

CHEM 2220 Introductory Organic Chemistry II: Reactivity and Synthesis**Course Outline 2019R Session (Winter 2019)**

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The CHEM 2220 UMLearn site provides complete course content, policy and expectations.

Required Materials:

- David R. Klein *Organic Chemistry, 3rd Ed.* (same book as for CHEM 2210)
- David R. Klein *Organic Chemistry as a Second Language First Semester Topics 3rd ed.*
- David R. Klein *Organic Chemistry as a Second Language Second Semester Topics 3rd ed.*
- *CHEM 2220 Laboratory Manual (2019 edition)*

Suggested Supplement:

- William C. Groutas *Organic Reaction Mechanisms: Selected Problems and Solutions.*

Course Philosophy

CHEM 2220 will emphasize the models chemists use to rationalize the principles of organic reactivity. Examples are given to illustrate these principles, not necessarily because the example itself is intrinsically important. Successful studying will combine learning the principles with practice applying them to solve problems.

The course's goal is twofold: First, to provide a sound basis of both fact and principle in organic chemistry; and Second, to teach logical analysis and problem solving. For most of you, the second goal may be most important. All career paths require logical thinking, and you can learn it in any subject if you approach the subject rigorously. This alone is worth the effort that we demand of students, and you will be repaid handsomely for your efforts in years to come.

Lectures will not cover everything in the curriculum, but will focus on the central ideas of each topic. Students should expect questions on anything in the assigned textbook readings in tests and exams.

Getting Help

Dr. Schweizer's Office Hours: Mondays and Fridays 2-3:30 pm. If this time does not work for you then make an appointment by e-mail. However, contact times outside regular office hours will be considered as an exception. I am happy to see you either singly or in groups. Don't be shy.

Dr. Esam Orabi's Office Hours: Mondays 11 am-12:30 pm and Wednesday 11 am-12:30 pm. Please email me to set up an alternative time if you cannot attend these office hours.

Dr. Luong's Office Hours: check UMLearn and the bulletin boards outside the laboratories.

Supplementary Instruction: Weekly group tutorials run by students who have previously done well in CHEM 2220. Details are available on UMLearn and at: http://umanitoba.ca/student/academiclearning/services/supplemental_instruction.html.

There are discussion forums on the UMLearn sites for both the lecture and the laboratory portions of CHEM 2220.

Marking Scheme:

Midterm Test	(15%)	6 - 8 pm, Thursday, March 07, 2019, Rooms TBA
Final Exam	(50%)	Scheduled in the April 2019 Exam Period.
Laboratory	(21%)	A minimum of 12.6/21 on the laboratory is required to pass the course. All students (EXCLUDING THOSE WITH LAB EXEMPTIONS) must also write the Lab Exam.
Lab Exam	(14%)	

A total of less than **50%** will result in a grade of F. Marks between 50% and 100% will be graded from D to A+. See UMLearn for details of how numerical scores will be converted to letter grades.

Midterm:

The midterm will be based on lecture and textbook material plus a general understanding of organic chemistry including material originally presented in CHEM 2210. If you have a legitimate conflict with the scheduled test time, consult Dr. Schweizer in advance to see what arrangements can be made. There will be no deferrals or re-writes.

Final Examination:

The final examination is **cumulative**. Problems may be drawn from any portion of the CHEM 2220 curriculum, and may also include material initially presented in CHEM 2210.

The final must be written by all students. Failure to write the regularly scheduled examination without a valid medical certificate or compassionate reason (e.g., death of an immediate family member) will result in a mark of zero on the examination and a grade of NP on the course. Deferral can only be granted by the student's home faculty.

The deferred final examination will be written in early May 2019 (the next deferred exam writing will be in Summer Session 2019).

Notes:

- The midterm, laboratory exam and final will be “free response”. *There will be no multiple-choice questions in this course.*
- The midterm and the final deal directly with course topics and concepts but specific molecules and reactions may differ. You must *understand* the material well enough to recognize its applicability in new situations.
- **For the final exam only**, you may bring one 8.5” x 11” sheet of hand-written notes (both sides may be used) into the exam room. You may put anything you wish on this sheet, provided that it is hand-written.
- **There is no minimum mark on the final exam required to pass the course.**

Laboratory:

Laboratory attendance is compulsory. The laboratory sessions begin Monday January 14th. All students registered in the laboratory must buy a CHEM 2220 laboratory manual (2019 Edition). The laboratories are in Rooms 264-290 of the Parker Building. Your room and locker number will be assigned by your name on the bulletin board just across from the laboratories.

A lab coat, eye protection and appropriate footwear (consult the laboratory manual for what is deemed “inappropriate”) must be worn in the laboratory at all times. Students should have their own magnetic stir beads (can be purchased from the bookstore or the Chemistry Graduate Students’ Association).

The laboratory program in CHEM 2220 consists of an experimental part (with written reports) and an exam. The experimental portion of the lab program accounts for 21% and the laboratory exam counts for 14% of your total mark in CHEM 2220. All students (EXCLUDING THOSE WITH EXEMPTIONS) must write the lab exam. **In order to obtain a passing grade in CHEM 2220, you must earn a minimum of 12.6/21 on the experimental part and you must have written the lab exam, regardless of your grade on the balance of the course work.**

Laboratory Exemptions: Laboratory exemptions may be granted to students who are re-taking CHEM 2220 after previously completing the course with an unsatisfactory final grade. To qualify for a laboratory exemption the student must have completed the laboratory portion of the course not more than two years preceding. Students re-taking CHEM 2220 may apply for a laboratory exemption using an online form accessed from the Department of Chemistry website (<http://umanitoba.ca/chemistry/>). Students with a laboratory exemption must register in the B99 section.

Please note that the previously obtained lab marks **will** be used in the computation of your mark in this course.

Practice Problems

- *You will only succeed in this course if you do practice problems diligently. This is the best “studying” you can do!*
- Work through all the SkillBuilder and Conceptual Checkpoint exercises in the assigned sections of Klein’s Organic Chemistry.

Academic Honesty:

We take academic honesty very seriously and we expect the same of you. Any potential infractions of the University’s policies on academic honesty will be referred immediately to the Faculty of Science for action. *If you are not sure what is expected in terms of academic honesty, contact us or consult the University Calendar.*

Copying another student’s work or copying material from any published source without correct citation of the source is plagiarism. Communicating with any person other than an invigilator during a test or exam, bringing unauthorized materials into a test or exam, or accessing such materials electronically are all considered cheating. Plagiarism and other forms of cheating are prohibited. The full definitions of plagiarism and other forms of cheating and the possible penalties associated with them are outlined on the following website: <http://umanitoba.ca/faculties/science/undergrad/resources/webdisciplinedocuments.html>.

Every student must write his/her own examinations, and having another person write an exam on one’s behalf is considered “Examination Personation”. This is forbidden in the strongest terms.

CHEM 2220 SYLLABUS

INTRODUCTION

The required textbook package consists of David Klein's *Organic Chemistry* plus his *Organic Chemistry as a Second Language* (parts 1 and 2). These will be referred to as "**OC**", "**SL1**" and "**SL2**" respectively. There is also the recommended supplementary book by William Groutas, *Organic Reaction Mechanisms, Selected Problems and Solutions* which some of you may choose to purchase.

For largely historical reasons, most organic chemistry textbooks including Klein's **OC** are organized around the "chemistry of the functional groups". This way of presenting organic chemistry unfortunately tends to obscure the common features of reactions, making it seem that (for example) the reaction of an alcohol with an alkyl halide is different from the reaction of an amine with an alkyl halide, when in fact they are almost exactly identical.

CHEM 2220 is built around the idea of *reaction mechanisms*. Whereas chemists have discovered many thousands of reactions, only *twelve common mechanistic motifs* and *eight less-common pathways* can explain the vast majority of these reactions. We will identify these simple building blocks and show you how they make it much easier to learn and understand organic chemistry. **OC**, **SL1** and **SL2** present the reaction mechanisms in a very clear way, which is why we have chosen to use these books, but because **OC** follows the traditional chapter organization, in order to keep the reaction mechanisms unified we will be "jumping around" a bit in the textbook.

Students are responsible for learning and understanding all material in the chapter sections listed and questions based on anything in these sections, presented in lecture, or in the end-of-chapter practice problems may appear on tests or the final exam. **Note that test and exam questions probably will not be exactly the same as those you have seen for practice, but all questions will be about chemistry you have learned. Part of your task is to learn to recognize what is going on in a new situation, so do not be fooled by new molecules.**