



## General Information

<i>Instructor:</i>	Dr. Arianna Demmerly	<i>Office Location:</i>	Reichardt 192
<i>Email:</i>	ademmerly@alaska.edu	<i>Office Hours:</i>	TBA, by Zoom.
<i>**Course Location:</i>	REIC 241	<i>*Course Type:</i>	Laboratory: In person

## Prerequisites

Organic Chem II + Lab (Chem F321 + Chem 321L, or similar)

## Co-requisites

The laboratory accompanies the lecture and must be taken concurrently as part of the course. The laboratory requires that the student attend each lab.

## In-depth Course description

Organic chemistry, simply defined, is the chemistry of carbon-containing molecules, but it is much more than that. In this course, we will explore the fundamental properties of organic molecules including their bonding, functionality, physical properties, reactions, synthesis and analysis. In this second semester, we will continue with our study of the reactions and synthesis of different classes of compounds, including conjugated systems, aromatic compounds, ketones/aldehydes, carboxylic and derivatives, and amines. Biomolecules include amino acids, peptides, carbohydrates, and lipids. The topic of stereochemistry, the spatial arrangement of atoms, is integrated throughout the course since it plays a central role in the biochemistry of life.

This course also has a laboratory component. In the laboratory, you build and study organic molecules using modern computational methods, and then synthesize, isolate, purify and characterize organic compounds. You will submit products for analysis and interpretation using modern instrumentation in our department. This course will serve as a foundational experience in organic chemistry, as you pursue your field of study, whether it be chemistry, biochemistry, biology, medicine, pharmacy, or some other field.

## Technology requirements

A University of **Alaska email address** is required for all communication in the class. This also provides access to the Blackboard system for individual scores and grades. Students must have regular **access to a computer and the Internet to access online materials in Blackboard**. Students will be expected to download course material as well as potentially upload assignments. The lectures for this laboratory section course will be posted in Blackboard under the relevant Lab in the form of recorded videos.



## Course Goals

1. In the laboratory, learn the following:
  - a. Common safety procedures
  - b. Reaction methods
  - c. Isolation and Purification Procedures
  - d. Spectroscopic and chromatographic analyses to verify structure
  - e. Molecular modeling methods to understand structure and reactivity

## Instructional Methods

**Laboratory.** The laboratory will be entirely conducted at UAF laboratory spaces.

## Laboratory Description

The laboratory is designed to illustrate modern techniques of isolation, purification, analysis and structure determination of covalent, principally organic, compounds. Lab portion will include an introduction to synthetic techniques and spectroscopy.

## Covid-19:

In order to keep everyone safe and minimize spreading infection, we have some updated rules for the lab. Please note—these may change and update during the semester and shift to keep everyone as safe as possible.

**If the university updates mask policies, then mask policies will be updated in the labs to reflect university policy.**

1. You will wash your hands when you enter the lab, and again when you leave.
2. You will wash all of your glassware and equipment after lab
3. You will disinfect the surfaces you've touched in lab before you leave
4. You must follow any extra instructions from your TA, lab instructors, or posted on Blackboard/Canvas.

## Laboratory Student Learning Outcomes

1. Know the hazards associated with common chemicals, especially those encountered in the experiments.
2. Know how to safely assemble reaction systems using glassware commonly employed in the organic laboratory. These methods include reflux, heating and cooling of reactions, and addition of reagents.
3. Know how to isolate and purify organic products using methods such as extraction, filtration, crystallization, distillation, solvent removal, and thin layer chromatography.
4. Learn the importance of stoichiometry to a chemical reaction. Learn how to assess the efficiency of a chemical reaction (percent yield and atom economy).
5. Learn the practical aspects of spectroscopic analyses of organic compounds. 6. Learn how to build and optimize simple molecules using WebMO/Gaussian and how to measure properties of those molecules.

## Show up on Time!

If you arrive late to your laboratory section, you may not be allowed to participate in that laboratory session. 15 minutes is the maximum allowed tardiness for labs. Why is this?

1. Your TA will review the techniques required for the experiment and will cover safety information and waste disposal directions at the beginning of the lab period. If you miss this pre-lab lecture, you will be a danger to yourself and everyone else in the room.

## Grading

There are 9 graded experiments, with one having a two part component. The laboratory portion of your grade will be the average of your best 8 experiments. The write-up is due the following week at the beginning of the lab period. You must complete at least 80% of the graded experiments in order to pass the course, no matter how well you are doing in the lecture portion of the class. The general grading scheme follows:

- Lab reports are due the following week at the beginning of the lab, unless otherwise noted.
  - Labs 1 session late will be worth 75% of the earned grade.
  - Labs 2 sessions late will be worth 50% of the earned grade.
  - Labs 3 or more sessions late will be worth 1 point total.
- You will earn 0 points if your lab does not have TA initials on the Pre-Lab and the Data & Observations/Response sheets.
- At the end of the semester, your lab score will be based upon the best 8 labs.
- See your course syllabus to determine how your lab score affects your total course grade.

Materials to be graded will be turned in to your TA during your designated lab time. You will be able to see your TA's grading comments on and scores on returned reports. Your lab scores will be posted on Blackboard and updated frequently throughout the semester.

### Tentative Due Dates for Lab Reports

Experiment	Due Date During Lab
Exp 1: NMR of Unknowns (100 pts)	Feb 6
Exp 2 Mass Spectrometry and Fragmentations (100 pts)	Feb 20
Exp 3: Isolation of Natural Products (100 pts)	Feb 27
Exp 4: Diels-Alder Reaction (100 pts)	Mar 6
Exp 5a: Iodination of Vanillin (100 pts) Exp 5b: WebMO (100 pts)	Mar 20
Exp 6: Suzuki Coupling (100 pts)	Mar 27
Exp 7: Synthesis of Soap; Saponification (100 pts)	Apr 3
Exp 8: Synthesis of Aspirin (100 pts)	Apr 10

### Lab Scores

Category	Points
Lab Reports	800 pts
Lab Notebook	200 pts
<b>Total Points</b>	<b>1000 pts*</b>

\*This score percentage wise will be forwarded to the instructor for the Organic chemistry course.

## Lab Notebooks:

Preparing and maintaining a lab notebook is a vital part of your lab education in just chemistry, but all sciences. You will maintain a neat and orderly notebook that is legible. This will be graded at the end of the semester and will account for 20% of your total lab grade. This notebook will be checked off at the beginning of each lab by your TA's to make sure the relevant safety and physical chemical information is present. Including the procedure.

The lab notebook is what you will conduct your experiment with, so if you did not write it down in the notebook, then it will be more difficult to conduct your experiment. The original procedures will not be allowed in the lab. The general rule of thumb of lab notebooks: If you did not write it down, then it did not happen.

## Cell Phone Policy

Cell phones and other electronics must be put away during lab work to minimize distractions and the possibility of lab accidents or contamination of your devices. On occasion, it may be appropriate to use your cell phone or other electronics as part of your lab exercise. Your TA will inform you if this is the case. If you wish to use a device to document part of a lab exercise, you must obtain permission before getting the device out. You are required to put the device back away after you are done using it for the lab. You are also required to follow any and all directions pertaining to the safe use of the device during the lab exercise. Headphones are prohibited at all times in this lab for safety reasons.

## Missed Labs

ABSOLUTELY NO MAKE-UP LABS WILL BE OFFERED. We have 9 (8 with one two part) scheduled lab experiments, and your lab grade will be averaged from your best 8 lab scores. Therefore, you may completely drop (or not attend) one lab—no questions asked. If more than one lab is missed due to circumstances beyond your control, an incomplete grade will be considered. Remember, you must compete and turn in a minimum of 7 experiments to pass the course. If you will miss lab sessions due to University-sponsored activities, participation in the military or personal emergencies, you must discuss this ahead of time with your instructor or with the laboratory coordinator.

## Safety

Safety is a major concern in an environment containing chemicals, flammables, hot surfaces, spills, glass, and electrical equipment—namely, a chemistry lab! Please read and obey all lab safety rules. Report any accident, however minor, to your instructor at once. Also inform your instructor of any unsafe condition you may spot. Your instructor is also trained in the use of our safety and first aid equipment—listen carefully to the safety presentation your instructor will give during the first week.



## Health Concerns

The experiments in Chem 325 are continually evaluated to make them as safe while still providing some amount of risk. The experiments are chosen to be done on the microscale, using small quantities of solvents in order to minimize risk. Your prelab entries into your lab notebook will include safety information, as well as physical properties. Knowing the safety information of the chemicals you will be handling is the first step towards maintaining a safe lab environment.

Certain experiments may pose a small risk to students who have chemical sensitivities, allergies, asthma, or are pregnant. If you fall into one of these groups, you will be encouraged to talk to the safety coordinator and/or discuss this with your physician. If you feel that a chemistry lab, or the use of any particular substance, poses an unacceptable risk to your health, see your instructor or TA immediately. We will work with you and your doctor to determine the appropriate course of action.

Arianna Demmery, Laboratory Coordinator

[ademmerly@alaska.edu](mailto:ademmerly@alaska.edu)

907-474-6748

Office: REIC 192 (next door to the Chemistry office)

### Tentative Lab Schedule

Experiment	Week	Concepts/Techniques
No Lab	Jan 16	No Lab
Exp 1: NMR/IR of Unknowns	Jan 30	$^{13}\text{C}$ , $^1\text{H}$ NMR, IR Structure Determination
Exp 2: Mass Spectrometry	Feb 13	Structure Determination, Fragmentation of Functional Groups
Exp 3: Isolation of Natural Product from Spices	Feb 20	Mass Spectrometry; Solvent Extraction
Exp 4: Diels-Alder Reaction	Feb 27	Reflux, NMR Coupling Constants, Molecular Modeling
Exp 5a: Iodination of Vanillin	Mar 6	Electrophilic Aromatic Substitution, Modeling, Redox
Exp 5b: Iodination of Vanillin	Mar 20	Continued WebMO
Exp 6: Suzuki Coupling	Mar 27	Catalysis, Reflux, NMR
Exp 7: Synthesis of Soap; Saponification	Apr 3	Lipids, ester hydrolysis, micelles, NMR
Exp 8: Synthesis of Aspirin	Apr 10	28 Nucleophilic acyl substitution, Reflux, Esterification, NMR

## Course Policies

### Plagiarism and Academic Integrity

Academic dishonesty applies to examinations, assignments, and laboratory reports. Examples include, but are not limited to:

- Presenting as their own the ideas or works of others without proper citation of sources;
- Utilizing devices not authorized by the faculty member;
- Using sources (including but not limited to text, images, computer code, and audio/video files) not authorized by the faculty member;
- Providing assistance without the faculty member's permission to another student, or receiving assistance not authorized by the faculty member from anyone (with or without their knowledge);
- Submitting work done for academic credit in previous classes, without the knowledge and advance permission of the current faculty member;
- Acting as a substitute or utilizing a substitute;
- Deceiving faculty members or other representatives of the university to affect a grade or to gain admission to a program or course;
- fabricating or misrepresenting data;
- Possessing, buying, selling, obtaining, or using a copy of any material intended to be used as an instrument of assessment in advance of its administration;
- Altering grade records of their own or another student's work;
- Offering a monetary payment or other remuneration in exchange for a grade; or
- Violating the ethical guidelines or professional standards of a given program.

For more, see [Students Rights and Responsibilities](#).

### Extended Absence Policy

Extended absences are defined as missed classes or course work by students beyond what is permissible by the instructor's written course policies. Students may need to miss class and/or course work for a variety of reasons, including, but not limited to:

- Official UAF activities such as participation in athletic events, conferences, etc.
- Bereavement
- Personal illness or injury
- Serious illness of a friend, family member or loved one
- Military obligations
- Jury service
- Other emergency or obligatory situations

For more information, go to the student handbook or the Center for Students Rights and Responsibilities.

### UAF Incomplete Grade Policy:

Your instructor follows the University of Alaska Fairbanks Incomplete Grade Policy:

“The letter "I" (Incomplete) is a temporary grade used to indicate that the student has satisfactorily completed (C- or better) the majority of work in a course but for personal reasons beyond the student's control, such as sickness, has not been able to complete the course during the regular semester. Negligence or indifference are not acceptable reasons for an "I" grade.”

For more information, see [the UAF regulations regarding grades](#).

### Student Protections Statement

I will work with the Office of Disability Services to provide reasonable accommodation to students with disabilities. The Office of Disability Services implements the Americans with Disabilities Act (ADA), and ensures that UAF students have equal access to the campus and course materials. I will work with the Office of Disabilities Services (208 Whitaker, 907-474-5655) to provide reasonable accommodation to students with disabilities [uaf.edu/disability/](http://uaf.edu/disability/)

UAF embraces and grows a culture of respect, diversity, inclusion, and caring. Students at this university are protected against sexual harassment and discrimination (Title IX).

Faculty members are designated as responsible employees, which means they are required to report sexual misconduct. Graduate teaching assistants do not share the same reporting obligations. For more information on your rights as a student and the resources available to you to resolve problems, please go to the following site: <https://www.uaf.edu/handbook/>

### Title IX

University of Alaska Board of Regents have clearly stated in BOR Policy that discrimination, harassment and violence will not be tolerated on any campus of the University of Alaska. If you believe you are experiencing discrimination or any form of harassment including sexual harassment/misconduct/assault, you are

encouraged to report that behavior. If you report to a faculty member or any university employee, they must notify the UAF Title IX Coordinator about the basic facts of the incident.

Your choices for reporting include:

- 1) You may access confidential counseling by contacting the UAF Health & Counseling Center at 907-474-7043;
- 2) You may access support and file a Title IX report by contacting the UAF Title IX Coordinator at 907-474-6600;
- 3) You may file a criminal complaint by contacting the University Police Department at 907-474-



7721. <https://uaf.edu/oeo/civil-rights/aa-eo/>

Any UAF employee or volunteer who reasonably suspects or observes minor abuse or maltreatment is required to report the incident. Reporting procedures are available on the UAF Protection of Minors. Violation of this policy by employees shall be reported as well.

### Equal Opportunity Employer

UA is an AA/EO employer and educational institution and prohibits illegal discrimination against any individual: [alaska.edu/nondiscrimination](http://alaska.edu/nondiscrimination).

### Library

Contact the Elmer E. Rasmuson Library at UAF reference desk for help with research. [library.uaf.edu](http://library.uaf.edu) or 907-474-7481

### Student Support Services

The Student Support Services (SSS) program, located in 514 Gruening Building, provides opportunities for academic development, assists students with college requirements, and serves to motivate students towards successful completion of their degree program.

Students have access to services if they meet any of the three eligibility requirements: a) limited income, b) documented disability, or c) first generation college student. Students receive intensive advising, one-one-one tutoring, technology check-outs, free printing and copying, computer lab space, and many other services. Additional information is at <https://www.uaf.edu/sss>, or contact them directly at (907) 474-6844.

### Rural Student Services

Responding to student needs by providing quality services to Native and rural students who expend positive effort in the pursuit of higher education and its opportunities. Please see: <https://uaf.edu/ruralss/>. Additional student support services can be found here: <https://www.uaf.edu/ruralss/tutoring-services/>.

### UAF Help Desk

Go to <https://alaska.edu/oit/> to see about current network outages and news. Reach the Help Desk at: [helpdesk@alaska.edu](mailto:helpdesk@alaska.edu) or 907-450-8300 (in the Fairbanks area) or 1-800-478-8226 (outside of Fairbanks).

### Effective Communication Resources

- UAF Speaking Center (907-474-5470, [speak@uaf.edu](mailto:speak@uaf.edu), Gruening 507)
- Writing Center (907-474-5314, [uaf-writingcenter@alaska.edu](mailto:uaf-writingcenter@alaska.edu), Gruening 8th floor) ● UAF Math Services, [uafmathstatlab@gmail.com](mailto:uafmathstatlab@gmail.com), Chapman 305 (for math fee paying students only)
- Debbie Moses Learning Center at CTC (907-455-2860, 604 Barnette St, Room 120).
- Developmental Math Lab, Gruening Building, Rm 406



For more information and resources, please see the academic advising resource list:

[https://www.uaf.edu/advising/lr/SKM\\_364e19011717281.pdf](https://www.uaf.edu/advising/lr/SKM_364e19011717281.pdf)

### Veteran and Military Support Services

UAF is committed to all veterans and military students—active duty, reserve, guard, separated and retired—as well as their dependents who are exploring UAF's academic opportunities. Staff members in Financial Aid, Admissions, Career Services, Veterans' Services and the Veterans' Resource Center are here to help you with any challenges you encounter while working while in or transitioning from a military to an academic environment. Please contact the Veterans Resources Center, 907-474-2475, <https://uaf.edu/veterans/> in room 111 in the Eielson Building.

### Emergency Notification Plan

Students will receive emergency notifications via phone or email. Please check your uonline account to confirm your emergency notification settings. For more information, please refer to the student handbook. In cases where you do not have access to your devices, as your instructor, I will take responsibility to relay any emergency notifications.

### Student protections statement

UAF embraces and grows a culture of respect, diversity, inclusion, and caring. Students at this university are protected against sexual harassment and discrimination (Title IX). Faculty members are designated as responsible employees which means they are required to report sexual misconduct. Graduate teaching assistants do not share the same reporting obligations. For more information on your rights

as a student and the resources available to you to resolve problems, please go to the following site:

<https://catalog.uaf.edu/academicsregulations/students-rights-responsibilities/>.