

Course-Level Assessment of Student Learning in Organic Chemistry

By: Stephen Chamberland, Ph.D., SFHEA

There are several ways that I assess student learning in the organic chemistry courses I teach. I also regularly modify course content and daily instruction based on feedback and reflection. I strive to ensure that all feedback and evaluation of student work is objective and meets clearly defined and designed criteria. Course grading criteria are included in the course syllabus and are communicated verbally on the first day of class and as needed throughout the semester. Course grades are determined using a carefully developed formula and a gradebook in Excel. Official grade updates are posted a few times throughout the semester. The formula is shared with students to promote transparency and to allow them to double-check their grade if they wish.

I evaluate students who take my organic chemistry courses using a combination of exams, graded homework, and what I call “small assignments.” Graded homework is exclusively tied to the accrual and mastery of content knowledge. The questions that I include in graded homework and on exams are designed to assess the remembering, understanding, applying, analyzing, and evaluating levels of Bloom’s Taxonomy. Rarely, I will probe a student’s ability to think at the “creating” level in Bloom’s Taxonomy, but it is often limited to just one question in a weekly assignment or a small portion of a single question. Graded homework is used as a formative assessment. If a student gets a question incorrect, they have two additional attempts to arrive at the answer without penalty. Although this may enable a strategy-minded student to narrow a four-choice multiple choice question down to just two options before running out of chances, students are encouraged to simulate testing conditions and answer the question correctly the first time. Many questions are open-ended and cannot be answered strategically.

Midterm exams contain a series of objective-style questions, such as multiple choice, ordering, and ranking, and also include a written portion that includes short essays, drawing, calculating, and pictorial free response style questions. The final exam is a standardized 70-question multiple choice test designed by the American Chemical Society. This summative assessment helps me gauge the extent of overall learning that occurs in a course relative to national norms.

Small assignments are designed to help students engage with the subject in a holistic way. Some reward students for creating materials to help them learn, such as study guides. Others are designed to promote metacognition, such as exam reflections. Some build community or promote greater awareness of inclusiveness in science. Moreover, one assignment seeks mid-semester feedback through a one-month wellness checkup survey created by the UVU Office of Teaching and Learning.

To maximize objectivity and transparency, each small assignment includes a set of carefully written instructions. Most assignments have a grading rubric that students are provided with before they begin work on the assignment. Most assignments are graded

using a specifications grading format. In this binary scoring schema, an assignment is awarded full credit if it meets specifications and receives no credit if it does not meet specifications. A mercy system exists (GOOF tokens) to enable students to revise and resubmit a limited number of graded assignments that did not meet the stipulated criteria for criteria.

I seek to build a culture of trust and accountability where students will regularly share honest feedback with me. I assess feedback mid-semester using OTL's one-month wellness checkup survey and at the conclusion of the semester using Student Ratings of Instructor (SRIs). The SRIs do not allow me to make changes for an ongoing or past course, but I consult and carefully consider feedback for future course improvements.

Enclosures:

- Sample course syllabus for Chem 2320
- Sample assignment for Chem 2320 showing transparent criteria and grading rubric
- Sample midterm examination for Chem 2320
- Annotated sample SRI showing which student comments were acted upon, which were not, and why.

Utah Valley University Department of Chemistry

CHEM 2320.001 and .003 – Organic Chemistry II – Spring 2024 Syllabus

Instructor: Steve Chamberland, Ph.D.; pronouns: he, him, his; Please call me “Dr.” or “Professor”

Contact: Office: PS 229; Phone: 863-6017; E-mail: schamberland@uvu.edu

Student hours: Face-to-face, Tues&Thur 11am-noon Guru’s Café, F 9-11am LA 201, or by appointment

Class meetings: Face-to-face, Monday–Thursday (001) 9am-10am, PS 015; (003) 10am-11am, CB 414

Instructional Assistant: Mr. Abram Caruso is available support student learning in this course.

Imperative: Regularly check UVU e-mail. Login to www.office.com using a StudentID@uvu.edu e-mail. I am so excited to help you learn organic chemistry, and I look forward to our time together this semester. My main motivation is to set up the course in such a way that allows all students to be successful in mastering the content, to grow as learners, and to recognize the importance of diversity in science. The expectation in my course is that you will fail quite frequently and quite spectacularly, but you will do so in a supportive, low-stakes environment that allows you to learn from those failures and demonstrate a depth of knowledge and reasoning ability on the higher-stakes exams. I will provide plenty of resources and motivate you through those failures to help you achieve your goals for the class. I love talking about chemistry and getting to know you, so if you have individual questions, the best way for us to work together is during student hours. Every faculty member is a potential mentor.

This learner-centered syllabus is written in the first person (I = you, the student)

Why study organic chemistry? Why is this course important?

Organic chemistry is the study of carbon-based molecules, the molecules of life.

Organic chemists

- make almost all the pharmaceuticals that treat and prevent diseases
- focus on *process*-oriented problem solving, not *product*-oriented thinking
- seek to understand and predict how chemical and biological systems work at the molecular level
- study intermolecular forces, nucleophile/electrophile interactions, common reactions that interconvert functional groups, and synthesize complex molecules from simpler ones.

Skills I will develop

- Master the electron-pushing formalism (EPF), a tool experts use to predict and explain the outcomes of chemical and biochemical reactions
- Multivariate problem solving, critical thinking, abductive reasoning, and creativity.
- Learn how to learn

This course provides the foundation for biochemistry and other upper-division chemistry and biology courses. Further, the rigor of the course will improve my performance on standardized exams such as the ACS, MCAT, PCAT, and DAT. Most importantly, these skills will be helpful to me if I’m planning a career in the sciences or in a related field where employers value critical thinking, creative problem-solving ability, and troubleshooting.

What do I want to get out of this course? What personal goals do I have?

What are the “big” questions this course will help me answer?

- How can we determine the structure of an unknown organic chemical?
- How do we know if an organic chemical is pure, how pure it is, and what the impurities are?
- How do we analyze and interpret what happened during an organic chemical reaction?
- What first principles guide our understanding about the structure and function of organic molecules?
- How are “basic moves” within the electron-pushing formalism (EPF) used to help us predict and explain the outcomes of organic chemical reactions?
- Can we control the outcome of organic chemical reactions and plan syntheses effectively?
- How have chemists from historically marginalized and minoritized groups (a.k.a. PEERs, Persons Excluded on the basis of Ethnicity or Race) made essential contributions in science?
- What role does organic chemistry play in the real world?
- How can a greater understanding of cognitive science help me learn better?
- How does an understanding of the structure, properties, and reactivity of organic molecules influence our understanding of biology, medicine (animal/human), what we buy, what we eat, how we interact with nature and the environment, and how we perceive our world and change it for the better/worse?

What specific learning outcomes will help me build a foundation for answering the big questions now and in the future?

Students who successfully complete this course should be able to...

- Demonstrate the relationship between molecular structure and function using inter- and intramolecular forces and their influence on the physical properties of organic molecules.
- Illustrate organic molecules and organic reactions in three dimensions, and name organic chemicals using IUPAC nomenclature.
- Identify and explain what qualities of an acid, base, nucleophile, or electrophile make it strong or weak.
- Propose plausible arrow-pushing mechanisms to illustrate electron flow during organic chemical reactions, such as addition, substitution, elimination, rearrangement, oxidation, reduction, condensation, and pericyclic.
- Explain what factors govern the stereo-, regio-, and chemoselectivity of organic reactions.
- Evaluate the relative stability among competing intermediates and transition states in organic reactions using energy and reaction coordinate diagrams.
- Apply the basic concepts of synthetic organic chemistry to propose and evaluate the preparation of organic molecules in fewer than ten steps from simple starting materials.
- Interpret and use IR (Infrared) and NMR (Nuclear Magnetic Resonance) spectroscopy and MS (Mass Spectrometry) to identify functional groups in organic molecules, to differentiate similar molecules, and to predict the outcome of organic chemical reactions.
- Demonstrate awareness of important contributions made by organic chemists from historically marginalized and minoritized groups.
- Relate how organic chemistry topics are relevant in the real world.

What materials* and resources will help me master the learning objectives?

*If money is an issue and I cannot afford all the required and recommended course materials, I should acquire resources in this order:

Required

- **WileyPLUS (\$70):** WileyPLUS is included in your registration fees for the course as part of the UVU Inclusive Access program. Already integrated into Canvas, WileyPLUS contains the e-textbook, the e-solutions manual and study guide, and an enormous trove of practice problems and tutorial videos. Online homework will be assigned using WileyPLUS, and you must have a subscription to view and complete the homework.

Recommended

- **ACS Organic Chemistry Study Guide:** Buy it [online](#). If you buy it online, you can also opt to purchase a practice ACS exam. On reserve at the UVU library, first floor circulation desk.
- **Print Textbook:** David Klein, [Organic Chemistry](#), 4th ed.; Wiley: 2021. ISBN-13: 978-1119659594. Previous editions are okay too, but all page and problem references will come from the 4th edition. Most students (>95%) say that the textbook is the #1 resource for success. WileyPLUS offers a paper copy of the textbook as an upgrade for just \$40.
- **Solutions Manual:** David Klein, [Student Study Guide and Solutions Manual for Organic Chemistry](#); Wiley: 2021. This resource includes answers to all in-chapter and end-of-chapter problems and provides in-depth explanations of problems. ISBN-13: 978-1119659587.
- **[Openstax Organic Chemistry, 10th edition](#):** This is a high-quality, free, online textbook.
- **Organic Chemistry as a Second Language:** David R. Klein (our textbook's author), 5th ed.; John Wiley & Sons, Inc. In 2 volumes, these books offer additional explanations of basic, unifying concepts. Many students find these books to be *extremely* helpful. ISBN-13: 978-1119493488 (1st semester, ~\$65 new), 9781119493914 (2nd semester, ~\$35 new).
- **Reaction Notebook:** I can compile a notebook of reactions to help me learn and understand the essential reactions and mechanisms that I need to know. This free handout is available on Canvas.

Optional

- **Molecular Model Set:** A model kit is an investment that helps me develop my spatial intelligence and ability to visualize molecular phenomena in 3D. I can use it to help me with homework and timed assessments. Prentice-Hall, ISBN-13: 978-0205081363; Darling Molecular Visions, ISBN13: 978-0964883710. The kit sold by the Campus Store is virtually identical to the Prentice Hall kit but has fewer pieces. Most students figure out too late how useful models can be. We will not use it much in Chem 2320, but it can be a helpful study aid if you struggle viewing things in 3D.

- **Make it Stick: The Science of Successful Learning:** Peter C. Brown, Henry L. Roediger III, Mark A. McDaniel. Harvard University Press. Cambridge, Massachusetts: 2014, ISBN 9780674729018. This book discusses recent research that shows what practices help you learn and retain what you learn, and which do not. It also resoundingly debunks the recent “learning styles” theory. It is an extremely helpful resource if you’re struggling to learn and retain material, and helps you recognize when you’re not actually learning but have an “illusion of knowing.” This illusion can be crippling when exam time comes. ~\$25

How will I demonstrate mastery of the learning objectives? How is learning assessed?

I may earn learning credit in the following ways:

Two-Stage Exams 55% Graded Homework 10% Small Assignments 10% Final Exam 25%

Two-Stage Exams: Each midterm exam is *cumulative* (~50-67% new material, ~33-50% old material) and will be given in two stages: individual and team. The individual and team exams will be taken on consecutive days and will be administered as follows. No exam scores are curved.

Stage 1: Individual Exam – Monday and Tuesday, days 1 and 2 (90% of the total exam score)

- Two portions: handwritten and objective
- Both the objective and written portions of the exam are timed and will be taken in class during our normal class meeting time. Questions of varying types will be offered on the objective exam, such as multiple-choice, multiple answer, and ranking/ordering. The written portion will contain mechanisms, short-answer questions, synthesis problems, and other problem-solving challenges.
- The following are permitted: molecular model set, a four-function or non-programmable scientific calculator, a pen or pencil (required for objective). Scratch paper and data tables will also be provided.
- The following are not permitted: textbook, notes, solutions manual, internet, phone, one-way (Alexa-style smart speaker) or two-way (walkie-talkie) communication device, and other people.
- I am not permitted to copy exam questions or upload questions to exam-sharing or Q&A websites. Students found doing so will automatically fail the course and be subject to expulsion from UVU.
- I am not permitted to discuss individual exams with anyone in person, on the phone, online, on social media, or in public before the end of the individual testing period. The goal of this proviso is to avoid influencing exam performance beyond an individual’s prior preparation.
- Each exam contains an honor statement. Students who sign and abide by the honor statement are eligible for exam credit. The individual exam is designed to see what you individually have learned.

Stage 2: Team Exam – Tuesday–Thursday, days 2–4 (10% of the total exam score)

- Collaborating with my teammates to solve problems mutually enhances everyone’s learning. The goal isn’t to get the all the points, it’s to help everyone in the group learn the material.
- Two portions: objective (untimed, online submission) and written (untimed, online submission).
- The following are permitted: textbook, course notes, teammates, model set, a four-function or nonprogrammable scientific calculator, a pen, pencil, or stylus to write with, scratch paper, and Canvas to download and submit the objective and handwritten portions.
- The following are not permitted: a drone, anyone who is not currently enrolled in the class, anyone who is not on your team, anything besides Canvas on the internet
- I am not permitted to copy exam questions or upload questions to exam-sharing or Q&A websites.

- If I require an individual due date extension on the individual or team exam, then I will take the “team” portion of the exam on my own using all the resources the team can use.
- If the team needs an extension due to schedule conflicts, we will reach out to the instructor.

Graded Homework: Graded homework will be assigned periodically using WileyPLUS. Carefully monitor the course calendar for assignments and due dates. Graded homework may be submitted late, but credit will be reduced for late assignments. Deadlines ensure I keep up with the material.

Small Assignments: These incentives encourage active engagement and class participation. Moreover, they are not designed to assess learning, but to enhance it. All small assignments will be found in the Module titled “Small Assignments” on Canvas.

ACS Final: The standardized American Chemical Society (ACS) final exam is full-year cumulative. It has 70 multiple-choice questions and lasts 110 minutes. The national mean is typically 50-55% and will correlate to a C (75%). The number of questions I answer correctly will be normalized to the National Average of correctly answered questions (NA), as follows. I earn 100/70 points for each correct response. This step gives the percentage score. Finally, my ACS final exam score = (percentage score x 0.75) / (NA x 70). The maximum possible normalized ACS final exam score is 100. For example, if a student answered 35 out of 70 questions correctly (50%) and the National Average was 35.5 out of 70 correct responses, the normalized percent score is calculated as $(50 \times 0.75) / (35.5 \times 70) = 73.94__\%$.

GOOF Tokens: Everyone begins the semester with three "Get Out Of jail Free" (GOOF) tokens (a Monopoly board game reference). A GOOF token may be redeemed in any one of following situations:

- to submit any small assignment after the due date,*
- to resubmit a small assignment after the due date if the original submission did not meet specifications,
- a mutually agreed-upon reason by both the instructor and student.

Students who retain all their GOOF tokens at the end of the semester will earn a 1% bonus that will be added to their final grade. Dr. C will do this automatically and it will be incorporated into the final grade posted in Banner. If I use a GOOF token, I may later choose to take it back and receive a zero on the “GOOFed” small assignment to keep the 1% bonus. I have full control.

*Except for the ACS Exam Study Guide, no small assignment or homework assignment will be accepted for any reason after the hard deadline of 11:59pm on the last day of classes, 4/23/2023. This deadline allows the instructor to grade last-minute assignment submissions in time to submit final grades.

Course Grades: This course is challenging. It is a pre-professional, upper-division course required for chemistry majors and pre-health professionals. Exam averages typically vary between 60-70% but are not curved. The learning credit I earn correlates to typical grade thresholds (no rounding). Unless exceptional circumstances arise, the final median course grade will fall in the C range or higher.

A	A-	B+	B	B-	C+	C	C-	D	E
93%	90%	87%	83%	80%	77%	73%	70%	60%	<60%

All scores will be posted on Canvas so I can track my progress, but Canvas is not the official grade book for the course. Official grade updates will be posted on Canvas after each midterm exam and before the final exam.

Final grades are not assigned until after the final exam, so even if I am struggling early, I should not give up. Still, course failure is an option. Showing up every day, doing all the work, and trying my best does not guarantee that I will pass the course. I must demonstrate mastery of the course learning objectives. Final grades can be changed only if a calculation error was made that results in a significant grade difference (e.g., C to C⁺, B⁺ to A⁻). My final grade is determined based on the scale above and is non-negotiable. The instructor will not provide grade bumps to any individual for any reason.

Extension/Make-Up Policy

An *extension without penalty* is available for graded work in the following situations:

- an unforeseeable, extreme emergency (something that endangers my life or the life of an immediate family member)
- undue personal hardship
- a sudden, incapacitating illness
- (in-person events) COVID infection or exposure to a person who tested positive for COVID
- a varsity NCAA athletic event that requires off-campus travel
- a required ROTC event or drill
- required travel to a research conference as a presenting author
- a required field trip for a credit-bearing class (not a continuing education class)

If I need an extension, then I will let Dr. C know by e-mail as soon as possible. I must provide at least 24 hours' notice before the scheduled due date. Absences without communication earn a zero, no exceptions. The ACS final exam will be given on the day and time scheduled by the UVU Registrar and not on any other day or at any other time for any reason, no matter what.

Exam regrades: I may submit a regrade request if I feel that some or all of my handwritten exam was graded unfairly. To mark or alter the exam in any way prior to submitting a regrade disqualifies my request, and I may be subject to disciplinary action for academic dishonesty—a student did that.

Objective multiple-choice questions are not eligible to be regraded upon request. If the professor made an error that affects a reasonable person's ability to interpret a question based on meaning or appearance, he will likely adjust my/everyone's score accordingly. Please let Dr. C know if you find an error in a test question. Question regrades will not be granted if my test-taking device cannot interpret standard picture files. The instructor's judgement will determine whether a question is fair or not.

- Recounting requests for all addition errors for any number of points are accepted.
- Regrade requests are due one week after my written exam is returned to the class for review.
- Please submit a note on paper or via e-mail that clearly explains which problem(s) I want regraded and why.

What is free Academic Tutoring, and how can it help me succeed?

This course is supported by tutors from Academic Tutoring. Tutors are students that have completed this course, and they understand the concepts well enough to help me work through questions I have. The tutoring program is certified by the College Reading & Learning Association, which means that tutors are trained to share learning and study strategies during tutorial sessions. While tutors will not complete or correct homework for me, or help me on take-home tests or quizzes, they will help me understand and reinforce concepts that I am learning in this class. For more information visit uvu.edu/academictutoring.

How do we include and celebrate diverse experiences and perspectives?

(Dr. C speaking): Your experience in this class is important to me and I want you to feel included, respected and that your voice is heard. As your instructor, it is my intent to create an inclusive and equitable learning atmosphere that is representative of a diversity of perspectives, where all students are encouraged to share, express, and contribute within a safe environment, and where everyone can be their authentic selves. If something offends you and it's not egregious, consider "calling in" a peer to help them improve how they relate with others. "Cancel culture" damages society. Voices and perspectives from all political, religious, and ideological leanings are welcome. Please feel free to contact me if you would like to talk about any suggestions and/or concerns. If that feels uncomfortable to you, you can also contact the Inclusion and Diversity Committee to ask for help and support.

Discussions and debates are a way to grow and learn. In this class, you will be encouraged to share your ideas and debate them critically and rationally. I ask that you do so with kindness and empathy for your classmates and their views. That you listen and respond respectfully and with care. Remember that in our diversity there is strength. That while some perspectives might challenge our fundamental assumptions, they also provide an opportunity to question, listen, and grow.

Finally, all people have the right to be addressed and referred to in accordance with their personal identity. In this class, we will have the chance to indicate the name that we prefer to be called and, if we choose, to identify pronouns with which we would like to be addressed. I will do my best to address and refer to all students accordingly and support classmates in doing so as well.

How can I honestly demonstrate what I have learned?

Because Dr. C and UVU care greatly about academic integrity, there is a zero-tolerance policy on academic misconduct in this course. I am responsible for knowing the UVU academic honesty policy outlined in the Student Rights and Responsibilities Code, Section 541 of the Policy Manual. I should also visit <http://www.uvu.edu/studentconduct/students/integrity.html>.

Academic misconduct includes, but is not limited to,

- copying answers from another student on an exam or assignment,
- allowing another student to copy my answers on an exam or assignment,
- sharing or receiving information about exam questions and content during an active exam,
- uploading any course material to exam-sharing services and cheating websites within or outside of the university, such as Chegg
- using unauthorized materials during an exam, and
- plagiarism from any source, including AI resources, unless authorized.

If I do not know what plagiarism is and want to know how to avoid it, I will ask the instructor. Appropriate use of AI to support learning will be discussed. All instructor-created course materials are copyrighted; thus, is a serious breach of academic honesty and copyright law to post any course materials online. Consequences will be draconian, and it can end an academic career. It's not worth it. Note from Dr. C: If you feel unbearable pressure from within yourself or from members of your family that instills ideas that lean toward misconduct, please talk with me about it. I can help.

All academic honesty concerns will be reported the UVU Student Conduct and Conflict Resolution office and will be formally investigated. Depending on the severity, incidences of misconduct will result in a zero for the assignment or exam and/or automatic course failure. Further disciplinary action may be taken. I will contact Dr. C if I have questions or concerns about this policy.

What is the course withdrawal policy?

From UVU Academic Policies and Standards: “Students may drop and withdraw from classes according to the dates and deadlines posted on the Semester Student Timetable. Classes may be dropped and not appear on the transcript through the drop deadline. After the last day to drop noted on the Semester Student Timetable, a grade of “W” will appear on the transcript for all official withdrawals and students will be responsible for tuition and fees. A “W” grade could impact a student’s satisfactory academic progress with the Financial Aid and Scholarships Office. Withdrawing from a course after the last day to withdraw deadline may only be for extenuating circumstances and not solely for academic difficulty and requires the signature of the department chair with a department approval stamp. Such changes to a student’s schedule may adversely affect current and future financial aid, scholarships and/or refunds. Students are cautioned to see a financial aid advisor before attempting to completely withdraw from school.”

If I am really struggling after the drop deadline and do not feel I can devote the time needed to improve, then I should consider withdrawing. If I stop attending class but do not withdraw, then I will lose access to graded assignments and my final grade will be “E.” While a “W” grade is not calculated into my GPA, an “E” counts as 0.00 grade points. Although UVU counts only my most recent course attempt into my GPA, graduate and professional schools may average all attempts to complete the course and will see all withdrawals. I should give my best effort the first time I take a course.

After the deadline, withdrawal from the course to avoid failure will not be granted for any reason. All post-deadline withdrawal requests require documentation. Misrepresenting one’s exigencies that serve as the basis for a withdrawal request will result in disciplinary action beyond course failure. Regardless of what an academic advisor may tell you, waiting until the end of the term to withdraw is a bad idea because the people needed to sign forms may not be available at the last minute.

How will religious observances be handled?

UVU values and acknowledges a wide range of faiths and religions as part of our student body, and as such provides accommodations for students. Religious belief includes the student's faith or conscience as well as the student's participation in an organized activity conducted under the auspices of the student's religious tradition or religious organization. The accommodations include reasonable student absences from scheduled examinations or academic requirements if they create an undue hardship for sincerely held religious beliefs. For this to occur, the student must provide a written notice to the instructor of the course for which the student seeks said accommodation prior to the event. The UVU campus has [a place for meditation, prayer, reflection, or other forms of individual religious expression](#) as is described on their website.

What course accommodations are available for persons with disabilities?

Students needing accommodations due to a disability including temporary and pregnancy accommodations may contact [UVU Accessibility Services](#) at accessibilityservices@uvu.edu or 801-863-8747. Accessibility Services is located on the Orem Campus in LC 312.

It will be helpful if I arrange and verify early that Accessibility-approved accommodations are in place as soon as possible. I am responsible for checking if my accommodations are in place through Accessibility Services - they may not contact me. A minimum of twenty-four hours’ notice is required to receive most accommodations that require the instructor to make special arrangements, such as additional time, due date extensions, or arranging for an alternate proctored testing location. No accommodation letter received on a weekend is eligible to receive accommodations before Tuesday.

Is there anything else I need to know?

E-mail is the best way to contact the instructor with general questions or concerns, but he cannot respond immediately. All inquiries sent via Canvas message will be forwarded to his UVU e-mail. He usually checks e-mail once per day, and you can expect a reply within 48-72 hours, often earlier. Messages sent after 12pm on Thursday are likely to receive a reply by 5pm on Monday.

(Dr. C speaking): I am a flawed human, and it irritates me when I receive e-mails that begin with "Hey" or "Yo", or worse, with no greeting at all. I care about civility in the written and spoken word. Taking the time to compose a respectful, courteous, and error-free message leaves a good impression. Professional etiquette is a crucial skill to learn before entering the workforce. Lastly, some people find my communication style to be blunt and brutally honest. Part of my disability is that I struggle with empathy and do not understand when people do not prioritize their education. It's just who I am and is not a reflection of you. We would all benefit from greater patience and compassion.

Finally, I should

- check Canvas and UVU e-mail regularly for announcements,
- change Canvas notification settings so that all important course information is forwarded to me in the way I'm most likely to see it (text, e-mail, push notification, etc.), and most importantly,
- understand that the syllabus is not a legal contract; the instructor reserves the right to change any part of this syllabus if necessary; any changes will be discussed in class and will be included in a Canvas announcement.

CHEM 2320 Expected Module Progress and Assessment Schedule

Week, Begins	Scheduled Events and Exams	Canvas module and accompanying reading from the Klein text
1, 1/8		Organic synthesis and spectroscopy Synthesis Review: Chapter 11 IR & MS, Chapter 14
2, 1/15	<i>M, 1/15, no class - MLK Day</i>	Chapter 14 (cont'd), NMR Chapter 15
3, 1/22		Chapter 15 (NMR), EPF review and practice
4, 1/29		Aromaticity and reactions of conjugated pi systems Chapter 16 - Conjugated pi systems and pericyclic reactions, Diels-Alder reaction
5, 2/5		Ch. 16 (cont'd) and Chapter 17 - Aromatic Compounds
6, 2/12	M-TH, 2/12-15: Two-Stage Exam 1 (Chapters 1-16)	Ch. 17 (cont'd) and Chapter 18 - Aromatic Substitution Reactions
7, 2/19	<i>M, 2/19, no class - Presidents' Day</i>	Ch. 18 (cont'd)
8, 2/26		
9, 3/4		Addition reactions at the carbonyl group Chapter 19
10, 3/11	<i>No class, Spring break</i>	
11, 3/18	<i>No in-person class: March 18-21*</i>	
12, 3/25	M-TH, 3/25-28: Two-Stage Exam 2 (Chapters 1-18, parts of 19)	Carboxylic acids and substitution reactions at the carbonyl group Chapter 20
13, 4/1		
14, 4/8		Carbonyl condensation reactions, Ch. 21
15, 4/15	College of Science Poster Session	Chapter 21 (cont'd) and Amines , Chapter 22
16, 4/22	<i>T, 4/23, last day of class</i>	Amines , Chapter 22 (cont'd)
Finals Week, 4/29	ACS Final Exam (001): W, 5/1, 9am-11am, PS 015 (003): M, 4/29, 9am-11am, CB 414	70 questions, 110-min time limit Covers chapter 1 - parts of chapter 23

*Dr. C will be traveling to New Orleans, LA to attend the American Chemical Society National Meeting. Pre-recorded lectures will be posted the week prior. No instructional time will be missed.

ASSIGNMENT: My Pathway, My Story

 Published Edit

Submit - My Pathway, My Story

When is this assignment due?

Students who submit this survey before the target date of 11:59pm will earn course credit. Extensions will be granted on an individual basis to students who add to the course late or who need extra time to complete it.

What do I need to do to complete this assignment?

Think about how your journey to science began. Write an informative and reflective essay (minimum of 500 words) that describes how you got here, where you are on your path, where you are going, and why. If you haven't heard of the term "imposter syndrome" before, look it up. You are also welcome to fulfill this assignment by recording a video of you speaking (please, no more than 10 minutes), write, compose, and sing a song, act it out and record it, write and produce a short film, as well as other forms of communication. Please reach out to the instructor if you have any questions, and don't hesitate to recruit classmates to help if you have an innovative idea.

Below are some questions you might consider as you prepare your story. Please don't feel you have to answer every question or answer each one in the order I present them. They are just to guide your thinking.

For example, have you faced any obstacles along the way? What are/were they? What is your plan after you graduate or complete your coursework at UVU? If you're thinking about transferring to another school, why? What questions do you have about science/chemistry careers? Do you think you will be successful? How do you define success? Do you have any role models in science? What is your career plan A, and do you have a plan B? If you are a woman or person who identifies as a member of an underrepresented group in science, how has it impacted your journey, if at all? Do you feel you belong in the science field? Are you welcomed in the science field, or excluded from it?

How will I submit this assignment?

Type your reflection in the text box provided, record a media video using the tools provided, or upload a document file or a video file. When you are done, click submit.

How will this assignment be graded?

This exercise is for your personal enrichment and is not intended as an opportunity for you to share what you think the instructor wants to hear. Please be sincere. Your personal attitudes and beliefs will not be judged in any way or have any effect on the grade the assignment receives. Students who complete an original narrative, video, song, or comparable form of multimedia of appropriate length will receive full credit. In case you might feel that revealing something deeply personal may enhance the impact of your truth but don't want the instructor to know it's you, each assignment will be graded anonymously. If you would like the instructor to know who you are and you choose to write an essay, you are welcome to include your name if you wish. Of course, if you make a video or movie, the instructor is likely to recognize you, so please keep that in mind.

Why am I being asked to do this assignment?

Many students, regardless of their status as "represented" or "underrepresented" in science, struggle to develop their identity as scientists. If you want to be a scientist, then you are one. Maybe you haven't yet started getting paid to be one. Often, students search for role models so they can get a glimpse of what a "real" scientist is or does. Most students who like and enjoy science can succeed in their science courses, but not everyone has yet mastered how they learn best and so they struggle. If being a scientist is something that sounds appealing to you or is something you've dreamed of since you were young, then don't let anything stop you from achieving your goal. You can do this!

Points 20

Submitting a text entry box, a media recording, or a file upload

Due	For	Available from	Until
Apr 23	Everyone	-	-

My Pathway, My Story rubric

You've already rated students with this rubric. Any major changes could affect their assessment results.

Criteria	Ratings		Pts
Description of criterion	20 pts Meets specifications Media created and uploaded successfully, on time, and includes the presenter's personal story of appropriate length and breadth. If an alternative format is chosen, it is executed successfully, on time, and includes the requested information.	0 pts Does not meet specifications Submitted late, not legible if handwritten, no alternative format provided, or does not otherwise meet the assignment details	20 pts
			Total Points: 20

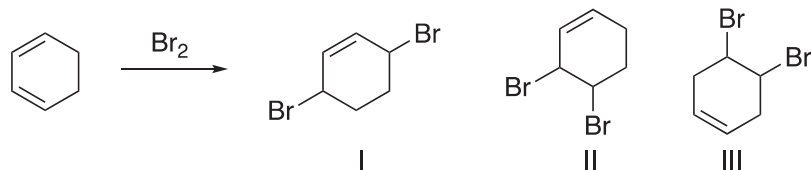
Chemistry 2320: Midterm Exam 1 Team – Objective Portion

Professor Chamberland

Due 11:59pm Friday, February 16, 2024

- Carefully read each question. Misunderstanding or misreading a question may elicit an incorrect answer.
- Using pencil, please place answers on the Scantron form provided.

1. What is/are the major product(s) of this reaction?



- A) **II** only C) **I** and **II** only
 B) **I** and **III** only D) **I**, **II**, and **III**

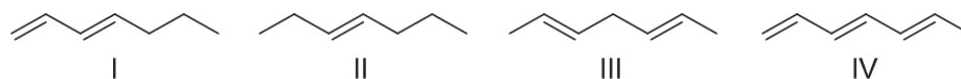
2. Which hexadiene isomer could undergo a [3,3]-sigmatropic rearrangement such as the Hardy-Cope rearrangement?

- A) (*E*)-hexa-1,3-diene B) (*Z,Z*)-hexa-2,4-diene C) (*E*)-hexa-1,4-diene D) hexa-1,5-diene

3. Which hexadiene isomer could serve as the diene in a [4+2] cycloaddition reaction?

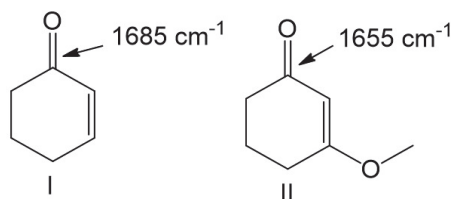
- A) (*E*)-hexa-1,3-diene B) (*Z,Z*)-hexa-2,4-diene C) (*E*)-hexa-1,4-diene D) hexa-1,5-diene

4. Which of the following compounds requires the least amount of energy to promote an electron from the ground state to its excited state?



- A) I B) II C) III D) IV

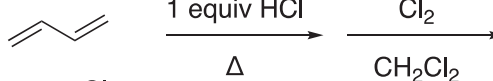
5. Why does the expected stretching absorption of the C=O bond in compounds I and II differ, as shown below?



- A) Compound I has more possible resonance structures than Compound II, increasing the single bond character of the carbonyl group in Compound I.
 B) Compound II has more possible resonance structures than Compound I, increasing the single bond character of the carbonyl group in Compound II.
 C) Only Compound I has resonance, causing it to have a higher stretching absorption.
 D) Only Compound II has resonance, causing it to have a lower stretching absorption.

6. When looking at a ^1H NMR spectrum, which of the following provide(s) information about neighboring atoms?
- A) Chemical Shift and Integration
 B) Chemical Shift and Multiplicity (Spin-Spin Splitting)
 C) Multiplicity (Spin-Spin Splitting) only
 D) Integration and Multiplicity (Spin-Spin Splitting)

7. What is the major product of this reaction sequence?



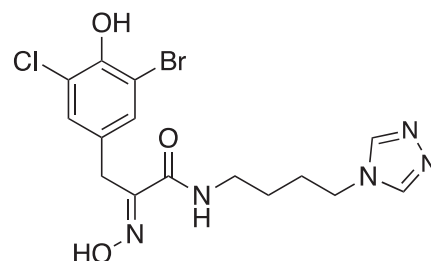
- A) B) C) D)

8. When hydrocarbons that contain dienes and polyenes are analyzed by UV/visible spectroscopy, which energy transition is most responsible for promotion of an electron from the ground state to an excited state?

- A) σ to σ^* B) π to π^* C) π^* to n D) σ to π^*

9. What is the Hydrogen Deficiency Index (HDI) of the compound shown at right?

- A) 7 B) 8 C) 9 D) 10



10. Which compound would show a molecular ion at m/z 114 and a major fragment at m/z 71?

- A) B) C) D)

11. Which of the following compounds is most likely to show a prominent peak at $M - 15$ in its mass spectrum?

- A) B) C) D)

12. Identify the structure with molecular formula $\text{C}_9\text{H}_9\text{ClO}$ that is consistent with the following spectroscopic data.

IR: 1680 cm^{-1}

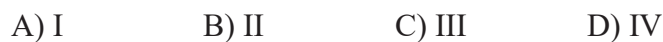
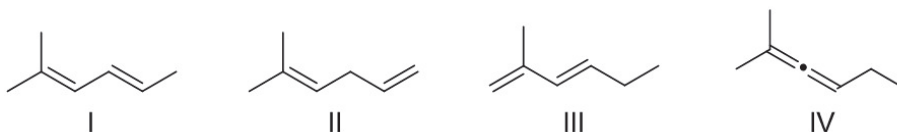
^1H NMR: 3.5 ppm (triplet, I = 2H), 4.0 ppm (triplet, I = 2H), 7.4 ppm (triplet, I = 2H), 7.6 ppm (triplet, I = 1H), 7.9 ppm (doublet, I = 2H)

- I II III IV
- A) I B) II C) III D) IV

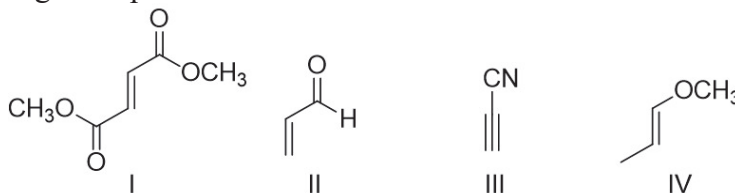
13. Which of the following would undergo the fastest Diels-Alder [4+2] cycloaddition with 2-methyl-1,3-butadiene?



14. Which one of the following dienes will release the least amount of heat upon hydrogenation with H_2/Pd ?



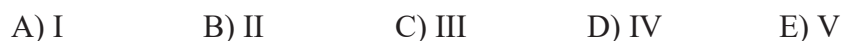
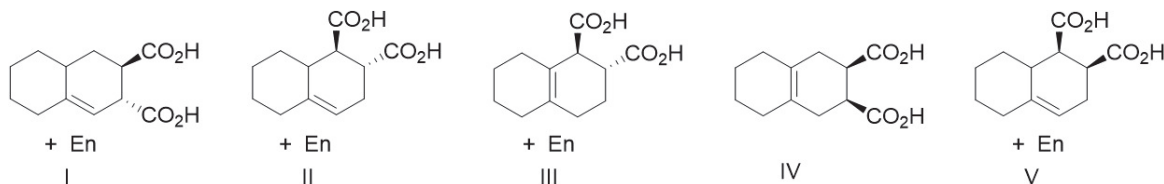
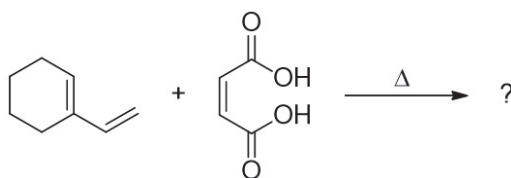
15. Which of the following dienophiles is least reactive in a Diels-Alder reaction?



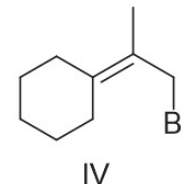
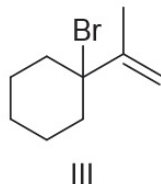
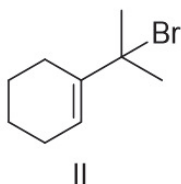
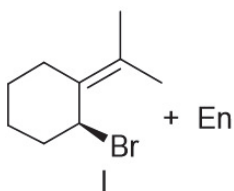
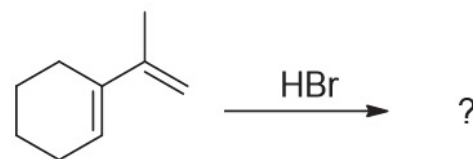
16. Which of the following statements is consistent with pericyclic reaction mechanisms?

- A) Octets are maximized in the intermediates.
- B) Charge separation is minimized in the intermediates.
- C) The most stable intermediate leads to the major product.
- D) No intermediates are formed during pericyclic reactions.

17. Identify the expected major product of the following Diels-Alder reaction.



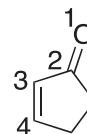
18. Identify the products of 1,2-addition for the following reaction.



- A) I and III B) II and IV C) II and III D) I and II

19. Which numbered atom(s) has/have a partial positive charge (δ^+) in the structure shown at right?

- A) 1 only B) 2 only C) 2 and 4 D) 1 and 3



20. The ^1H NMR spectrum of 1-propanol displays a singlet for the OH proton instead of a triplet. Which answer choice below best explains why this is so.

- A) This is typical of all protons bound to oxygen.
 B) 1-propanol is too small for coupling to occur.
 C) 1-propanol molecules rapidly exchange the OH proton, which prevents splitting.
 D) The signal for the OH proton is out of the normal range of the ^1H NMR spectrum, meaning that it is not usually visible.

Name _____

Chemistry 2320: Midterm Exam 1 Individual – Written Portion

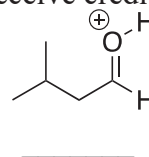
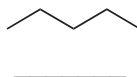
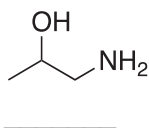
Professor Chamberland

Monday, February 12, 2024

- **I invite you to sign and abide by the honor statement at the bottom of page 1.** Without exception, students who sign and adhere both to the letter and the spirit of the honor statement are eligible to receive credit for their work.
- Please check to ensure you have a complete written portion. There should be 3 total pages.
- Carefully read each question. Misunderstanding or misreading a question may elicit an incorrect answer.
- Ensure that answers are provided for all parts of each question.
- A helpful starting strategy is to scan through the entire exam and answer questions you know first.
- When prompted, please place answers in the space provided. Answers that do not fit completely in the allocated space may be marked wrong. If you wish to use more space, please *circle* your final answer.
- To be eligible for full credit, please ensure that your answers are unambiguous and sufficiently detailed. For example, if a reaction gives a racemic mixture, indicate that a racemic mixture is formed or write (“plus enantiomer” with your structure). I will grade what is written, though it may not be what you had intended.
- You are invited to use pencil or **one color** of pen (blue or black ink only, please) on this exam.

You have 50 minutes for this exam portion. May you relax, and then relax some more. GOOD LUCK!

1. (60 points) On the line below each compound, provide the correct pKa value for the *most* acidic hydrogen atom in each molecule. Your answer must be within ± 2 pKa units to receive credit.



2. (80 points) Explain the factors responsible for the low yield (20%) of the Diels-Alder [4+2] cycloaddition reaction between buta-1,3-diene and ethylene even when the reaction is heated to 200 °C. Then, explain how the structures of buta-1,3-diene and ethylene could be modified to give a higher yield of [4+2] cycloaddition product at a lower temperature.

Chem 2320 Midterm Exam – Individual Honor Statement

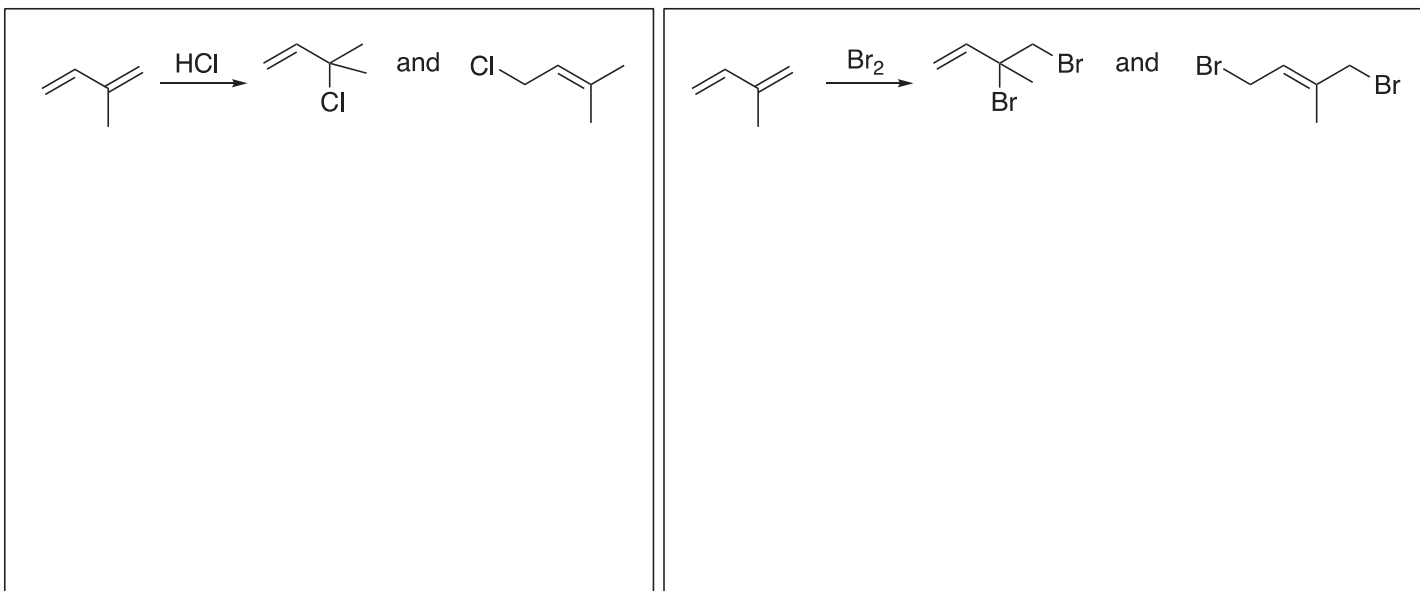
By signing below, I affirm on my honor that I have not received and will not divulge any unfair information about the contents of this exam to a classmate, a third party, or online. I have used only permitted resources.

3. (80 points) Suggest a plausible mechanism for the reaction shown in ONE of the following TWO boxes. Circle the answer you want graded if you draw mechanisms in both boxes. Ensure that your mechanism shows how both products are formed. Clearly show each elementary step in your mechanism, if necessary.

The mechanism will be graded using the mechanism rubric as follows:

Criteria: Proper Arrows (PA); Structural Integrity (SI); Reagent Usage (RU); Rationality of Steps (RoS)

Point breakdown: Mastery = 20 points; Mastering = 17; Developing = 14; Emerging⁺ = 10; Emerging = 0

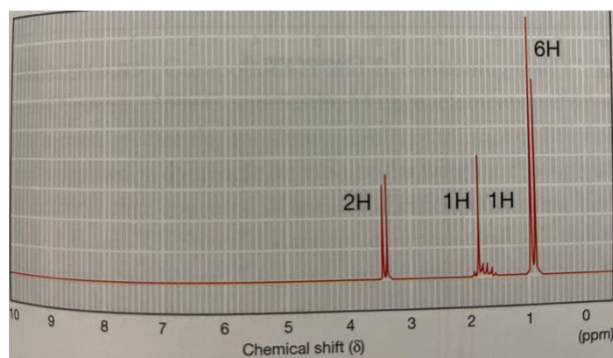


4. (100 points) A reaction of 2-methylpropene gave a product $C_4H_{10}O$ with the following data. For each peak, the data is presented as follows: chemical shift, multiplicity, integration value. A spectrum is also provided.

$C_4H_{10}O$ product data

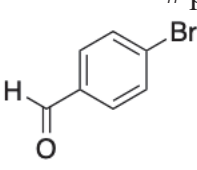
3.42 ppm, doublet, 2H 1.78 ppm, nonet, 1H
 1.88 ppm, singlet, 1H 0.91 ppm, doublet, 6H

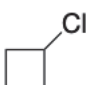
- A. Determine the structure of the product with formula $C_4H_{10}O$ and write your answer in the box below.



- B. Propose a synthesis of the product $C_4H_{10}O$ that you determined in part A, starting from 2-methylpropene. If any steps in the method must be performed in sequence, indicate that using 1. 2., etc. Only show the reagents needed for the step or series of steps. Mechanisms and reactive intermediates are not required. Show a forward synthesis, not a retrosynthesis.
- C. MS analysis of the product $C_4H_{10}O$ gave peaks at m/z $[M-18]^+$ and m/z $[M-43]^+$. In the space below, draw the structure that corresponds to EITHER the $[M-18]^+$ peak OR the $[M-43]^+$ peak.
- D. Which did you draw for pt. C, the structure of the $[M-18]^+$ peak or the structure of the $[M-43]^+$ peak?

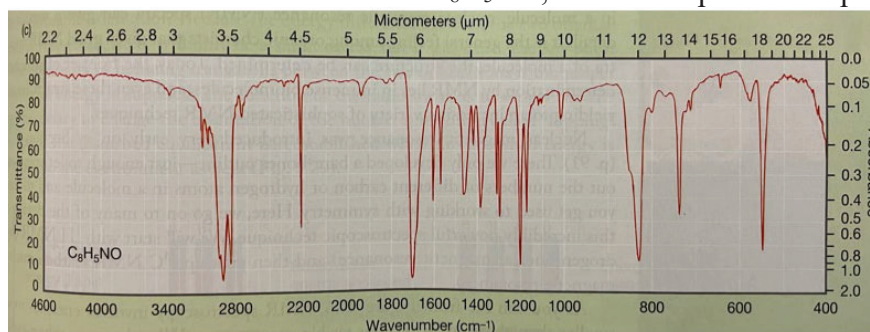
5. (80 points) For molecules A and B, describe how many unique peaks you would expect to see in the proton NMR spectrum and in the carbon NMR spectrum.

A.  # peaks - ^1H NMR # peaks - ^{13}C NMR

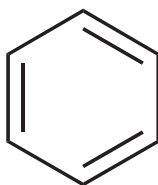
B.  # peaks - ^1H NMR # peaks - ^{13}C NMR

(hint#1: consider the 3D shape of the molecule)
(hint #2: build a model)

6. (100 points) Consider a molecule with the formula $\text{C}_8\text{H}_5\text{NO}$, whose IR spectrum is provided below.



- A. Calculate the Hydrogen Deficiency Index (HDI) for $\text{C}_8\text{H}_5\text{NO}$. Show your work to receive credit. Double check your work, because your answer, correct or incorrect, will guide your thinking throughout the problem. $\text{HDI} = \frac{1}{2}(2\text{C} + 2 - \text{H} + \text{N} - \text{X})$.
- B. The isomer of $\text{C}_8\text{H}_5\text{NO}$ that gives the IR spectrum shown above contains a benzene ring and one or more substituents on the benzene ring. Using the IR data and the benzene ring given below as a template, propose a reasonable structure for $\text{C}_8\text{H}_5\text{NO}$.



- C. Indicate which bonds in the structure you drew for part B correlate to the following stretching frequencies in the IR spectrum: 2900 cm^{-1} , 2200 cm^{-1} , and 1700 cm^{-1} (approximate numbers). Use arrows to point to specific bonds. Label each arrow with one of the given stretching frequencies.
- D. Circle the H atom and put a box around the C atom that would appear the most downfield in the ^1H NMR and ^{13}C NMR spectrum, respectively.

Problem	Possible Points	Score
1	60	
2	80	
3	80	
4	100	
5	80	
6	100	
Total	500	

Course Evaluation Reporting

Courses for: Stephen B. Chamberland

CRN: 22754 | Term: 2023 Fall | College: SC | Department: |
 Schedule Code: | Instr Method: | Campus: | Section Status: |
 Sort By 1: | Sort By 2: | Output: Detail | Records: 500 | Excel: | Search:

- Only Courses **with** Surveys
- Only Courses **without** Surveys
- Show Comparative Averages
- Show Detail Comparative Stats
- Show Number Response Counts
- Show Group Summary Only
- Include 95% Confidence Interval
- Include Min / Max / Median
- Display Question Code
- Hide Text Entry / Comments

If nothing is listed below, hit the search button for data to populate.
 If you change any settings with the above checkboxes, please hit the search button to save the changes.
 Click on the Professor name to see all Courses for that particular Professor.
 Click on the number under "Evaluations Taken" to see detail information for that particular Course.

Term	Coll	Dept	Sch	Inst	Camp	Stat	Course	CRN	Description	Professor	Evals Taken	Total Enroll	% Comp	Reporting Disabled
2023 Fall	SC	CHEM	F	LEC	M	A	CHEM 2320 002	22754	Organic Chemistry II	Stephen B. Chamberland	24	28	85.7	
Total:											24	28	86%	

Records: 1 Time: 0.01 Seconds

The Course Avg will be green if over 10% of the Course Mean, and red if less than 10% of the Course Mean.

Student Experiences

Total	Strongly Agree	Agree(%)	Neutral(%)	Disagree(%)	Strongly Disagree(%)	Avg	Std Dev
72	58	38	4	0	0	4.54	0.58

Description	Total	Strongly Agree	Agree(%)	Neutral(%)	Disagree(%)	Strongly Disagree(%)	Avg	Std Dev	Instr Course Mean	Instr Overall Mean	Course Mean	Dept Mean	Div Mean	Univ Mean
Completed course work.	24	75	25				4.75	0.43	4.74	4.74	4.73	4.59	4.51	4.52
Prepared for class.	24	46	50	4			4.42	0.57	4.35	4.41	4.32	4.33	4.30	4.37
Contact Instructor when needing help.	24	54	38	8			4.46	0.64	4.44	4.41	4.37	4.36	4.39	4.51

Overall Eval

Total	Strongly Agree	Agree(%)	Neutral(%)	Disagree(%)	Strongly Disagree(%)	Avg	Std Dev
120	80	19	0	1	0	4.78	0.47

Description	Total	Strongly Agree	Agree(%)	Neutral(%)	Disagree(%)	Strongly Disagree(%)	Avg	Std Dev	Instr Course Mean	Instr Overall Mean	Course Mean	Dept Mean	Div Mean	Univ Mean
Learned more.	24	88	13				4.88	0.33	4.82	4.82	4.71	4.57	4.60	4.62
Instructor helped.	24	79	21				4.79	0.41	4.79	4.79	4.68	4.41	4.46	4.54
Subject used outside class.	24	83	13		4		4.75	0.66	4.68	4.69	4.54	4.30	4.42	4.55
Class challenged to think in new ways.	24	79	21				4.79	0.41	4.85	4.85	4.76	4.54	4.50	4.54
I developed essential skills.	24	71	29				4.71	0.45	4.68	4.69	4.54	4.33	4.36	4.48

Instructor Evaluation

Total	Strongly Agree	Agree(%)	Neutral(%)	Disagree(%)	Strongly Disagree(%)	Avg	Std Dev
168	84	10	4	2	0	4.76	0.63

Description	Total	Strongly Agree	Agree(%)	Neutral(%)	Disagree(%)	Strongly Disagree(%)	Avg	Std Dev	Instr Course Mean	Instr Overall Mean	Course Mean	Dept Mean	Div Mean	Univ Mean
Instructor was prepared.	24	92	4	4			4.88	0.44	4.91	4.92	4.80	4.64	4.62	4.62
Instructor was respectful.	24	79	8	8	4		4.63	0.81	4.68	4.71	4.54	4.55	4.64	4.65
Instructor provided feedback.	24	83	8		8		4.67	0.85	4.65	4.69	4.51	4.41	4.47	4.52
Instructor was available.	24	83	17				4.83	0.37	4.74	4.77	4.61	4.51	4.59	4.61

Instructor had clear expectations.	24	79	13	8		4.71	0.61	4.68	4.69	4.54	4.53	4.54	4.54
Instructor was enthusiastic.	24	92	8			4.92	0.28	4.94	4.95	4.88	4.67	4.70	4.68
Instructor was clear on how to succeed.	24	79	13	4	4	4.67	0.75	4.61	4.66	4.38	4.48	4.52	4.57

Open ended questions

Total
0

Description
what help learning most.
<input checked="" type="checkbox"/> Attending class for one was super helpful. Having instruction 4 days a week was key for me maintaining a good grasp on the subject.
<input checked="" type="checkbox"/> Attending class in person, attending office hours, taking notes, and doing the homework made it extremely simple to succeed in this class.
<input checked="" type="checkbox"/> Dr. Chamberland was an extraordinary teacher. He gave you a myriad of materials to help you succeed in this class. He made sure we knew he was always available to answer questions, give help on homework, or even just talk. He cares about his students and wants to see them succeed. Ochem II is an extremely hard class and there is no getting around that. With the resources that Dr. Chamberland has laid out for his students, it is easier to succeed and get the scores you would have liked in this class.
<input checked="" type="checkbox"/> Dr. Chamberland's lectures and the team exams are two things that truly helped me succeed this semester. I have never had a class where we did individual exam and a group exam and it was really beneficial. Being able to talk through my exam with a group helped me correct my mistakes and clarify topics I wasn't confident in.
<input checked="" type="checkbox"/> Going to class and having the book online.
<input checked="" type="checkbox"/> He was one of the few teachers that helped me feel comfortable asking questions. He also wanted me to succeed in my other classes as well.
<input checked="" type="checkbox"/> Homeworks! Loved the homeworks.
<input checked="" type="checkbox"/> I learned a lot more taking Organic chemistry from this professor than my previous one. You definitely have to work for your grade and the class is hard. But Dr. Chamberland tries his best to teach in a very simple way. Organic chemistry is not easy or simple, but I feel like I was able to learn the material and then practice problems on my own. I enjoyed the homework we had and the small assignments. It made it easy to balance the homework in this class and my other classes as well. What helped me most in this class was reading the book and doing a lot of practice problems. I liked the textbook we have as well it's very interactive. Honestly practice, practice, practice is what helped me the most.
<input checked="" type="checkbox"/> I loved all the connections to everyday life - like with the different smells and the compounds and their properties. I also found the practice problems to be very helpful.
<input checked="" type="checkbox"/> I really enjoyed the homework software, it was very easy to use and the best online chemistry homework I've ever had. I also appreciated the tangents, such as discussing the COVID vaccine or old books when we discussed aromaticity.
<input checked="" type="checkbox"/> I think that the homework's were extremely helpful. I think the most helpful thing for me was reading the book and doing practice problems.
<input checked="" type="checkbox"/> In class practice
<input checked="" type="checkbox"/> Practice problems or relevant out of class resources to apply the concepts taught in lectures.
<input checked="" type="checkbox"/> Professor Chamberlain is a very polite and genuine individual. I felt comfortable talking to him in class and about issues with the material. His class time was spent effectively showing the processes within OChem.
<input checked="" type="checkbox"/> Really enjoyed the lecture style. Focusing on mechanisms a lot was really helpful, as that was the hardest thing to learn from the textbook. I liked most of the homework. I thought the tests were hard but fair.
<input checked="" type="checkbox"/> The homework and pre-lecture assignments were very helpful for my learning. I appreciated the teacher's availability to arrange a time to meet with me when regular student hours conflicted with my schedule. I also felt that the team tests were very beneficial in helping me learn and solidify my understanding of the course material. I appreciated the handouts given in class too. I also appreciated earning more points through the small assignments offered.
<input checked="" type="checkbox"/> The homework assignments and class structure were very conducive for learning.
<input checked="" type="checkbox"/> The homework was what I found to be the most useful.
<input checked="" type="checkbox"/> The textbook and practice problems
<input checked="" type="checkbox"/> The weekly homework assignments were really helpful! I also appreciated all of the opportunities for extra credit.
<input checked="" type="checkbox"/> What helped me learn a lot in this class was doing the practice problems in the homework and what gaps I was missing. It helped that these problems were from the textbook, so I could find a similar one or if I was super stuck, I could look and correct my work. I also enjoyed doing the team work portion with my group as that allowed me to learn and think on doing the synthesis problems different ways. I also liked the pre-lectures to keep us aware of the upcoming week.
<input checked="" type="checkbox"/> What helped me learn the most in this class was practice problems. I did the practice problems in the book and many other resources including organic chemistry as a second language and chads prep.
<input checked="" type="checkbox"/> Working problems and lots of identifying situations (each reaction has variables and you need to understand those to effectively complete the work).
<input checked="" type="checkbox"/> practice problems

General comment: Graded homework was instituted this semester in response to student feedback in prior semesters. Several student comments address homework directly.

Building a culture of trust promotes meaningful and authentic student-faculty interactions that enrich the student learning experience.

Suggestions for improvement.

A study guide for the exams would be really helpful. It would also be nice to scale the grading for the ACS-style questions in the same way that the actual ACS is scaled. Finally, it would be nice if the homework were weighted a little more in calculating the overall course grade.

							Mean	Mean				
Work collaboratively.	24	92	8		2.92	0.28	2.94	2.95	2.83	2.59	2.53	2.48
Connect to community.	24	50	25	25	2.25	0.83	2.21	2.23	2.12	2.11	2.20	2.33
Participate in events.	24	50	33	17	2.33	0.75	2.44	2.41	2.29	1.83	1.88	2.02

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