

**CONCORDIA UNIVERSITY
DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY**

**CHEM 293
SPECTROSCOPY AND STRUCTURE OF ORGANIC COMPOUNDS**

SYLLABUS – Summer 2017

GENERAL INFORMATION

Spectroscopy and Structure of Organic Compounds (CHEM 293) is a three-credit, one-term course required for all degree programs in chemistry and biochemistry. CHEM 293 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.

INSTRUCTOR	Professor H.M. Muchall (HMM) Office LOY SP 275.15 Tel. 848-2424 x3342 (I will not return calls.) heidi.muchall@concordia.ca
COURSE FORMAT	Lectures and Laboratory
LECTURE HOURS	Monday/Wednesday 10:15 – 11:30
LOCATION	LOY CC 310
TEXTBOOK	<i>Pavia, Lampman, Kriz, Vyvyan</i> , Introduction to Spectroscopy, 5th Edition
CALCULATOR	scientific, non-programmable
COURSE WEBSITE	http://faculty.concordia.ca/muchall/chem293/
OFFICE HOURS	Mo/Th 15:00 – 16:00 Plus: drop-in “anytime”: just come on in if I’m in the office!

COURSE WITHDRAWAL

Students who withdraw from the course must also check-out from their lab section. Only students registered in the course may attend the lab and receive a mark for lab work. **Sunday, July 10, 2017 is the last day for academic withdrawal from our Summer-term course.**

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, except where explicitly stated otherwise. 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: complete reading the relevant textbook material **before** the lecture. Take good lecture notes and work through them **after** the lecture. Re-read 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, Exams 1 and 2 and the Final Exam are **open book!** Have pencil and paper or the lecture slides 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

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

These are lecture, not book, chapters. A more detailed description with keywords covered can be found at <http://faculty.concordia.ca/muchall/chem293/outline.html>. The lecture slides are also posted here, as pdf, for students to print and bring to class to annotate. It is not useful to print the slides too small! I suggest one slide per printed page.

EXAMINATIONS

There will be four (4) formal examinations:

1. Exam 1 (in-class, textbook allowed) on **June 12, 2017**,
2. Exam 2 (in-class, textbook allowed) on **July 24, 2017**,
3. a Lab Exam (in-class) on **August 2, 2017** (see below) and
4. a Final Exam (textbook allowed) after the end of classes, arranged by the Examinations Office.

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 exam, 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 (me, HMM) 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 onto the Final Exam.

QUIZZES AND PROBLEM SETS

There will be six (6) short quizzes at various times throughout the term during a lecture period. Each quiz will include one or two simple questions related to the previous weeks' material. To account for absences, late shuttle busses or snowstorms, the top five (5) scores will count towards the final course grade.

There will not be formal problem sets or assignments. However, problem sets from previous years and their answers are posted on the course website (<http://faculty.concordia.ca/muchall/chem293/problems.html>). Work through the problems and pay particular attention to how the information is given in the answers.

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 5, 2017**. Late applications will not be accepted. Signed and completed forms must be returned to the **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 INFORMATION

The laboratory coordinator is Mr. **Vincent Lau (SP 201.10, Tel. 848-2424 x5976)**. All questions on matters related to the labs (absences, switches) should be addressed to him.

The CHEM 293 laboratory is located at SP S114-01. **Laboratories start the week of Monday, May 8, 2017.** 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 Mr. Lau. If you are absent from a lab, you must produce a written excuse (analogous to the above section “**Examinations**”). Only one such absence is allowed.

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 reports 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 2, 2017

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 grade.

The lab exam is an integral part of the laboratory portion of CHEM 293. As such, it is linked to the labs, i.e., the lab exam will be written in the term the lab is taken.

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. General lab information can be found in Moodle (CHEM 293 LAB site).

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: all questions on procedures or general understanding of lab material must be brought to a TA first.

ACADEMIC HONESTY (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 293, 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 2012 or more recently)**, you have fulfilled the requirement. You are exempt, if you can locate your ID in the pdf file located on the Departmental web site (<http://www.concordia.ca/content/dam/artsci/chemistry/docs/compliance-list.pdf>).

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 **once** for Summer classes (see the appendix for the time offered); the quiz is online, can be accessed through the MyConcordia portal (on Moodle, choose CHEM 101 under Specialized Chemistry Sites) 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 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 grade.

COURSE GRADE

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

Quizzes (5)	5 % (1 % each)
In-class Exams (2)	30 % (15 % each)
Final Exam	40 %
Lab Mark	25 % (10 % lab exam, 15 % lab reports)

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-). The Minimum passing mark for the lab exam is 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
49-40 (theory)	<40 (theory) or <50 (lab exam) or <60 (lab)

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

H.M. Muchall
April 2017

Appendix

Seminar on academic conduct

Date	Time	Place
Monday, May 15	17:45-18:45	CC 204

A sign-up sheet is available in or near SP 201.01 (Departmental office).