or unauthorized data for a lab report. It could be a paper purchased through one of the many available sources. “Plagiarism” does not refer to words alone – it also refers to images, graphs, tables and ideas. “Presentation” is not limited to written work. It also includes computer and artistic works. Finally, if you translate the work of another person into English and do not cite the source, this is also plagiarism.

The Academic Code of Conduct can be found in section 17.10 of the undergraduate calendar (<http://www.concordia.ca/academics/undergraduate/calendar/current/17-10.html>). Any form of cheating, unauthorized collaboration, copying or plagiarism found in this course will be reported and the appropriate sanctions applied.

As part of CHEM 393, you are **required** to attend a seminar and pass a quiz on avoiding plagiarism and other forms of academic dishonesty, offered by the Department of Chemistry and Biochemistry. If you have already attended the seminar and achieved 100 % (110 points) on the quiz **within the past five (5) years (i.e. Summer 2010 or more recently)**, you have fulfilled the requirement. The aim of the seminar and quiz is to clarify which practices are considered unacceptable by the Department of Chemistry and Biochemistry. The

seminar will be offered during the third week of classes (see the appendix for the times offered); the quiz is online, can be accessed through the MyConcordia portal (click on Powered by Moodle under Course Websites and choose CHEM 101 under Specialized Chemistry Sites; not possible through the guest login!) and can be taken from after the seminar up to the deadline announced on the CHEM 101 site, but preferably as soon as possible. **If you do not attend the seminar and/or do not pass the quiz (the passing mark is 100 %), your course grade will be lowered by one full letter grade with an incomplete (INC) notation.** Please refer to the academic calendar section 16.3.6 on how to remove the INC and restore the proper course grade.

COURSE GRADE

The final grade of the course is based on the marks obtained in the examinations and the laboratory, which includes the lab exam. The composition of the final course grade is as follows:

Dr. Robidoux's part	In-class Exam 1	15 %
	Surprise Quizzes (3 or 4)	7 %
	Attendance	3 %
Dr. Muchall's part	In class Exam 2	25 %
Final Exam	25 %	
Lab Mark	25 % (10 % lab exam, 15 % lab reports)	

In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.

Separate minimum passing marks are required for the lectures (weighted average) and the laboratory (weighted average). The minimum passing mark for the lecture part is 50 % (D-), for the lab part 60 % (C-). Minimum passing mark for the lab exam 50 % (see above). The grading scheme (percentage to letter grade) follows:

Passing Grades:

A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-
100-90	89-85	84-80	79-77	76-73	72-70	69-67	66-63	62-60	59-57	56-53	52-50

Failing Grades:

F	R
<50 (theory)	<40 (theory)
	or
	<50 (lab exam)
	or
	<60 (lab)

H.M. Muchall, S. Robidoux
April 2015

Appendix

Seminar on academic conduct

Date	Time	Place
Tuesday, May 19	20:45-21:45	CC-214

To make sure we have the proper room size, please sign up outside SP 201.01 (Departmental office).