



## Organic Chemistry I Laboratory, CHEM F321

1 Credit

Fall 2022

### General Information

<i>Instructor:</i>	Dr. Thomas Green	<i>Office Location:</i>	Reichardt 174
<i>Email:</i>	<a href="mailto:tkgreen@alaska.edu">tkgreen@alaska.edu</a>	<i>Office Hours:</i>	TBA, by Zoom.
<i>Telephone:</i>	(907) 474-1559 (office) (907) 799-9403 (cell)	<i>*Course Type:</i>	In-person laboratory
<i>**Course Location:</i>	Reichardt 241	<i>Meeting Time:</i>	Wed 2:15-5:15pm Wed 6:00-9:00pm Thur 11:30am-2:30pm
<i>Teaching Assistants</i>	Leilani Megliola Lahra Weber	<i>Office Location</i>	TBA
		<i>Office Hours</i>	TBA

### Prerequisites

General Chem II, CHEM F106X or similar.

### Co-requisites

An online lecture accompanies the laboratory and must be taken concurrently as part of the course.

In the laboratory, you first build and study organic molecules using modern computational methods, and then synthesize, isolate, purify, and characterize organic compounds. You will also learn how to interpret spectra to identify functional groups and specific organic structures. You will submit products for analysis and interpretation using modern instrumentation in our department. My vision is that 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.

### Course Readings/Materials

The following materials are *required* for the course and can be purchased.

1. Lab Textbook: Making the Connections<sup>3</sup>; A How-to-Guide for Organic Chemistry Lab Techniques, 3<sup>rd</sup> edition, Anne B. Padias, 2015, Hayden McNeil. Available from <https://hmpublishing.redshelf.com/app/ecom/book/156287/making-the-connections-3rd-edition-156287-9780738079752-anne-b-padias> EISBN13: 9780738079752 ~\$26



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2. Lab notebook for recording experimental data results, and conclusions. The lab notebook will be supplied by the department. Student Lab Notebook, 2012 Book Factory, Lab-050-7GSS, 50 pages. No cost.

A University of Alaska email address is required for all communication in the class. This also provides access to the Canvas system for individual scores and grades.

### Technology requirements

A University of **Alaska email address** is required for all communication in the class. This also provides access to the Canvas system for individual scores and grades.

Students must have regular **access to a computer and the Internet to access online materials in Canvas**. Students will be expected to download course material. Laboratory materials such as procedures, report forms and instructional videos lectures will be posted in Canvas in the form of recorded videos.

### Course Goals

In the laboratory, learn the following:

1. Common safety procedures.
2. Reaction methods
3. Isolation Procedures
4. Purification techniques
5. Spectroscopic and chromatographic analyses
6. Introduction to computational methods in chemistry.

### 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.



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### Explanation of Student Effort

Students are expected to spend 2-3 hours per credit hour outside of class to be successful. Thus, you should expect to spend 8-12 hours outside of class studying for this class. Although this is typical, you may spend more or less than this, depending on your previous experience studying chemistry.

### Instructional Methods

1. The instructor or teaching assistant will provide a brief introduction on the practical aspects of organic chemistry, using a combination of Power Point slides and Chalkboard. The Lab Schedule will be available on Blackboard and at the end of this syllabus.
2. Laboratory sessions will consist of conducting reactions of organic compounds and their isolation, purification, and characterization.
3. Each experiment will require a "Lab Report" which will consist of Pre-lab and Post-lab components. The Pre-lab portion must be completed prior to coming to lab. If it is not completed, you will not be allowed to work in the lab for that day's experiment. Your TA will need to verify with her/his initials that you have completed the pre-lab questions. Students are also required to keep a laboratory notebook. The lab notebook will be collected at the midterm, evaluated but not graded, and returned with suggestions for improvement. The lab notebook will be graded at the end of the semester.
4. A lab textbook *Making the Connections*<sup>3</sup> by Anne Padias which describes techniques, glassware, lab notebooks, spectroscopic techniques, etc. Readings will be assigned to the student for each experiment.

Experiment	Week of	Concepts/Techniques	Wade Chapter	Padias Text
NO LAB	Aug 29	No Lab		
Exp 1: Safety; Lab Notebook; Calculation of Solvent Properties	Sep 5	Lab Safety, Computational Chemistry, Dipole Moment, Molecular Geometry	2	1-4, 5-13 37-43, 117
NO LAB but watch Videos on IR Spectroscopy on Canvas	Sep 12	IR Spectroscopy Introduction	12	
Exp 2: IR Spectroscopy	Sep 19	IR of Functional Groups	12	66-76
Exp 3: Alkanes/Cycloalkanes	Sept 26	Computational Chemistry: Conformational Analysis	3	117
NO LAB but watch Videos on NMR Spectroscopy on Canvas	Oct 3	NMR Spectroscopy Introduction	13	
Exp 4: NMR Spectroscopy of Unknowns	Oct 10	NMR processing; interpretation of NMR spectra	13	77-104
Exp 5: Thin Layer Chromatography	Oct 17	TLC: H-Bonding, mobile phases, functional groups, intermolecular forces	--	17-36 167-173
Exp 6: Crystallization of Benzoic acid.	Oct 24	Melting point, recrystallization,	--	121-129 49-52
Exp 7: Triphenylmethanol and SN1 reaction	Oct 31	Acid Catalysis, SN1 Reaction, melting point, TLC, Recrystallization	6	139-142



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Exp 8: Dehydration of an Alcohol	Nov 7	Distillation, drying of solvents mechanism, alkene stability	7	143-159 139-142
Exp 9: Reduction of Camphor	Nov 14	Hydride reduction, stereoisomers, NMR. WebMO	10, 13	77-104
Make-up Experiments	Nov 21	--	--	

### Due Dates for Lab Reports and Homework.

All lab reports will be due exactly one week after the completion of the experiment, at 11:59 pm.

Experiment	Week of
Exp 1: Safety; Lab Notebook; Calculation of Solvent Properties	Sept 12
Exp 2: IR Spectroscopy	Sept 26
Exp 3: Alkanes/Cycloalkanes	Oct 3
Exp 4: NMR spectroscopy of Unknowns	Oct 17
Exp 5: Thin Layer Chromatography	Oct 24
Exp 6: Crystallization of Benzoic Acid	Oct 31
Exp 7: Triphenylmethanol and SN1 reaction.	Nov 7
Exp 8: Dehydration of an Alcohol	Nov 14
Exp 9: Reduction of Camphor	Nov 21



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### Evaluation

Grades will be posted to the Canvas Course Site. Each lab (9) is worth 20 pts for 180 pts. The laboratory notebook is worth 20 for total of 200 pts. The score will be incorporated into the lecture grade. See lecture syllabus.

### Course Policies

#### Expectations on Progress in Coursework.

Students are expected to complete all laboratory experiments in timely manner. If these are not completed on time, the students are expected to provide a legitimate excuse or explanation to the Teaching Assistant in writing, preferably prior the anticipated missed deadline, so that appropriate rearrangements can be made to make up the missed assignment.

### 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](#).



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### 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 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/>



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### 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.



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### 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).

### eCampus Student Services

UAF eCampus Student Services helps online students with registration and course schedules, provides information about lessons and student records, assists with the examination process, and answers general questions. Their Academic Advisor can help students communicate with instructors, locate helpful resources, and maximize their learning experience. Contact the UAF eCampus Student Services staff at 907-479-3444 (toll free 1-800-277-8060) or contact staff directly – for directory listing see: <https://ecampus.uaf.edu/contact>

### 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.



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### Emergency Notification Plan

Students will receive emergency notifications via phone or email. Please check your uaonline 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.

### COVID-19

Students should keep up-to-date on the university's policies, practices, and mandates related to COVID-19 by regularly checking this website:

<https://sites.google.com/alaska.edu/coronavirus/uaf/uaf-students?authuser=0>

Further, students are expected to adhere to the university's policies, practices, and mandates and are subject to disciplinary actions if they do not comply.

### 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/>.