

## Syllabus for CHM 522 – Spring 2022

### Advanced Organic Chemistry II

- Instructor:** Lorenzo Mosca  
**Class Meetings:** Tu-Th 11:00 am – 12:15 am  
**Where:** Beaupre 215 – with a remote contingency
- Office Hours:** Office hours by appointment. Feel free to drop by my office.  
 Remote office hours are an option.
- Where:** Beaupre 325D  
**Contacts:** [lorenzo@uri.edu](mailto:lorenzo@uri.edu), put **CHM 522** in the object.  
 (401) 874-2364  
 Office: Beaupre 325D
- Textbook:** There are a variety of perfectly good textbooks that satisfy the need for this course.
- 1) March's Advanced Organic Chemistry**  
 Michael B. Smith, Jerry March, Wiley. Any edition from the 5<sup>th</sup> onward is perfectly good.  
 The 8<sup>th</sup> edition (newest) is quite pricey, so look out for used books deals.
  - Advanced Organic Chemistry, Part B: Reaction and Synthesis  
*Francis A. Carey, Richard J. Sundberg* – Springer, 4<sup>th</sup> or 5<sup>th</sup> editions.
  - 3) Modern Methods of Organic Syntheses**  
*William Carruthers, Iain Coldham* – Cambridge University Press, 4<sup>th</sup> edition, 2004.
  - Organic Syntheses: Strategy and Control  
*Paul Wyatt, Stuart Warren* – Wiley, 2007
- These last two books are 10+ years old, but still do a decent job (and can be found for little money through used book online stores. My favorites are in **bold**).
- Other materials (strongly recommended)**
- **Organic Syntheses: The Disconnection Approach**  
*Paul Wyatt, Stuart Warren* – Wiley, 2<sup>nd</sup> edition, 2011.  
 A must-read quick book!
  - I deeply recommend taking this 10-hour course on Coursera:  
<https://www.coursera.org/learn/learning-how-to-learn> Sign up for the free version (without certificate). This course is offered by an engineer and a neuroscientist specifically for learners in STEM at any level; plus, it's very dorky.
- Course pre-requisites:** CHM 427 or 505 or 521. Otherwise, request permission from the instructor.

**Course requirements (\* contributes to grade):**

- Lecture attendance will not be taken but is strongly encouraged (see policies).
- 2 intermediate tests (\*) – 15% of grade/each
- 2 take home quizzes (\*) – 10% of grade/each
- Final presentation (\*) – 25% of grade
- Review paper (\*) – 25% of grade – Due by **Monday, April 25<sup>th</sup>**

**Important Dates and Reminders**

01/24/22	M	<b>First day of classes – not for CHM 522</b>
01/25/22	T	<b>First day of CHM 522</b>
02/17/22	Th	Take home quiz #1 (due by F 02/18/22)
03/11/22	T	Test #1
03/14/22 – 03/20/22		<i>Spring Break!</i>
03/31/22	Th	Take home quiz #2 (due by F 04/01/22)
04/26/22	T	Test #2
05/02/22	M	<b>Last day of Classes</b>
05/05/22	Th	<b>Official Final Exam Day (11:30am – 1:30pm   BP 215)</b>
05/18/22	W	Grades are due in e-Campus.

All Exams and the Final Exams will be given in Beaupre 215 (see Covid-19 statement below).

**Course Aims**

This course is based on two basic truths:

- ① Most organic molecules can be built using multiple retrosynthetic pathways,  
*And*
- ② One of these pathways is more logical and efficient than the other ones.  
*The rest are corollaries.*

Each disconnection of a target organic molecule needs to make sense. First, it needs to yield fragments that are chemically sound, accessible and must proceed with the highest possible conversion yield. Stereo-, regio- and chemo-selectivity effects must be considered at each step.

*In this course we will learn how to plan a sound organic synthesis and in doing so we will explore modern developments for the formation of C–C bonds and C–X bonds.*

Topics: Everything that fits

• Definitions • C–X disconnections • Umpolung • Formation of cycles • Protecting groups • C–C disconnections of alcohols • C–C disconnections of carbonyl compounds • C–C disconnections, alkenes and alkynes • Diels-Alder • Carbonyl condensations for 1,3- and 1,5-difunctional compounds • 1,2-, 1,4- and 1,6-difunctional compounds • Radical reactions • Saturated heterocycles • Unsaturated heterocycles • Photochemistry • Pericyclic reactions •

Special topics (if time allows): • Advanced stereochemistry • Sonochemistry • Mechanochemistry • Atom deletion •

Your path as graduate students requires the ability to critically review primary literature. In turn, this requires being able to search for it, identify critical points, and discuss / present them. This is even more important in a fast-paced

field like organic chemistry. To prepare you for graduate and post-graduate work, and to pass this course, you must complete a *Review Paper* and a *Final Presentation*.

*Review Paper:* In couples, choose a topic in organic chemistry of relevance to you or your work (suggested). I suggest to focus on a very specific one, for example “*the synthesis of asymmetric ureas using triphosgene*”, or “*bismuth(III) triflate as a Lewis acid catalyst*”. You should give a draft topic to me by Tuesday, February 1<sup>st</sup>, however, you can change it later. Work toward writing a review paper that contains a minimum of 25 references to the topic, and that is between 5 and 10 pages long (font size: 11, single line spacing), excluding the references and figures. Each page should have at least one figure/scheme/chart/table (redrawn, when possible, especially reaction schemes). The paper should include an abstract (200 words). Start working on it immediately! And send drafts to me when you can, so that we can adjust it along the way.

*Final Presentation:* Your “*Final Exam*” should be a 35-minute-long oral presentation (+15 min discussion) on a topic in organic chemistry that is different from your Review Paper (although there might be connections to it). You can choose virtually any topic: reactions (i.e., “*Juliá-Colonna epoxidation reaction*”), people (i.e., “*the works of Bob Grubbs*”), companies (i.e., “*Zymergen*”), concepts (i.e., “*models of nucleophilic addition to carbonyls*”). You will present this in front of the class as your final work and receive feedback that will be counted toward your grade.

## Grading

- 2 intermediate tests (\*) – 15% of grade/each
- 2 take home quizzes (\*) – 10% of grade/each
- Final presentation (\*) – 25% of grade
- Review paper (\*) – 25% of grade

Unjustifiably late take home quizzes or assignments will not be graded.

Below is the official conversion table between percentage scores, letter grades and grade points.

93% – 100%	A	4.0	73% – 76.9%	C	2.0
<u>90% – 92.9%</u>	<u>A–</u>	<u>3.7</u>	<u>70% – 72.9%</u>	<u>C–</u>	<u>1.7</u>
87% – 89.9%	B+	3.3	67% – 69.9%	D+	1.3
83% – 86.9%	B	3.0	63% – 66.9%	D	1.0
<u>80% – 82.9%</u>	<u>B–</u>	<u>2.7</u>	<u>60% – 62.9%</u>	<u>D–</u>	<u>0.7</u>
77% – 79.9%	C+	2.3	0% – 59.9%	F	0

**Your part** – There are a few points where your full commitment is required:

- Note-taking – Please take notes, share them with your fellows, read them/reorganize them before the next class.
- Do your part in the class – this includes obvious things, such as trying not to get distracted, taking part in activities according to what you are comfortable with, ask me to slow down or go over it once again if something is not clear.
- Ask me questions – the rule of the class is that **there are no dumb questions**.
- Practice, practice, practice!
- Use the opportunity of more facetime during office hours!
- Be ready to challenge yourselves and to critically review your work.

*It is my utmost priority to ensure that your learning takes place in a respectful, safe, and constructive environment. I will not tolerate aggressions and any other actions based upon prejudice and intolerance. As a group of people with biases, we shall learn how to understand and work with our differences. Equity and inclusion are critical components*

*for campus community members to thrive and become responsible citizens of the World. If you are a target or a witness of a bias incident, you are encouraged to submit a report to the URI Bias Response Team at [www.uri.edu/brt](http://www.uri.edu/brt). There you will also find people and resources to help.*

## **Classroom Policies**

### **COVID-19**

The University is committed to delivering its educational mission while protecting the health and safety of our community. While the university has worked to create a healthy learning environment for all, it is up to all of us to ensure our campus stays that way.

As members of the URI community, students are required to comply with standards of conduct and take precautions to keep themselves and others safe. Visit [web.uri.edu/coronavirus/](http://web.uri.edu/coronavirus/) for the latest information about the URI COVID-19 response.

- Universal indoor masking is required for all community members, on all campuses, regardless of vaccination status. If the universal mask mandate is discontinued during the semester, students who have an approved exemption and are not fully vaccinated will need to continue to wear a mask indoors and maintain physical distance.
- Students who are experiencing symptoms of illness should not come to class. Please stay in your home/room and notify URI Health Services via phone at 401-874-2246.
- If you are already on campus and start to feel ill, go home/back to your room and self-isolate. Notify URI Health Services via phone immediately at 401-874-2246.

**Important!** If you are unable to attend class, please let me know prior to the start of class at (401) 874-2364, [lorenzo@uri.edu](mailto:lorenzo@uri.edu) or through Brightspace.

### **Communication with the Instructor**

In person during class or office hours.

Phone: (401) 874-2364.

Email: [lorenzo@uri.edu](mailto:lorenzo@uri.edu), try to include CHM 522 in the object.

I expect to get back to you as soon as possible within 24 hours during weekdays. Emails and messages received after 8:00 pm will be addressed the next available weekday.

### **Attendance/Tardiness and Make-Up Policy**

Attendance for this class is not required (but strongly encouraged for success). If you know you won't be able to make it in time for the beginning of the class, please contact me in advance.

Intermediate tests and final presentation/review paper are necessary for obtaining a good grade. Missing one of these due to unjustified absence automatically results in an F grade that will be averaged into the final grade. I consider a justified absence a verifiable instance of:

- Religious observance of a holy day
- Illness
- Personal tragedy
- University sanctioned events

It is your sole responsibility to communicate with me prior to the missed exams and classes. For classes, it is your duty to make-up for the missed work. I will be offering you to make-up lectures during the next available office hours.

In case of a missed exam, arrangements will be made to administer a similar one at a later date, including exams given at the Academic Testing Center ([uri.edu/atc](http://uri.edu/atc)).

**Exam Records**

All graded materials are available for consultation in my office for 365 days after the last day of classes. You can request copies for personal use. After this time the originals will be archived digitally and destroyed.

**Academic Honesty and Integrity**

You are expected to be honest in all academic work. Your name on any written work or exam shall be regarded as assurance that the work is the result of your own independent thought, study and effort. You have an obligation to know how to quote, paraphrase, summarize, cite and reference the work of others with integrity. The following are examples (non-comprehensive) of academic dishonesty:

- Using material, directly or paraphrasing, from published sources without proper citation
- Claiming disproportionate credit for work not done independently
- Unauthorized possession or access to exams
- Unauthorized communication during exams
- Unauthorized use of another's work or preparing work for another person
- Taking an exam for another person
- Altering or trying to alter grades
- The use of notes/text or electronic devices to gain an unauthorized advantage during exams
- Fabricating or falsifying facts, data, or references
- Facilitating or aiding another's academic dishonesty

The university policy on academic honesty is clear. Any incidence of academic dishonesty (see above or URI's Student Handbook), will result in either one or all of the following: a grade of zero, failure for the course, formal notification to the Dean.

**Disability Accommodations**

Please notify me with your Disability Access and Inclusion (DAI, formerly DSS) accommodation letter as early as possible. I will be happy to discuss and arrange for your approved academic accommodations. If you have not yet established services through DAI, please contact them to engage in a confidential conversation about the process for requesting reasonable accommodations in the classroom. DAI can be reached here: (401) 874-2098, [web.uri.edu/disability](http://web.uri.edu/disability), <https://web.uri.edu/disability/request-form/> email: [dai@etal.uri.edu](mailto:dai@etal.uri.edu).

**Changes to the Syllabus**

Due to unforeseen circumstances, the contents of the syllabus and the content of the course may be subject to changes. You will be notified of any change in advance. In fact, you should consider this as a "living document" rather than a "carved in stone" contract.