CHEM 3390: Structural Transformations in Organic Chemistry

Course Outline for Fall 2020

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Lectures

Lectures will be held on Mondays, Wednesdays, and Fridays from 8:30 to 9:20 am (Central Time, US & Canada), through Webex on UMLearn. They will be recorded and made available for students' benefits.

Course Content, Expectations and Prerequisites

This course will cover the mechanisms of Organic Chemistry reactions that allow for transformations of functional groups as well as carbon – carbon bond formation (see table below). The Laboratory is a major part of CHEM 3390. You are expected to put a substantial effort into the lab, including thorough preparation, careful experimentation, thoughtful analysis of results and complete, accurate and presentable written reports.

Contents
Part 1: Fundamental Ideas, Stereochemistry and Conformations of Organic Molecules
Part 2: Addition Reactions to Alkenes
Part 3: Reductions
Part 4: Oxidation Chemistry
Part 5: Nucleophilic Addition to Carbonyl Groups
Part 6: Lithium Aldol Reactions
Part 7: Applications and Synthetic Strategies

CHEM 2220 is a prerequisite for this course and students are expected to be familiar with the contents of that course.

Course Material

This course will follow the books *Advanced Organic Chemistry (Parts A and B)* (Carey and Sundberg) which are available online through U of M Libraries. Further material may be uploaded in UMLearn for the students' benefit.

Your Lab Manual is available on UMLearn.

In addition, the Not Voodoo website (http://chem.chem.rochester.edu/~nvd/index.php?page=home) contains essential information about practical laboratory techniques. We assume you have consulted this site before each lab and that you know how to carry out the operations needed in each experiment. If you have any doubts, ASK YOUR LAB TA!

Supplementary Course Material

The following are useful supplementary materials available in the library or as e-books: *Organic Chemistry* (J. Clayden et al.); *Electron Flow in Organic Chemistry* (P. Scudder); *March's Advanced Organic Chemistry* (Smith and March); *Spectrometric Identification of Organic Compounds* (Silverstein et al.).

Office Hours

Students can reach Jorge through email (decarvjm@myumanitoba.ca) for any questions and he will reply as soon as possible. However, do not expect replies during the weekends. Office hours will be held on Friday afternoon from 2:00 to 5:00 pm (Central Time, US & Canada), through Webex on UMLearn.

Assignments and Marking

As mentioned before, the Laboratory component is a major part of CHEM 3390 and the weighing it is given in the grading scheme reflects this (*vide supra*).

There will be 4 problem sets uploaded to UMLearn during the term and should be upload by the students, in pdf format, in their respective Assignment folders, by their respective deadlines (more information will be provided during the term). You are strongly advised to do all of them. Any problem sets you hand in will be marked, but your final grade will be based on the best 3 of 4.

Laboratory	30%
Problem Sets (best 3 of 4)	15%
Midterm Test	15%
Final Exam	40%

F	<50%	**B**	≥65% and <72%
D	≥50% and <55%	**B+**	≥72% and <80%
C	≥55% and <60%	**A**	≥80% and <88%
C+	≥60% and <65%	**A+**	≥88%

The Midterm test will be administered as a "take home" test, counting for 15% of your final mark. Students should estimate the Midterm test to take approximately two hours of their time and they should treat it as a closed book examination to test their knowledge. The Midterm will be released on UMLearn in the course contents folder on Monday, November 2nd, at 1:00 pm and will be due Friday, November 6th, at 1:00 pm (Central Time, US & Canada), in the labelled UMLearn Assignment folder (in pdf format).

The Final Exam will also be a "take home" exam and is cumulative including basic material from second-year Organic Chemistry. The questions will be built around new material in CHEM 3390 but you must be able to use concepts and reactions introduced in your introductory course. Students should estimate the Final exam to take approximately three hours of their time and should treat it as a closed book

examination to test their knowledge. The final exam will be scheduled by the University, released in UMLearn contents' folder and submitted by the due date in the labelled UMLearn assignment folder (in pdf format).

For all course work, students are expected to follow the University's academic integrity policies. Students should acquaint themselves with the University's Student Discipline Bylaw and related Procedures on academic dishonesty (see Section 2.2.1) found in the Academic Calendar. Ignorance of the regulations and policies regarding academic integrity is not a valid excuse for violating them.

The Faculty of Science and The University of Manitoba regard acts of academic misconduct in quizzes, tests, examinations, laboratory reports or assignments as serious offences and may assess a variety of penalties depending on the nature of the offence. Acts of academic misconduct include, but are not limited to bringing unauthorized materials into a test or exam, copying from another individual, using answers provided by tutors, plagiarism, and examination personation. Note: cell phones, pagers, PDAs, MP3 units or electronic translators are explicitly listed as unauthorized materials, and must not be present during tests or examinations. Penalties that may apply, as provided for under the University of Manitoba's Student Discipline By-Law, range from a grade of zero for the assignment or examination, failure in the course, to expulsion from the University.

All governing documents may be accessed on the University of Manitoba web-page: http://umanitoba.ca/admin/governance/governing_documents/index.html

For more information on suggested minimum penalties assessed by the Faculty of Science for acts of academic dishonesty please click here for PDF.

All Faculty members (and their teaching assistants) have been instructed to be vigilant and report all incidents of academic dishonesty to the Head of the Department.

Course Technological Requirements

Students enrolled in this course must ensure they satisfy the following minimum technological requirements:

- A computing device where one can create and edit documents,
- An internet connection capable of streaming videos and downloading software, and
- Access to a web-cam and microphone.

Course Policies

Students who are unable to meet a course requirement due to medical circumstances are currently not required to submit medical notes. However, students are required to contact their instructor or academic advisor by email to inform of the missed work and make arrangements for extensions, deferrals, or make-up assignments. Please follow these guidelines, if you are unable to meet an academic requirement for your courses.

- Contact your instructor for term work such as a class, quiz, midterm/test, assignment, lab
- Contact an advisor in your faculty of registration for a missed final exam (scheduled in the final examination period)
- Inform your instructor/advisor as soon as possible, do not delay. Note for final exams, students must contact within 48 hours of the date of the final exam.
- Email your instructor/advisor from a U of M email address, and include your full name, student number, course number, and academic work that was missed within 48 hours of the date of the missed examination.

Please note that circumstances that result in missing multiple course assignments/tests/classes may require medical documentation (e.g., Authorized Withdrawal, Tuition Fee Appeal, Leave of Absence, or accessibility-related accommodations). Students are advised to speak with an advisor in their faculty/college/school of registration in this case.

Laboratory

All laboratory assignments must be completed in order to receive a passing grade for this course.

Students can find the detailed Lab schedule in UMLearn.

Be aware that Parker Building will have its doors open at 8:15 am and 2:15 pm so, students must be inside Parker by this time or will not be able to enter and perform the experiments.

Please respect physical distancing while waiting for lockers or labs to open as well as inside the labs during the course of the experiments (waiting for instruments, waste bottles, weighing areas, etc.).

Please bring your own disposable masks to wear. We recommend disposable masks just in case chemicals are transferred to the mask you can throw it away. Wearing masks may lead to fogging of the safety glasses. Sealing the gap between the nose and the mask with medical tape will mitigate the fogging.

When you enter the labs, please wash your hands or use the provided hand sanitizer.

70% ethanol solution is provided at your lab. Please sanitize your work area before you leave.

Once you collect your belongings from your locker, please leave the locker door open so that staff know to sanitize the locker.

Assignments and Make-up Exams

For students with a legitimate reason for missing an assignment (illness), they are required to submit what they have completed until that point. No early or late Midterm will be given. In this scenario, the final examination (since it is cumulative) will be scaled to count for 55% of the grade. If a student misses

the Final exam, an oral exam will be preformed via Webex and will be recorded for the Instructors' review and as a proof of the evaluation. However, the student must acquire the necessary hardware (e.g. extra webcam or some drawing hardware) to be able to show his/her work. The oral exam will be a one on one meeting between the student and Jorge and it will take around 1h30min. The student will be asked open questions about the concepts taught in this course as well as to provide arrow pushing mechanisms for chemical reactions provided. Students may also be asked to interpret and/or sketch NMR spectra.

Professional Conduct

We recognize that these are unusual circumstances and some adjustments need to be made when working virtually. At the same time, we do want to remind you that University policies, such as the Respectful Work and Learning Environment policy, still apply, as do basic expectations around how students will engage with each other and all members of the University. This means that when participating in classes, online meetings, etc., students are expected to behave professionally, and follow the same basic norms as they would in person, such as being properly clothed, not being impaired, and participating respectfully. Essentially, if you wouldn't do it in an in-person class, don't do it in a virtual setting.

Please familiarize yourself with the UM Respectful Work and Learning Environment (RWLE) http://umanitoba.ca/admin/governance/media/Respectful_Work_and_Learning_Environment_RWLE_Policy_-_2016_09_01.pdf

Section 2.5(c) of the Student Non-Academic Misconduct and Concerning Behaviour Procedure describes types of inappropriate or disruptive behaviour (https://umanitoba.ca/admin/governance/media/Student_Non-Academic_Misconduct_and_Concerning_Behaviour_Procedure_-_2018_09_01.pdf).

Students are expected to act in a respectful manner. Policies regarding respectful work and learning environment and sexual assault can be found at http://umanitoba.ca/admin/governance/governing_documents/community/230.html.

Other Student Resources

A list of University governing documents pertaining to students can be found at http://umanitoba.ca/admin/governance/governing_documents/students.

Health & Mental Health Resources

Students with Health and/or Mental Health issues may seek advice and/or help from the Student Counselling Center, Student Accessibility Services, or University Health Services.

Final Examinations, Grades and Grade Appeals Resources

Final examination and grades policies can be found at http://umanitoba.ca/admin/governance/governing_documents/academic/1299.html.

For more resources about examinations, see http://umanitoba.ca/faculties/science/undergrad/resources/Academic%20Resources%20index.html.

Students wishing to appeal their term work grade can do so through the Registrar's office. A fee is charged for each appeal. More information can be found at http://umanitoba.ca/student/records/grades/690.html.

To appeal your final grade, you can initiate the process at the Registrar's office. A fee will be charged for each appeal. Check http://umanitoba.ca/student/records/ for more information.

Limited Access and VW Resources

Limited Access Policy: At present, Limited Access does not apply to students who have previously been subject to this restriction for three consecutive terms. Students will be able to register to repeat a course (or equivalent) during their initial registration time. https://umanitoba.ca/student/records/academicpolicychanges/limitedaccessfaq.html

Voluntary Withdrawal (VW), Authorised Withdrawal (AW) and Limited Access Policies

VW: Students have the opportunity to voluntarily withdraw (VW) from a class on or before **November 23, 2020**. By then, you will have received feedback so you can assess your progress. If you are not likely to pass the course, or achieve your desired grade, you should consider a VW. You may contact the instructor of the course to review your progress in more detail, or you may discuss the VW option with a Faculty academic advisor. Students enrolled in the course after the VW deadline will be assigned a final grade.

http://umanitoba.ca/u1/know_yourself/573.html

AW: At times medical or compassionate circumstances arise that prevent a student from performing as they would under normal circumstances. If you are in this position you should contact a Faculty academic advisor to discuss your options. Be prepared to provide documentation supporting your situation.

http://www.umanitoba.ca/student/resource/student_advocacy/authorized-withdrawal/index.html

Academic Integrity

Academic integrity is taking responsibility for and being honest with your work and respecting the work of others. Since you are a member of the university community, we want you to learn what that responsibility and honesty entails and how we respect the work of others.

The Faculty of Science continues to uphold high standards of academic integrity. We know that our students support us in this endeavour and we count on each and every one of you to do your part. Same academic standards apply online, remote learning, and in class education. We expect all students to strictly adhere to instructions from their professors regarding what resources can and cannot be used during exams, to follow all rules professors decide to set.

To aid professors in ensuring that all forms of assessments have been administered fairly, the University will be electronically monitoring tests, quizzes and examinations, included, but not limited to overseeing

chat-rooms, relevant predatory web-sites and, in so doing, we will analyze scholastic evidence of individual exams.

E-monitoring tools will include one of the following: Respondus Lockdown Browser & Respondus Monitor; WebEx; Zoom or Microsoft Teams.

For students, in exceptional circumstances, who cannot participate in an e-proctored exam, in-person written or oral exams may be administered. The University of Manitoba adheres to the Provincial health and safety recommendations and those will be strictly followed if an in-person examination is administered.

Please carefully review information with regards to academic integrity: **be aware; be proactive; be smart and be honest.**

Academic Integrity Message from Associate Dean Krystyna Koczanski : https://youtu.be/Ok-lilm4SeE

UM Respondus Student Guide

https://universityofmanitoba.desire2learn.com/d2l/le/content/6606/viewContent/1463719/View

The Student Discipline By-Law may be accessed at:

http://umanitoba.ca/admin/governance/media/Student_Discipline_Bylaw_-_2009_01_01.pdf

The list of suggested minimum penalties assessed by the Faculty of Science for acts of academic

dishonesty is available on the Faculty of Science webpage:

Faculty of Science – Suggested Minimum Penalties for Acts of Academic Dishonesty

All Faculty members (and their teaching assistants) have been instructed to be vigilant and

report every incident of academic dishonesty to the Head of the Department.

https://universityofmanitoba.desire2learn.com/d2l/le/content/6606/viewContent/1463719/View

Using Copyright material

Please respect copyright. We will use copyrighted content in this course. University guidelines

state that copyrighted works, including those created by instructors of the course are made available for private study and research and must not be distributed in any format without permission. Since it is illegal, do not upload copyrighted works to a learning management system (such as UM Learn), or any website, unless an exception to the Copyright Act applies or written permission has been confirmed. For more information, see the University's Copyright Office website at http://umanitoba.ca/copyright/

or contact um_copyright@umanitoba.ca .

Students Accessibility Services

If you are a student with a disability, please contact SAS for academic accommodation supports

and services such as note-taking, interpreting, assistive technology and exam accommodations.

Students who have, or think they may have, a disability (e.g. mental illness, learning, medical,

hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

Student Accessibility Services http://umanitoba.ca/student/saa/accessibility/

Ways to stay engaged!

Your university experience is not only about learning course content but also about connecting with others and establishing a network during your time here. Don't let this opportunity slip away - reach out to your professors, instructors, teaching assistants as well as classmates. These connections will be helpful for your future endeavors.

Even though much of this term's academic experience is remote, there are ways for you to connect with others in our community. Here are some suggestions:

For academic Resources , please explore: https://www.sci.umanitoba.ca/students/undergraduate-students/academic-resources/getting-help-with-courses/

To get involved with the Faculty of Science Students' Community, connect with Science Student Association as well as various discipline-specific groups. https://www.sci.umanitoba.ca/students/undergraduate-students/student-life-and-resources/student-council-associations-and-groups/

There are so many great opportunities available for research in the Faculty of Science. Gain first-hand experience in our labs as a summer research assistant.

https://www.sci.umanitoba.ca/students/undergraduate-students/current-students/undergraduate-research-opportunities/