

**University of Rhode Island**

**Department of Chemistry**

**CHM 226: Organic Chemistry Laboratory - Syllabus - Spring 2023**

**Updated:** 1/23/2023

**Course Coordinator:** Oleg Kazakov, Beupre 117G, oleg\_kazakov@uri.edu

**Oleg's Office Hours (if needed):** via Starfish or by appointment

### **Textbook/Materials**

A carbon copy laboratory notebook must be used to record all data.

Experimental procedures and supplemental information will be provided to you via Brightspace, but the textbook for the accompanying lecture course (CHM 227/228) may be useful for preparing laboratory reports.

**Safety goggles/glasses, lab coat, nitrile gloves.** RAM account and card to purchase items in the chemistry stockroom. A calculator that is not capable of accessing the internet. The calculator app on smartphones/tablets/etc may NOT be used. **MNova** and **ChemDraw** software (free downloads though URI Chemistry).

Access to the Internet. **Please, be aware that you are responsible for checking the Brightspace site, coming to the lab prepared to conduct the right experiment and checking your URI e-mail regularly.**

### **Course Goals**

CHM 226 is an introduction to conducting organic research. The ultimate goal of the course is to provide students with a basis by which they will be able to conduct a chemical reaction that they have never performed before. The "real world" of organic chemistry involves performing reactions and making compounds that are unknown. The virtually unlimited diversity of chemical structures originates from a bubblers of lab and analytical techniques. By conducting specific named reactions and targeted technique instruction, this course will introduce students to a variety of skills that they may implement in their professional development and careers. You are about to embark on one of the most empowering courses in the undergraduate curriculum after which you will have the tools required to synthesize almost any chemical compound, including those that are unknown to humanity (and maybe the rest of the Milky Way Galaxy). Also, this material is encountered in the MCAT.

## Course Grade

Evaluations are directly related to work performed in the lab, and attendance is required. There are no makeup labs. All graded work should be performed individually.

Student grades will be based on evaluations of each experiment (100 points each) and the lab final exam (200 points). The lowest grade amongst experiments will automatically be dropped, whereas the lab final exam grade will be undroppable. Course letter grades will be determined by this scale (%): >95 A; >90 A-; >87 B+; >84 B; >80 B-; >77 C+; >74 C; >70 C-; >60 D. **There is no curve in this course, and no extra credit will be offered.**

## Grading

Students will receive a grade for each experiment and exam (see the point values below) and criteria that will be evaluated for each experiment are given below. Requirements for graded submissions depend on a particular experiment and will be specified. Generally, the grade will be determined as described here:

### ***Experiment Evaluations (100 pts each)***

- *Lab notebook, data analysis, post-lab questions* (90 pts). *Lab notebook* copy pages and data are submitted in the pdf format, and entries are made according to the guidelines. *Data analysis* should be performed for relevant data (including spectra) with entries provided in table or list form, assigned and analyzed. Note, that not all experiments have data analysis.
- *Lab technique/citizenship* (10 pts). While points given to other sections of the evaluations will vary depending on the experiment, lab technique/citizenship will always be 10% of the points.

### ***Lab Final Exam Evaluation (200 pts)***

- *The overarching examination* will test your knowledge by answering questions and performing scientific tasks pertaining to the course content.

*Lab technique and citizenship* are important parts of safely conducting chemistry experiments in a shared space, and each experiment includes 10 points for technique/citizenship. Individuals and groups of students will receive a demerit for exhibiting poor technique and/or citizenship. Each infraction will be documented and will result in the loss of 5 points minimum from that experiment. Serious infractions (e.g. removing safety glasses or lab coat) will result in the loss of all 10 points of technique for an experiment, and repeated infractions will result in loss of additional points (beyond the allotted 10 points) and possible dismissal from the course. Non-attributable violations will result in

point deduction from the entire section (e.g. untidy waste/dispensing area, minus 5-10 points from everyone).

Other examples:

1. Students engage in unsafe practices including horseplay, no safety glasses, no lab coat, etc. (minus 10 points).
2. Students maintain an untidy work space (including the chemical weighing and dispensing area) and do not return the lab to its starting condition. (minus 5-10 points).
3. Students place outside-lab devices (e.g. cell phones) on the lab bench. (minus 5 points).
4. Students fail to follow the lab safety policies. (minus 5-10 points).
5. Students placing lab notebooks inside the fume hood while experiments are performed (minus 5 points).
6. Students using mobile phones during lab sessions with gloves (minus 5 points).
7. Being late to lab; important safety information is discussed at the beginning of the lab period. (<2 min late, minus 5 points; 2-10 min late, minus 10 points).

**No makeup labs are planned to be given.**

### **Regrading**

Students may request a regrade on any evaluation for up to 1 week from when the evaluations are made available for review. Requests for regrades must 1) be made in writing and 2) clearly state the issue/point being disputed. The whole assignment is subject to regrading. Any assignment performed in pencil will not be regraded.

### **Timely and Late Submissions**

A student has one week after the last day of a particular experiment to submit their lab report. The report is handed to the TA at the beginning of the lab meeting on the day when the report is due. A deduction 10 (ten) points per day will be applied to lab reports submitted past the due time.

### **Plagiarism**

Cheating or plagiarism on a graded assignment will result in a zero for that evaluation and referral to the Dean and possible failure of the course. Students are expected to follow the University policy of **ACADEMIC HONESTY** and all other University policies.

## **Cancellations**

In the event that classes are cancelled (e.g. snow day), an experiment may be deleted from the schedule. For grading purposes, do not count on being able to complete all laboratory experiments. The laboratory schedule is subject to change in the event of emergencies, cancellations, etc., and it is the responsibility of all students to be present for all scheduled lab sessions.

## **Absenteeism**

This is a laboratory course; there is no substitution for a missed lab. If a student must be absent for any reason, the missed experiment will be counted as their dropped grade. Further absences resulting in a missed experiment will result in a grade of zero for that experiment. Students that miss more than 2 experiments will be advised to drop the course. If a student misses one day of a multiple day experiment, they should not expect to be able to finish the experiment in the other day(s). Excused absences must be cleared by Dr. Oleg 2 weeks in advance, minimum.

Absences due to medical reasons and necessary adjustments are to be communicated as soon as possible to Dr. Kazakov and the TA leading the section.

*Students will not be admitted to the lab if they are 10 minutes late to lab;* important safety information is discussed at the beginning of the lab period. That experiment will receive a grade of zero.

## **Equipment**

Students are responsible for the equipment in the drawer assigned to them on the first day of class. Any broken equipment must be replaced at the student's expense, this includes any shared/departmental equipment. Any student who has an unpaid bill with the chemistry stockroom will have a hold placed on their account which will prevent the student from registering in the future. Drawers must be checked out at the end of the semester or if a student chooses to drop the course. Improper or missed checkout may result in a charges from the stockroom and a hold on the student's account.

## **Anti-Bias Statement**

We respect the rights and dignity of each individual and group. We reject prejudice and intolerance, and we work to understand differences. We believe that equity and inclusion are critical components for campus community members to thrive. 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.

## Important Spring 2023 Semester Dates

- January 23: First day of classes
- January 23-29: Open add period in e-Campus
- Jan. 30 - Feb. 5: Late add period in e-Campus, permission numbers required for enrollment
- February 5: Last day to add courses via e-Campus, late add form needed after this point. Last day to add Pass/Fail option.
- February 14: Courses dropped on or after this date will receive a *W*
- February 20: Classes **do not** meet, offices are open - **Presidents Day** (*make up snow day if needed*)
- March 6: Last day for students to drop courses in e-Campus (late drop form needed after this date)
- March 8: Mid-semester
- March 11-19: Spring break – classes do not meet, offices are open
- March 21: First Year student midterm grades and midterm surveys due in e-Campus
- May 1: Last day of classes
- May 2 - 3: Reading days for exams. (*May 2 is class make-up day if needed and approved by Provost*)
- May 4 - 5, 8 - 10: Final exam period
- May 16: Final grades due in e-campus by 12:00 Noon

## COVID/Viral Illness Precautions Statement

The University is committed to delivering its educational mission while protecting the health and safety of our community. As members of the URI community, students are required to comply with standards of conduct and take precautions to keep themselves and others safe.

- Masks are required in all classrooms, laboratories, and spaces where direct academic instruction and research are taking place, unless the instructor or staff member expressly waives that requirement.
- We strongly recommend surgical or higher grade masks where face coverings are required. Masks should be properly worn, well-fitting, and high quality.
- Students who do not comply with the classroom/lab masking requirement will be asked to leave class and will be reported through the Student Conduct process.
- Students who are experiencing symptoms of viral illness should NOT go to class/work. Those who test positive for COVID-19 should follow the isolation guidelines from the Rhode Island Department of Health and CDC.
- If you are unable to attend class, please notify me prior to the start of class by e-mail.

## Keeping a Laboratory Notebook

Students must acquire a carbon copy laboratory notebook and maintain it according to the rules below. Students will be required to hand in a copy of their lab book entries for each experiment; hand in all pages. These copies should be affixed to the lab report. In short, a lab notebook should contain enough information that a person 'skilled in the art' could reproduce your experiments. Students need to arrive at the lab ready to listen to safety/lab discussion and/or perform experimentation. If a student arrives with an empty lab notebook (i.e. is not ready to start the experiment) they may be asked to leave the lab.

An example lab page will be on the Brightspace course site.

Before coming to lab:

1. Name the experiment.
2. Write down a purpose or hypothesis statement. It can be difficult to remember why you did something 6 months after you do it.
3. Place a chemical drawing of the reaction being performed at the beginning of the entry, if applicable.
4. For each reagent used, clearly give 1) the desired amount; 2) the amount used in grams/mL/etc; 3) (m)mol; and 4) (m)M; 5) formula weight and density (if applicable). These data will help as you go to write up experiments and help trace errors later.
5. Write down a **condensed** procedure or flow chart for the lab. There is no point in copying a procedure (nearly) word-to-word, so save time and give yourself a shortened version of the actions you need to perform; you can always refer back to the experimental.

During/after each experiment and in general:

1. Give a short synopsis of the experimental procedure and reference any literature that you are following (this can often be done before the lab as well). Update your notebook with observations.
2. Errors should be crossed out with a single line and the new entry provided above/beside
3. Each experiment should receive its own page (or more than one page).
4. All spectra/data should be numbered (physically on the paper) and saved to the spectrometer/instrument so that they reference a specific notebook page. The sample should be numbered in the same format. Use the format: 'your initials'-'notebook number'-'page number' (ex. FL-1-15). The type of data collected and what was analyzed should be clearly labeled in the notebook.

5. Multiple analyses should be given letters. Example: if FL-1-15 is the crude material, the purified material could be called FL-1-15b. Consider giving complicated purifications their own notebook page/experiment.
6. Cross reference your pages, if applicable. For experiments that use more than one page, clearly label at the bottom of the first page where the second page starts (it may not always be on the next page).
7. Date your entries.
8. Calculate yield and give brief conclusions that also demonstrate your advanced understanding of the experiment. Think about it as giving yourself pointers for 'next time' you do that reaction. For instance, "The yield was low because the [...] was [...]. Next time [...] should be [...]."

### Final Notes on How to Achieve Great Success in CHM 226

CHM 226 is a hands-on course that emphasizes lab work. However, this course will require you to recruit your background Chemistry knowledge to complete the course. The background knowledge is not re-taught in the lab course, so it is a very good idea to identify as soon as possible any pertinent knowledge items that are required in the course but are forgotten/unknown (hopefully not so much)/need reviewing by **you**.

It is quite important for you to stay on top of your work. "If you are not ahead, you are..."

If you find that you are struggling (say, you need to review ), **seek help right away**. Reach out to your TA and/or Oleg, attend TAs' and/or Oleg's office hours, and make appointments with your TA and/or Oleg. The important thing is that you get help **early**!

If you have any questions, do not hesitate to ask!