Organic Chemistry I, CHEM F321

4 Credits

Fall 2021

General Information

Instructor:	Dr. Tom Green	*Office Location:*	Reichardt 174
Email:	tkgreen@alaska.edu	*Office Hours:*	TBA, by Zoom.
Telephone:	(907) 474-1559 (office) (907) 744-2726 (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 access. https://www.pearson.com/store/p/organic_chemistry/P100001143844/9780136781776 18-weeks (first semester only) is $70. Two-semesters (24 months) is $120. eText and Mastering: ISBN-13: 9780134130040.

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 Amazon, McMillian, and Redshelf (online version). ~$30

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 with Course PIN 9@H4VK. The cost is $6.

7. Access to Packback. Participation is a requirement for this course, and the Packback Questions platform will be used for online discussion about class topics. Cost is $29.

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.

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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. 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. The student will be required to return the kit using enclosed FedEx prepaid return labels. Failure to return the kit will result in a hold on the student account in the amount of $600.

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.

Packback Requirements.
Your participation on Packback will count toward 10% of your overall course grade.
There will be a Weekly Saturday at 11:59PM deadline for submissions. In order to receive full credit, you should submit the following per each deadline period:

1. Open-ended Question every week with a minimum Curiosity Score of 50, worth 33.33% of each assignment grade.

2. Responses every week with a minimum Curiosity Score of 50, worth 66.67% of each assignment grade.

Half credit will be provided for questions and responses that do not meet the minimum curiosity score.

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.

Course Calendar

Date	Module	Due Dates/Exams	Topic	Laboratory
Aug 23 Aug 25 Aug 27	1 1 1		*Module 1: Structure and Bonding*	No LAB
Aug 30 Sep 1 Sep 3	2 2 2	Mastering 1	*Module 2: Acids and Bases; Functionalities*	Lab 1: WebMO and Solvents
Sep 6 Sep 8 Sep 10	3 3 3	Mastering 2	*Module 3: Infrared Spectroscopy*	Lab 2: IR Spectroscopy
Sep 13 Sep 15 Sep 17	4 4 4	Mastering 3, BACON 1	*Module 4: Alkanes and Cycloalkanes*	Lab 3: WebMO: Alkanes and Cycloalkanes
Sep 20 Sep 22 Sep 24	5 5 5	Mastering 4 Exam 1: Module 1,2,4	*Module 5: Stereochemistry*	LAB 4: TLC Analysis of Functional Groups
Sep 27 Sep 29 Oct 1	6 6 6	Mastering 5, BACON 2	*Module 6: Alkyl Halides; Nucleophilic Substitution*	Lab 5: Crystallization of Benzoic acid
Oct 4 Oct 6 Oct 8	7 7 7	Mastering 6, BACON 3	*Module 7: Nuclear Magnetic Resonance Spectroscopy*	Lab 6: SN1 of triphenylmethanol; WebMO

Oct 11 Oct 13 Oct 15	8 8 8	Mastering 7, BACON 4	*Module 8: Structure and Synthesis of Alkenes; Elimination*	Lab 7: NMR of Unknowns
Oct 18 Oct 20 Oct 22	9 9 9	Mastering 8, BACON 5 Exam 2: Modules 5,6,8	*Module 9: Reactions of Alkenes*	Lab 8a: Dehydration of Alcohol to Alkenes
Oct 25 Oct 27 Oct 29	10 10 10	Mastering 9	*Module 10: Mass Spectrometry*	Lab 8b: GC/MS of Alkenes
Nov 1 Nov 3 Nov 5	11 11 11	Mastering 10, BACON 6	Module 11: Alkynes	
Nov 8 Nov 10 Nov 12	12 12 12	Mastering 11	Module 12: Synthesis of Alcohols	Lab 9: Reduction of Camphor; WebMO
Nov 15 Nov 17 Nov 19	13 13 13	Mastering 12 Exam 3: Modules 9,11,12	Module 13: Reaction of Alcohols	
Nov 22 Nov 24 Nov 26	14 -- --	Mastering 13, BACON 7 Thanksgiving Thanks	*Module 14: Ethers, Epoxides, and Thioethers*	
Nov 29 Dec 1 Dec 3	14 14 Review			
Dec 6 Dec 7		Mastering 14 Final Exam: Modules 13,14 and Selected 1-12	*FINAL EXAM*	

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Lab Schedule

Experiment	Week of	Concepts/Techniques	Wade Chapter	Padias Text
NO LAB	Aug 23	No Lab		
Exp 1: Safety; Lab Notebook; Calculation of Solvent Properties	Aug 30	Computational Chemistry: Dipole Moment, Molecular Geometry	2	1-4, 5-13 37-43, 117
Exp 2: Limonene from Oranges; IR Spectroscopy	Sept 6	Phase diagrams, IR spectroscopy, terpenes	2, 12	66-76
Exp 3: Alkanes/Cycloalkanes	Sept 13	Computational Chemistry: Conformational Analysis	3	117
Exp 4: Thin Layer Chromatography	Sept 20	Thin Layer Chromatography, H-bonding, polarity, functional groups	2	17-36 167-173
Exp 5: Crystallization of Benzoic Acid	Sept 27	Melting point, Recrystallization	--	121-129 49-52
Exp 6: Triphenylmethanol and SN1 reaction.	Oct 4	Acid Catalysis, SN1 Reaction, melting point, TLC, Recrystallization	6	139-142
Exp 7: NMR spectroscopy of Unknowns	Oct 11	NMR processing; interpretation of NMR spectra	13	77-104
Exp 8: Dehydration of an Alcohol	Oct 18	Distillation, drying of solvents mechanism, alkene stability	7	143-159 139-142
Exp 8: GC/MS analysis of Alkenes	Oct 25	Chromatography, Mass Spectrometry	12	109-116
Exp 9: Reduction of Camphor	Nov 8	Hydride reduction, stereoisomers, NMR. WebMO	10, 13	77-104
Make-up Experiments	Nov 15	--	--	

Due Dates for Lab Reports and Homework.

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

Experiment	Due date
Exp 1: Safety; Lab Notebook; Calculation of Solvent Properties	Sept 10
Exp 2: IR Spectroscopy	Sept 17
Exp 3: Alkanes/Cycloalkanes	Sept 25
Exp 4: Thin Layer Chromatography	Oct 1
Exp 5: Crystallization of Benzoic Acid	Oct 8
Exp 6: Triphenylmethanol and SN1 reaction.	Oct 22
Exp 7: NMR spectroscopy of Unknowns	Oct 29
Exp 8: Dehydration of an Alcohol	Nov 12
Exp 9: Reduction of Camphor	Nov 19

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
Exam 1	100
Exam 2	100
Exam 3	100
Final Exam	150
Laboratory	250
Mastering	200
Packback/BACON	100
Total	1000

Range	Letter Grade	Points
100 - 90%	A	1000-900
89 - 80%	B	899-800
79 - 70%	C	799-700
69 - 60%	D	699-600

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/.