

Syllabus for CHM 291 – Fall 2021

Organic chemistry

Instructor: Lorenzo Mosca
Class Meetings: MWF 10:00 am – 10:50 am
Where: Beaupre 215

Office Hours: M 1:00 pm – 2:00 pm
 W 2:30 pm – 3:30 pm
 F 11:00 am – *noon*
 Office hours by appointment. If you wish to schedule outside the above times, please notify me with at least 24 hours of advance notice. Remote office hours are possible as an option (Zoom). For appointments, use STARFISH, or other communication methods (in person, email, phone call).

Where: Beaupre 325D
Contacts: lorenzo@uri.edu (or via Brightspace), **put CHM 291** in the object.
 (401) 874-2364
 Office: 325D Beaupre Center for Chemical and Forensic Sciences

Suggested book

Organic Chemistry by Solomons, Fryhle, Snyder | 12th Ed. | Wiley

Get the loose-leaf version with access to WileyPlus. Graded homework will be assigned through WileyPlus and additional learning materials and study guides are available.

Optional: Organic Chemistry, 12e Study Guide & Student Solutions Manual (Solomons) Wiley.

Other materials (strongly recommended)

● A molecular model set; good kits can be purchased on the following websites:

- www.darlingmodels.com (Kit #1)
- www.megamolecules.com (Organic Chemistry or Organic Chemistry Plus)
- www.indigoinstrument.com/molecular_models/molymod/sets/
- www.indigoinstrument.com/molecular_models/orbit/sets/

Pick any of the organic chemistry sets or ask me for more suggestions.

● I deeply recommend taking this 10-hour course on Coursera, if you have the time or the will: <https://www.coursera.org/learn/learning-how-to-learn> Sign up for the free version (without certificate). This course was made by an engineer and a neuroscientist specifically for learners in STEM at any level; plus, it's very dorky.

Course website

Information, announcements, and more materials will be available on Brightspace (<https://brightspace.uri.edu>)

Course pre-requisites: CHM 192 with C- | Chemistry majors only | Not open to people with credits in CHM 227

Course requirements (* contributes to grade):

- Lecture attendance will not be taken but is strongly encouraged (see policies).
- Syllabus Quiz** (due on Sunday 09/12/21 by 10:00 pm) – Pass only, retake as many times.
- Assignment 1** (due on Monday 09/13/21 by 10:00 pm) – Editor/Critic.
- Participation in online fora** – Introductions (due on Friday by 10:00 pm) | Oral exam discussion | “Learning to learn” organic chemistry discussion.
- Group activities.** Each group activity includes a class part and a take home part.
- Exams 1*/2*/3* – Graded and weighed 16% of the final grade for each exam (total 48%).
- Oral Exams* – Following exams 2 and 3 – Required, extra credit (0, 1+ or 2+ grade bumps).
- Homework* sets on WileyPlus – 20 Homework sets. Three lowest scores OR three no turn-ins will be automatically dropped (or any combination up to three). 17 homework sets will weigh 17% of the final grade (1% each). Each homework is due on WileyPlus following this schedule:
Homework assigned on Monday → due Thursday by 10:00 pm
Homework assigned on Wednesday → due Sunday by 10:00 pm
Homework assigned on Friday → due Tuesday by 10:00 pm (following week).
- Final Exam* – 35% – **MONDAY DECEMBER 20, 2021 (11:30 am – 1:30 pm).**

Important Dates

09/08/21	W	First day of classes
09/08/21 – 09/14/21	W-T	Open Add period
09/15/21 – 09/21/21	W-T	Late Add period – late add form needed after
09/30/21	TH	Drop on or after will receive a W
10/11/21	M	Class does not meet Columbus Day
10/13/21	W	Exam 1 (up to the end of Ch 4)
10/20/21	W	Last day to drop class
11/08/21	M	Exam 2 (up to the end of Ch 6)
11/25/21 – 11/28/21	TH-M	Thanksgiving recess
12/06/21	M	Exam 3 (up to the end of Ch 8)
12/13/21	M	Last day of Classes
12/14/21	T	Reading Day
12/20/21	M	Final Exam CHM 291
12/22/21	W	Finals make up day (Snow or Cancellation)
12/29/21	W	Grades are due in eCampus.

All Exams and the Final Exams will be given in Beaupre 215.

Topical Calendar

W	09/08/21	First day. Introductions, syllabus, course map, Q&A
F	09/10/21	Intro to Organic Chemistry, two postulates, bonds.
M	09/13/21	Atoms, octet rule, Lewis structures, VSEPR, isomers, formulas
W	09/15/21	Resonance, quantum mechanics, atomic and molecular orbitals, hybridization
F	09/17/21	Methane, ethane, ethene, ethyne
M	09/20/21	Hydrocarbons, polarity, functional groups, nomenclature, CIP rules
W	09/22/21	Functional groups, nomenclature, introduction to IR
F	09/24/21	IR spectroscopy, identification of organic compounds
M	09/27/21	Acids and bases, reactions, K_a and pK_a
W	09/29/21	Organic acids and bases, acidity and basicity in non-aqueous solvents
F	10/01/21	Acidity, basicity and polarity (<i>Ch 4 ends</i>)

M	10/04/21	Conformations of alkanes, nomenclature
W	10/06/21	Conformation of ethane, butane, cycloalkanes
F	10/08/21	Chair-boat conformation, ring strain and reactivity, cis-trans isomerism
W	10/13/21	Exam 1 (up to the end of Ch 4)
F	10/15/21	Synthesis and Reactions of Alkanes and Cycloalkanes
M	10/18/21	Stereochemistry, isomerism, chirality
W	10/20/21	<i>R</i> -/ <i>S</i> - system, relative vs. absolute stereochemistry, optical activity, Fischer proj.
F	10/22/21	Cyclic compounds stereochemistry, synthesis of chiral compounds, separations
M	10/25/21	Haloalkanes, nucleophilic substitution, leaving groups, electro- and nucleophiles
W	10/27/21	S_N2 , mechanisms, transition states, <i>K</i> and <i>k</i> , stereochemistry of S_N2 reactions
F	10/29/21	S_N1 mechanisms, intermediates, useful S_N1 and S_N2 transformations (<i>Ch 6 ends</i>)
M	11/01/21	Alkenes, alkynes, <i>E</i> -/ <i>Z</i> - isomerism, thermal stability
W	11/03/21	Syntheses of alkenes, the elimination mechanism(s), $E2$
F	11/05/21	$E1$, $E1CB$, alkynes, hydrogenations
M	11/08/21	Exam 2 (up to the end of Ch 6)
W	11/10/21	<i>Orals</i>
F	11/12/21	<i>Orals</i>
M	11/15/21	Hydrogenations, reductions, C-C bond formations
W	11/17/21	Electrophilic additions to double and triple bonds
F	11/19/21	Ionic additions, Markovnikov's regiochemistry, oxymercuration-demercuration
M	11/22/21	Addition of X_2 molecules, anti-Markovnikov's regiochemistry, hydroboration
W	11/24/21	Synthesis of alkynes, Oxidations / cleavage of alkenes and alkynes (<i>Ch 8 ends</i>)
M	11/29/21	What is a radical? Homolytic fission of bonds, hydrogen abstraction
W	12/01/21	Radical addition, halogenation of methane, <i>K</i> and <i>k</i> , higher alkanes
F	12/03/21	Allyl and benzyl radicals, radical polymerization, other radical reactions
M	12/06/21	Exam 3 (up to the end of Ch 8)
W	12/08/21	<i>Orals</i>
F	12/10/21	<i>Orals</i>
M	12/13/21	Special topics, Q&A, Grades and exams, last day to turn in graded material.
T	12/14/21	Reading Day
M	12/20/21	Final Exam (comprehensive), Beaupre 215, 11:30 am – 1:30 pm

Grading

Your final grade will be computed using the weighted average of:

- ① three exams (16% each),
- ② the final exam (35%) and
- ③ graded homework sets (17%).

Unjustifiably late homework or assignments will not be graded. Three late/missed OR three lowest homework sets will be dropped. Late/missed work in excess of 3 will be graded with a zero.

Grade adjustment.

- ① Additional items marked with ** above (Syllabus Quiz, Assignments, Class Activities, Online discussion) receive a (+) completed/satisfied or a (–) incomplete/not satisfied. +/- will be used to decide final grades in borderline cases.
- ② Oral exams will be given the following scores: 0 (participation/unsatisfactory), + (satisfactory), ++ (excellent). You get no grade bump if you get two 0s (but if you are borderline, you get the higher grade), you get 1+ grade bump if you get at least one + (so 0|+, +|+, or +|++), you get 2+ grade bumps (a letter bump!) if you get two ++.

Re-grading policy. You may ask to re-grade a homework or an intermediate exam. The entirety of the exam/homework you submit for re-grading will be re-graded.

You have 1 token to use toward retaking an intermediate exam. The material will be the same, but questions and problems will be different. The token can be used only before the next intermediate exam and before the end of the last full week of classes (12/12/21). The new grade will be used toward computing the final grade.

All written exams and corresponding orals focus on the material covered until the published dates in the topical calendar, exams 2 and 3 should be expected to have materials from previous exams as well. The final exam is comprehensive of all course materials. Below is the conversion table between percentage scores, letter grades and grade points.

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

Course Aims

This course is based on two basic truths:

- ① carbon atoms can and will form 4 bonds with other atoms, including other carbons,
- ② electrons move from where there are more to where there are less.

The rest are corollaries.

Carbon atoms (and other elements') can be used to form words (molecules). These words interact through grammar (electrons moving around) to make sentences (reactions).

Learning organic chemistry is like learning a new language. There is a new vocabulary (nomenclature) and there are different grammar rules.

In this course you will learn how to speak basic organic chemistry and by the end of this course you will be able to:

- 1) Identify organic molecules and use the line/angle drawing conventions to make representation of them in 2D and 3D
- 2) Assign names following IUPAC rules of organic compounds and draw organic compounds from their IUPAC or traditional names
- 3) Predict the physical properties (i.e., melting and boiling points, miscibility, acidity or basicity), of molecules containing different functional groups
- 4) Identify symmetry elements of a molecule and establish their relative and absolute stereochemistry
- 5) Assign vibration modes to a molecule or functional group and identify them on an IR spectrum
- 6) Distinguish between nucleophiles, electrophiles and leaving groups, organize them in scale of reactivity
- 7) Identify which organic substrates undergo nucleophilic substitution vs elimination, and justify the two limiting mechanisms of unimolecular and bimolecular processes
- 8) Identify different isomers of alkenes, assign their configuration
- 9) Write reasonable synthetic preparation of alkenes and alkynes and write reasonable mechanisms for their reactions
- 10) Describe the process of the radical halogenation of hydrocarbons.

In addition to the above (very) tangible learning objectives, you will practice yourselves in the art of thinking and speaking as a scientist (it takes a lifetime). We will do so by using self-guided inquiry activities and oral exams.

Yes, organic chemistry is hard. The only way to succeed is by studying it and practicing it every day!

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

- Note-taking – Please take notes, share them with your fellow chemists, 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! It's a new language and you cannot expect to learn it passively. Do your homework! Then do some more! You can find a wealth of practice sets online or by taking any organic chemistry textbooks from the library. Meet and discuss with your fellow chemists, review your problem sets and our classroom activities. The graded homework shall not be the only homework you do. **In fact, you should practice every weekday.**
- 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. 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/ 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 or through Brightspace.

Communication with the Instructor

In person during class or office hours.

Phone: (401) 874-2364.

Email: lorenzo@uri.edu, **must include CHM 291** in the object. Or use Brightspace.

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.

Exams are mandatory. Missing an exam 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).

Late assignments and homework will only be accepted and graded with a prior and verifiable justification.

Drops and Withdrawals

Missing attendance for both of the first two class meetings (without notifying me) will result in removal from the class roster.

You can drop this class until the end of the third week of classes (09/30/2021).

You can withdraw (W on transcript) until 10/20/2021.

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.

Electronics and Recording

You may not record audio or video of lectures, exams, or office hours without in-writing permission from all individuals present. You may choose to take your notes in writing or typing, but your use of electronic devices (laptop, iPad, tablets) should not be a distraction to your fellow chemists.

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, <https://web.uri.edu/disability/request-form/> email: dai@etal.uri.edu.

Resources

● Academic Enhancement Center (AEC) – offers free face-to-face and web-based services to undergraduate students seeking academic support. Peer tutoring is available for STEM-related courses by appointment online and in person. ● The Writing Center offers peer tutoring focused on supporting undergraduate writers at any stage of a writing assignment. ● The UCS160 course and academic skills consultations offer students strategies and activities aimed at improving their studying and test-taking skills. Complete details about each of these programs, up-to-date schedules, contact information and self-service study resources are all available on the AEC website: uri.edu/aec ● Wellness Resource Center (WRC) – provides a relaxing atmosphere and a safe, comfortable space for you to escape the stresses of life. The WRC is located on the lower level of the Anna Fascitelli Fitness and Wellness Center. ● *Well-being Coaching* offers one on one meetings with a certified Well-being Coach, who is trained to identify your strengths and support you with a goal or behavior change. Your coach will guide you holistically and support you through day-to-day struggles.

Reading Day (12/14/2021) falls on a Tuesday. There are no sanctioned classes. I am available for extended office hours upon appointment (individual or group), anytime between 9:30am and 5:30pm.

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.