

CHM 348H: Organic Reaction Mechanisms Fall 2017

Tuesday and Thursday 2-3 pm, LM 158

This course provides a comprehensive overview of one of the most fascinating aspects of modern chemistry: the logic and mechanistic basis for understanding the chemical transformations of organic molecules. The main goal of this course is to teach problem-solving techniques related to such transformations from a mechanistic point of view. This endeavor is particularly relevant at the beginning of one's 3rd year of undergraduate studies as it provides a much-needed support for the overwhelming amount of factual information one receives in prior organic chemistry courses. The lectures cover the general areas: overview of structure and stereochemical principles, applications of molecular orbitals (including pericyclic reactions, aromaticity, and photochemistry), kinetics and mechanisms, examples of mechanisms in solution. The chemistry of reactive intermediates involved in the corresponding reactions will be discussed throughout the course. This prepares students for structure, mechanism in theory in all areas of chemistry. Students will also be exposed to laboratory experiments that will provide practical insights into topics covered in the lectures and readings. As a result, students will receive thorough preparation in laboratory skills needed for understanding the reactivity of all types of molecules, including, organic, inorganic and biological types.

TEXTS: Lectures – Carey and Sundberg, *Advanced Organic Chemistry Part A* (available at no cost as an on-line version through the U of T Libraries) and McMurry "Organic Chemistry" from previous courses. The lab manual will be provided for sale through the laboratory.

BASIS OF GRADES: Final examination (30 %: during the final examination period); term tests (15 % each); laboratory (including reports) (40 %). Problems will be suggested but not graded. We do not supply previous tests. The details of the laboratory are spelled out in the laboratory manual, which is a required acquisition. Further information can be found on the Blackboard website "Laboratory Information" page. You are expected to check Blackboard regularly (once per day) for any important lecture and laboratory updates.

RETURN OF GRADED MATERIAL: The objective of the grading process is to provide and return the graded work as quickly as possible. The graded material will be

returned either during class or laboratory. The graded paper should be carefully checked for any oversights or addition errors.

TEST RE-GRADING. Requests for any reconsideration of grading of a test must be submitted in writing along with the test. This must be done within one week of the date in which the tests are returned to the class. The written request should specify what errors are to be corrected. The entire test will be re-graded and re-totaled as a result and any changes recorded and noted. There is no process for further appeals. Please note that partial credit is given in some cases for incorrect answers. The provision of partial credit is not subject to negotiation. In order to avoid serious academic penalties, it is essential that work submitted for regrading is not changed in any way from the state in which it was received.

LECTURES AND READING: Information is transmitted through lectures, reading from the texts, reading from additional material, and assigned problems. Slides used in class lectures are available to minimize note-taking but they do not provide a substitute for reading the texts and doing problems.

LABORATORY REPORTS AND OTHER INFORMATION: This will be provided separately during the first week of classes.

LECTURE & TERM TEST SCHEDULE: See below.

ACCESSIBILITY ACCOMMODATIONS – Please use the Accessibility Services office (<https://www.studentlife.utoronto.ca/as/services>). The course will provide the remedies that office indicates to the staff of the course.

MISSED TEST POLICY: An acceptable written petition is required, preferably with a medical exemption form if applicable. The petition must be submitted in person to the lecturer within one week of the missed exam. There will be no supplemental hour exams. As there are two hour exams, if one is missed with an acceptable petition, the grade on the other hour test will count for both tests or a makeup test will be given. If both tests are missed and there is no makeup exam offered, the final exam will count for 60% of the grade. If a test is missed without an acceptable petition, the grade of “0” will be recorded for that test.

OFFICE HOURS: Professor Ronald Kluger: DB 444 (opposite Chemistry Library). Normally MWF 11:30-12:30. Please contact by email (r.kluger@utoronto.ca) in advance to confirm or to request an alternative. Professor Andy Dicks: LM 118.

Available for consultation during laboratory hours, and via appointment (adicks@chem.utoronto.ca). Extra office hours will be announced by email.

TURNITIN: Laboratory reports are checked with TURNITIN. Normally, students will be required to submit their reports to Turnitin.com for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their reports to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com website.

CHM 348 Schedule 2017

Date	Tuesday	Thursday	Reading (C&S = C; McMurry= M)	Slide Files (C&S chapter or noted)
September 7	Classes start Thursday	Stereochemistry, molecular mechanics, conformations	C 2.1, 2.2, 2.3	Stereochemistry, Chapter 2
12, 14	Continues	Molecular orbitals	C 1.2	Chapter 1
19, 21	Transition state theory, kinetics, reaction principles		C 3.2, 3.3	Transition state theory, Chapter 3
26, 28	Free energy predictions, aromaticity		C 3.6	Chapter 3, Chapter 8
October 3, 5	Pericyclic reactions		M 14 & 30 C 10.1	McMurry 30 & 14, Chapter 10
10, 12	Hour Test 1	Photochemistry	C 12.1	Chapter 12
17, 19	Isotope effects, organocatalysis		C 3.5-3.8	Chapter 3
24, 26	Nucleophilic substitution, carbocations		C 4.1, 4.3, 4.4	Chapter 4
Oct 31, November 2	Elimination mechanisms		C 5.10	Chapter 5

7, 9	Reading week			
14, 16	Hour Test 2	Carbanions	C 6.1-6.4	Chapter 6
21, 23	Carbanionic processes	Carbonyl reactions	C 7.1-7.3	Chapter 7
Nov 28, 30	Carbonyl reactions	Decarboxylation	C 7.3-7.6	Chapter 7, Decarboxylation
Dec 5	Last day - review			