Organic Chemistry I, CHEM F321

4 Credits

Fall 2022

General Information

Instructor:	Dr. Thomas Green	*Office Location:*	Reichardt 174
Email:	tkgreen@alaska.edu	*Office Hours:*	TBA, by Zoom.
Telephone:	(907) 474-1559 (office) (907) 799-9403 (cell)	**Course Type:*	Lecture: Online asynchronous Laboratory: Online
***Course Location:*	Online Lecture Online Laboratory	*Meeting Time:*	

Prerequisites

General Chem II, CHEM F106X or similar.

Co-requisites

An online laboratory accompanies the lecture and must be taken concurrently as part of the course. The laboratory requires that the student be able to conduct experiments at home or other appropriate safe location using a laboratory kit supplied by the department.

Course description

A systematic study of the more important functional groups of carbon compounds, including their mechanisms of reaction, methods of synthesis, and physical and spectroscopic properties. Lab portion will include an introduction to synthetic techniques and spectroscopy.

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 first semester, we will start with a survey of the basic functional groups that we will encounter throughout the two-semester sequence of organic chemistry, then move into a detailed discussion of the reactions and synthesis of hydrocarbons, alkyl halides, alcohols, and ethers. 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 first 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. 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.

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Course Readings/Materials

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

1. Organic Chemistry, 9th edition, Leroy G. Wade and Jan William Simek, Pearson, 2017. The most economical option is the eText + Mastering instant access. https://www.pearson.com/store/p/organic_chemistry/P100001143844/9780136781776 18-weeks (first semester only) is $75. Two-semesters (24 months) is $125. eText and Mastering: ISBN-13: 9780136781776

2. Mastering Chemistry, digital platform from Pearson for online Homework. See link above.

3. Lab Textbook: Making the Connections[3]; A How-to-Guide for Organic Chemistry Lab Techniques, 3rd 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**

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

5. Laboratory kit with chemicals and equipment for conducting online experiments. The kit will need to be returned.

6. BACON Tutorials. Go to https://learnbacon.com/ and sign up. The course PIN is **CR@WFZ** . The cost is $6.

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 as well as upload assignments. The lectures for this course will be posted in Canvas in the form of recorded videos.

Mastering Homework problems will be assigned using questions from the textbook in coordination with the Mastering digital platform. Mastering will be accessed through Canvas. All students need to purchase the access code and register through Canvas.

The videos will be short, typically no more than 10-15 min, with identified topics. You will be prompted with questions, typically multiple choice or short answer, as you move through video. The video content will correlate with the order of chapters in the textbook, covering Chapters 1-14. Students are expected to watch all videos that are posted.

Course Goals

1. Be able to interpret, explain, and predict the physical and chemical properties of organic molecules based on their molecular structures, functional groups, and reaction conditions.

2. Be able to identify and illustrate mechanisms (step-by-step pathways) associated with the reactions of organic molecules.

3. Be able to identify, classify and illustrate stereochemical (spatial) relationships of organic molecules.

4. 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 modelling methods to understand structure and reactivity

Student Learning Outcomes

Specific Learning Outcomes are defined for each chapter in the textbook. Please refer to the Blackboard course under Course Content for listing of these Learning Outcomes.

General Learning Outcomes for the Course are:

- Demonstrate a knowledge of organic chemistry, molecular structure, orbital theory, bonding patterns, reaction chemistry, mechanistic interpretation and nomenclature.
- Demonstrate an understanding of modern spectroscopic principles and their application to organic molecules.
- Demonstrate competency of modern laboratory techniques, including reaction, isolation, purification, and analyses of organic molecules.

- Demonstrate how organic chemistry is relevant to other scientific disciplines such as biochemistry and molecular biology.

Instructional Methods

Lectures. All lectures will be delivered asynchronously by Canvas. Good internet connectivity is required.

Homework will be delivered using an online delivery program called Mastering, which accompanies the textbook. **All students need to purchase the access code and register through Canvas.**

Exams. All exams will be delivered via **Gradescope**. You can access Gradescope within Canvas. If you need an entry code, it is **E7JZ88.** The student is responsible for all information from the assigned text, lecture, and homework. Any of these sources will be used to construct exam questions. Three exams and a cumulative final exam will be given as indicated in the course schedule. All students are required to take the final exam in order to pass the course. No exam scores will be dropped. Students need to be able to scan their completed exam and then submit via Gradescope.

Laboratory. The laboratory will be conducted at home by the student. A kit will be mailed from the university containing chemicals and lab equipment. **You will need to complete a shipping address form available on Canvas**, The student will be required to return the kit using enclosed FedEx prepaid return labels. Do not return the chemicals Instructions on Canvas describe proper disposal of excess chemicals. **Failure to return the kit will result in a hold on the student account in the amount of $600. You are required to sign a Lab Equipment Financial Responsibility form, available on Canvas, prior to the shipping of the equipment**

Lab procedures, report forms and introductory videos will be posted on Canvas. Students will complete the lab experiment and then submit the lab report using Gradescope. Students will need a means of scanning their lab report. The lab constitutes 25% of the grade for the course.

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.

Mastering Homework/ Mastering is an online homework program that is required. You will need to purchase access to Mastering. You can register through Canvas. Due dates are typically Monday, 11:59 pm. See Canvas Calendar.

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Course Calendar

Date	Module	Due Dates/Exams	Topic	Laboratory
Aug 29 Aug 31 Sep 2	1 1 1		*Module 1: Structure and Bonding*	No LAB
Sep 5 Sep 7 Sep 9	2 2 2	Labor Day Mastering Intro/Primer	*Module 2: Acids and Bases; Functionalities*	Lab 1: WebMO and Solvents
Sep 12 Sep 14 Sep 16	3 3 3	Mastering 1, BACON 1	*Module 3: Infrared Spectroscopy*	No Lab
Sep 19 Sep 21 Sep 23	4 4 4	Mastering 2	*Module 4: Alkanes and Cycloalkanes*	Lab 2: IR Spectroscopy
Sep 26 Sep 28 Sep 30	5 5 5	Mastering 3 Exam 1 Modules 1-3	*Module 5: Stereochemistry*	Lab 3: WebMO: Alkanes and Cycloalkanes
Oct 3 Oct 5 Oct 7	6 6 6	Mastering 4, BACON 2	*Module 6: Alkyl Halides; Nucleophilic Substitution*	
Oct 10 Oct 12 Oct 14	7 7 7	Mastering 5, BACON 3	*Module 7: Nuclear Magnetic Resonance Spectroscopy*	Lab 4: NMR of Unknowns
Oct 17 Oct 19 Oct 21	8 8 8	Mastering 6, BACON 4 Exam 2 Modules 4-6	*Module 8: Structure and Synthesis of Alkenes; Elimination*	LAB 5: TLC Analysis of Functional Groups
Oct 24 Oct 26 Oct 28	9 9 9	Mastering 7, BACON 5	*Module 9: Reactions of Alkenes*	Lab 6: Crystallization of Benzoic acid

Oct 31 Nov 2 Nov 4	10 10 10	Mastering 8	Module 10: Alkynes	Lab 7: SN1 of triphenylmethanol; WebMO
Nov 7 Nov 9 Nov 11	11 11 11	Mastering 9, BACON 6	Module 11: Synthesis of Alcohols	Lab 8: Dehydration of Alcohol to Alkenes
Nov 14 Nov 16 Nov 18	12 12 12	Mastering 10 Exam 3 Modules 7-9	Module 12: Reaction of Alcohols	Lab 9: Reduction of Camphor; WebMO
Nov 21 Nov 23 Nov 25	13 13 13	Mastering 11	*Module 13: Ethers, Epoxides, and Thioethers*	
Nov 28 Nov 30 Dec 2	– -- --	Mastering 12, BACON 7		
Dec 5 Dec 7 Dec 9	– – –	Mastering 13		
Dec 12	Finals	Exam 4 Modules 10-13		

Lab Schedule				
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	Sep 12	Watch Module 3 Videos on IR Spectroscopy	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	Oct 3	Watch Module 7 videos on NMR Spectroscopy	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
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

Due Dates for Lab Reports.

All lab reports will be due one week, Monday, after the completion of the experiment,

Experiment	**Due date**
Exp 1: Safety; Lab Notebook; Calculation of Solvent Properties	Sept 19
Exp 2: IR Spectroscopy	Oct 3
Exp 3: Alkanes/Cycloalkanes	Oct 10
Exp 4: NMR spectroscopy of Unknowns	Oct 24
Exp 5: Thin Layer Chromatography	Oct 31
Exp 6: Crystallization of Benzoic Acid	Nov 7
Exp 7: Triphenylmethanol and SN1 reaction.	Nov 14
Exp 8: Dehydration of an Alcohol	Nov 21
Exp 9: Reduction of Camphor	Nov 28

Evaluation

Grades will be posted to Canvas Course Site. Class grades may be adjusted (curved) from the following schedule only in the students' favor.

	Points	Percentage	Letter Grade
Exam 1	100	97.0-100.0	A+
Exam 2	100	90.0-96.9	A
Exam 3	100	87.0-89.9	B+
Exam 4	100	80.0-86.9	B
Mastering	250	77.0-79.9	C+
Bacon	100	70.0-76.9	C
Lab	250	67.0-69.9	D+
Total	1000	60.0-66.9	D
		<60.0	F

Course Policies

Expectations on Progress in Coursework.

Students are expected to complete all online homework in timely manner. Students are expected to take all quizzes and exams during the scheduled times. If these are not completed on time, the students is expected to provide a legitimate excuse or explanation to the Professor 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.

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/

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.

Library

Contact the Elmer E. Rasmuson Library at UAF reference desk for help with research.
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 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, Gruening 507)
- Writing Center (907-474-5314, uaf-writingcenter@alaska.edu, Gruening 8th floor)
- UAF Math Services, 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

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 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/.