Instructor: **Name:** Dr. Allegra Liberman-Martin
Email: libermanmartin@chapman.edu
Office Hours: TBA

Textbooks/Materials: Organic Chemistry (w/Wiley Plus Card & SSM/SG), Author: Klein, Publisher: John Wiley & Sons, Incorporate, Edition: 3rd, Year Published: 2017 **(required)**

Supplemental Instructors (SI): **Link to access SI sessions: chapman.joinknack.com**

Course Description: CHEM 230 is the first semester of a two-semester (one year) study of organic chemistry. Students will learn fundamental and essential concepts, and the relevance of organic chemistry to a number of subjects. Topics of discussion will include the organic functional groups containing carbon-carbon double bonds, triple bonds, the alkyl halides, alcohols, ethers, and organometallic compounds. The structure and properties of organic compounds, nomenclature of organic compounds, stereochemistry, and spectroscopic methods of analysis will also be studied. There will be an emphasis on the relationship between structure and functionality in organic compounds, and the electron pushing mechanisms for organic reactions. Introductory synthetic organic chemistry will be covered.

Course-Wide Intended Learning Outcomes: At the end of this course, each student will be able to:

- Describe, and give examples of the basic principles, concepts, and theories from the first semester of organic chemistry, including the central role of the scientific method and the importance of observation.
- Apply reasoning skills acquired in the classroom to solve problems through assigned homework sets, guided inquiries and laboratory exercises.
- Apply the scientific method to evaluate and analyze data and draw conclusions based upon that analysis.

Program-Wide Intended Learning Outcomes: In addition to the above learning outcomes, CHEM 230 supports, in part, the learning outcomes for the B.Sc. in Chemistry:

- Apply the scientific method to solve problems
- Demonstrate written, visual and oral presentation skills to communicate scientific knowledge
- Apply critical thinking and analytical skills to design and execute a scientific experiment, thoroughly analyze the results, and arrive at well-reasoned scientific conclusions.
- Demonstrate an understanding of core knowledge in chemistry

Please see the end for detailed learning outcomes (Hint: study guide)

Success Strategies: Your deep understanding of fundamental organic chemistry concepts coupled with frequent and consistent practice of conceptual and algorithmic problems is **crucial** for success in this course. And as we progress through the course material, you will build on, and reinforce, fundamental concepts from previous chapters. As a result, your instructor has designed this course to encourage necessary **daily** practice (see Class Structure). In addition, here are some additional best-practices that you are encouraged to implement:

- Dedicate 2–3 hours to studying and solving organic chemistry problems every day.
- Attend each class prepared to solve more problems. Ask questions!
- Attend office hours frequently with specific questions on concepts or problems you have attempted.
- **Attend Supplemental Instructor (SI) Sessions Once Per Week**: All SIs are students who not only excelled in the course in previous years but are also trained to teach effectively. Each SI will engage you in instructor-approved practice problems. They will also answer any ongoing questions you have.

Class Structure: Class sessions will be held on Zoom (link provided on course Canvas page).

Prior to each class time, you will be expected to (1) do the assigned pre-lecture readings and/or watch the pre-lecture videos made by the instructor, and (2) take the pre-lecture quiz.

As you log into the Zoom class, you will be expected to (1) download the in-lecture worksheet from Canvas, and (2) think critically, communicate with your instructor and your peers, and solve the worksheet problems. To ensure an active and

vibrant class, your visual and audio presence is expected. Please plan to have your webcam turned on and be prepared to speak during discussions and breakout sessions.

After each class, you will be expected to (1) solidify your learning by solving the suggested problems**, and (2) attend office hours and SI sessions with questions you have on any of the concepts introduced in the pre-lecture materials, in-lecture worksheets, or in the suggested problems.

** You can find the suggested problems for each class day in the course schedule. The instructor will not collect or grade your solutions to these problems.

Pre-Lecture Quizzes: An online quiz will be assigned before every class (except on review days and exam days). Pre-lecture quizzes will be posted on Canvas ≥24 hours before the upcoming class, and will be due at 9:00am the day of class. Use this to assess your understanding of the assigned pre-lecture reading/video. **There are no make-up quizzes and your lowest six pre-lecture quizzes will be dropped.**

Attendance and Participation: You are expected to attend each Zoom session at your scheduled class time and participate fully in the in-lecture exercises and discussions. To foster this, your instructor will take attendance each class day and will record your participation during in-class activities (through polls, file uploads, etc.) – each of which will be worth 1 point. Your accumulated attendance and participation points are worth a maximum of 5% of your total grade. Excused absences with documentation (due to illness, religious holidays, or an official University event) do not lower your attendance and participation score. In addition, up to three unexcused absences are permitted without a grade penalty during the semester.

In-Class Quizzes: During each Friday class session (except on exam days and the last day of the semester), a 15-minute Canvas quiz will be given. Each Friday quiz could contain material covered in the prior week (Friday the previous week and Monday and Wednesday earlier in the week). In-lecture quizzes are designed to provide practice with the technology and style of questions you could encounter on an exam. Ten in-lecture quizzes will be given throughout the semester, and **your lowest two in-lecture quiz scores will be dropped**.

Exam and In-Class Quiz Authorizations: You are authorized to use your textbook, your notes, a calculator of your choice, and any material your instructor has provided to you while completing exams and in-class quizzes. You are not authorized to speak with anyone other than your instructor (including classmates, family members, friends, etc.) or use the internet (beyond the course Canvas page) while completing exams. All exams and in-class quizzes will be given through the course Canvas website and will be proctored in Zoom (link provided through Canvas). During the exam/quiz, you must be on Zoom with your webcam (either on a computer or cell phone) turned on and your face visible.

Course Policy on Unauthorized Assistance in Exams and In-Class Quizzes: The organic chemistry faculty take cases of academic integrity violations very seriously. All suspected academic integrity violations for any in-class quiz, lecture exams, or the final cumulative exam will be investigated fully according to Chapman's Academic Integrity Policy. See below for the baseline sanctions for any academic integrity violation in each assessment.

Assessment	**Baseline Sanction for Academic Integrity Violation**
In-Class Quiz	A zero on **all** in-class quizzes
Lecture Exam	An 'F' in the course
Final Cumulative Exam	An 'F' in the course

Alternate Meeting Times for Lecture Exams: It is our goal to give all students enough time to demonstrate their knowledge during lecture exams. To support this goal, the three lecture exams for this course will be administered via Zoom to all students taking **CHEM 230** on the following **Friday** dates from **12:00pm to 1:15pm**: **September 25, 2020; October 23, 2020**; and **November 20, 2020**. Note that the exam testing period is ***not*** during the regular class time and there will be ***no organic chemistry classes on these dates***. Students are required to attend the scheduled test periods in order to take the lecture exams. All efforts have been made prior to the beginning of this course to accommodate students with potential

conflicts of the exam times with other courses. However, should you foresee conflicts with other courses during Add/Drop period, it is imperative that you let your instructor know as soon as possible.

Students with Testing Accommodations who take accommodated exams at the Testing Center will reserve a time on the scheduled exam dates of September 25, 2020, October 23, 2020, and November 20, 2020.

Make-Up Policy for In-Lecture Quizzes and Lecture Exams ONLY: The only reasons that qualify for a make-up in-lecture quiz or lecture exam are: (1) serious illness with proper documentation (i.e., doctor's note or Dean of Students' Letter), or (2) required attendance at an **OFFICIAL** University event with written notification to the professor **PRIOR** to the exam and as early as possible. Please note that Greek events are not considered official University events.

Evaluation: Your grade in this course is based on attendance and participation, pre-lecture quizzes, in-class quizzes, three lecture exams, and a final cumulative exam.

Assessment	Date	Weighting (%)
Attendance + Participation	Frequently (In class)	5
Pre-lecture quizzes	Frequently (24 hrs before class)	10
In-class quizzes	Weekly	15
Lecture exam 01	Fri., Sept. 25, 12:00 – 1:15 pm	15
Lecture exam 02	Fri., Oct. 23, 12:00 – 1:15 pm	15
Lecture exam 03	Fri., Nov. 20, 12:00 – 1:15 pm	15
Final cumulative exam	Wed., Dec. 16 8:00 – 10:30 am	25

Course Grading Rubric:

Score (%)	Grade	Score (%)	Grade
92.5 – 100	A	72.5 – 76.9	C
89.5 – 92.4	A–	69.5 – 72.4	C–
87.0 – 89.4	B+	67.0 – 69.4	D+
82.5 – 86.9	B	62.5 – 66.9	D
79.5 – 82.4	B–	59.5 – 62.4	D–
77.0 – 79.4	C+	< 59.5	F

Progressive Improvement Exam Scoring: To encourage consistent study habits throughout the semester and lower stress levels surrounding exams, we use an exam scoring system that encourages progressive improvement. If you **score higher** on an exam **directly after** an exam with a **lower score**, your score on the prior lower exam will be **increased to the average of the two scores.** For example, if you receive a 60% on Exam 1 and an 80% on Exam 2, your Exam 1 score will be retroactively raised to 70%. Note that Exam 3 and the Final have no effect on Exam 1. This policy includes the ability of the cumulative final exam to impact a lower score on Exam 3. Also, note that **a lower score on a later exam will never lower an earlier exam score**.

Extra Credit Policy: After Lecture Exams 1, 2, and 3, a link to a post-exam survey will be provided. This survey is designed to help you to analyze your exam performance and find strategies that work best for you in learning the material. Completing the post-exam survey one time after a given lecture exam will result in one percentage point of extra credit being added to your exam percent score. There are no additional extra credit opportunities for this course.

Course Electronic Access: Course materials including the syllabus are available on Canvas. The Canvas site will be the primary repository of all course components, including pre-lecture videos, quizzes, exams, and Zoom links.

Academic Integrity Policy: Chapman University is a community of scholars that emphasizes the mutual responsibility of all members to seek knowledge honestly and in good faith. Students are responsible for doing their own work and academic dishonesty of any kind will be subject to sanction by the instructor/administrator and referral to the university Academic Integrity Committee, which may impose additional sanctions including expulsion. Please see the full description of Chapman University's policy on Academic Integrity at www.chapman.edu/academics/academicintegrity/index.aspx.

Students with Disabilities Policy: In compliance with ADA guidelines, students who have any condition, either permanent or temporary, that might affect their ability to perform in this class are encouraged to contact the Disability Services Office. If you will need to utilize your approved accommodations in this class, please follow the proper notification procedure for informing your professor(s). This notification process must occur more than a week before any accommodation can be utilized. Please contact Disability Services at (714) 516–4520 or visit www.chapman.edu/students/student-health-services/disability-services if you have questions regarding this procedure or for information or to make an appointment to discuss and/or request potential accommodations based on documentation of your disability. Once formal approval of your need for an accommodation has been granted, you are encouraged to talk with your professor(s) about your accommodation options. The granting of any accommodation will not be retroactive and cannot jeopardize the academic standards or integrity of the course.

Equity and Diversity Policy: Chapman University is committed to ensuring equality and valuing diversity. Students and professors are reminded to show respect at all times as outlined in Chapman's Harassment and Discrimination Policy. Please see the full description of this policy at http://www.chapman.edu/faculty-staff/human-resources/eoo.aspx. Any violations of this policy should be discussed with the professor, the dean of students and/or otherwise reported in accordance with this policy.

Student Support at Chapman University: Over the course of the semester, you may experience a range of challenges that interfere with your learning, such as problems with friend, family, and or significant other relationships; substance use; concerns about personal adequacy; feeling overwhelmed; or feeling sad or anxious without knowing why. These mental health concerns or stressful events may diminish your academic performance and/or reduce your ability to participate in daily activities. You can learn more about the resources available through Chapman University's Student Psychological Counseling Services here: https://www.chapman.edu/students/health-and-safety/psychological-counseling/

Food Pantry Assistance: If you or a student you know could benefit from access to the food pantry or would like more information on the food pantry program, contact the Dean of Students at (714) 997-6721.

Detailed Intended Learning Outcomes

Unit 01: Bonding, Acidity, and Conformational Analysis of Alkanes

By lecture exam 01, you should be able to:

- Draw Lewis structures for all covalent compounds.
- Assign formal charges to all atoms in any organic compound.
- Predict hybridization, draw hybrid-orbital diagrams, and determine geometry from Lewis structures.
- Identify constitutional isomers for organic molecules.
- Determine bond polarity and overall dipole moments for organic molecules.
- Identify noncovalent interactions within and between organic compounds.
- Rationalize boiling point differences between organic compounds.
- Interconvert between condensed, skeletal, Lewis structures, and chemical formulas.
- Identify functional groups in any molecule.
- Draw short-hand structures in 3-D perspective (i.e., using dashes and daggers).
- Draw resonance forms of Lewis structures and use curved-arrow notation to interconvert between resonance forms.
- Draw and interpret resonance hybrids.
- Label localized and delocalized electrons and determine in what type of orbital they reside.
- Identify the acid, base, conjugate acid, and conjugate base in any Brønsted-Lowry acid-base reaction.
- Predict the curved-arrow mechanism and products of any acid-base reaction.
- Predict the equilibrium favorability of acid-base reactions.
- Recall the general pKa range for the following groups: alkanes, alkenes, alkynes, amines, carboxylic acids, amides, ethers, hydrogen halides, sulfuric acid, ketones, alpha carbons, and water (include all reasonable protonation states of these species).
- Identify the structural and electronic factors governing acidity.
- Predict the most prevalent acid or base in any solution.
- Identify Lewis acids and Lewis bases and show curved-arrow mechanisms for their reaction.
- Convert between names and short-hand structures for any saturated organic compound.
- Interconvert between Newman and other projections of organic molecules.
- Dissect the ground and transition state conformers arising from single-bond rotations. Identify the relative energies.

Unit 02: Stereoisomerism, Principles of Organic Reactivity, Substitution and Eliminations

By lecture exam 02, you should be able to:

- Compare strain and stability of cycloalkanes with different ring sizes.
- Draw ring structures for (substituted) cyclohexanes. Identify and draw ring-flipped chair conformers. Predict relative stability of monosubstituted cyclohexane chair conformations.
- Define stereoisomerism and identify the classification of stereoisomers.
- Assign the Cahn-Ingold-Prelog (CIP) *R/S* system to asymmetric centers.
- Explain optical activity.
- Determine when plane-polarized light is affected by a sample.
- Use optical rotation in calculating enantiomeric excess.
- Differentiate between enantiomerism, diastereomerism, meso compounds, and constitutional isomerism.
- Explain the relationship between symmetry and chirality.
- Draw and identify *E-Z* stereoisomerism.
- Draw and identify *cis-trans* stereoisomerism in cyclohexanes and predict their relative stabilities.
- Understand the relationship between bond dissociation energies and bond strength and bond length.
- Use bond dissociation energies to predict enthalpy of reactions.
- Predict entropy of reactions qualitatively.
- Exploit the relationship between enthalpy, entropy, and Gibbs free energy.
- Predict the position of equilibria using K_{eq} and *G*.
- Depict energy changes during a chemical reaction using a reaction coordinate diagram. This includes drawing and labeling the diagram's axes, as well as showing relative energies of reactants, transition states, intermediates, and products.
- Identify nucleophilic and electrophilic centers.
- Draw curved-arrow mechanisms for nucleophilic attack, proton transfer, loss of a leaving group, carbocation rearrangement.
- Determine the appropriate reagents, predict the products and stereochemical outcomes, and propose mechanisms for S_N2, S_N1, E2, and E1 reactions involving alkyl halides.
- Correlate proposed mechanisms to the rate-law of any organic reactions.
- Use the Hammond Postulate to rationalize reactivity.
- Predict the relative stability of alkenes.

Unit 03: Addition to Unsaturated C-C Bonds, Alcohols

By lecture exam 03, you should be able to:

- Recognize addition and elimination reactions.
- Compare enthalpy or entropy changes that occur during addition or elimination reactions.
- Determine the appropriate reagents, predict the products and stereochemical outcomes, and propose reasonable mechanisms for the following reactions involving alkenes: hydrohalogenation, hydration, alcohol addition, hydroboration-oxidation, halogenation, dihydroxylation, and epoxidation
- Determine the appropriate reagents and predict the products and stereochemical outcomes for the following reactions involving alkenes: oxymercuration-demercuration, hydrogenation, and ozonolysis.
- Explain the relative acidities of alkane, alkene, and terminal alkyne C–H bonds.
- Determine if a base is strong enough to deprotonate a terminal alkyne.
- Determine the appropriate reagents, predict the products and stereochemical outcomes, and propose mechanisms for the following reactions involving alkynes: hydration, hydroboration-oxidation, and Brönsted acid-base reactions.
- Determine the appropriate reagents and predict the products and stereochemical outcomes for the following reactions involving alkynes: hydrohalogenation, halogenation, ozonolysis, and hydrogenation.
- Draw mechanisms for acid- and base-catalyzed tautomerizations.
- Identify reagents that can be used to deprotonate alcohols.
- Propose reagents to prepare alcohols using substitution and addition reactions.
- Determine oxidation states to determine if a reaction involves oxidation, reduction, or neither.
- Determine appropriate reagents, predict the products and stereochemical outcomes, and propose mechanisms for aldehyde or ketone reduction using $NaBH_4$ or $LiAlH_4$.

- Determine the appropriate reagents, predict the products and stereochemical outcomes, and propose mechanisms for substitutions and elimination of alcohols.
- Identify strong and weak oxidants.
- Determine appropriate reagents and predict the products for alcohol oxidation reactions.
- Propose multi-step syntheses of compounds using any combination of reactions we've learned so far.

Unit 04: Ethers and Epoxides, Radicals

- Determine the appropriate reagents, predict the products and stereochemical outcomes, and propose mechanisms for the preparation of ethers using the Williamson ether synthesis.
- Determine the appropriate reagents, predict the products and stereochemical outcomes, and propose mechanisms for the ring-opening of epoxides under basic and acidic conditions.
- Explain the regiochemistry of epoxide ring opening under basic or acidic conditions.
- Explain the structure, geometry, and relative stability of carbon radicals.
- Rank the relative C–H bond strengths within a molecule.
- Draw resonance structures for carbon radicals.
- Identify common curved-arrow patterns in radical mechanisms and draw mechanisms for radical reactions using fishhook arrow-pushing patterns.
- Identify initiation and propagation steps for a radical reaction.
- Use the Hammond Postulate to rationalize the difference in selectivity between radical chlorination and bromination reactions.
- Determine the appropriate reagents, predict the products and stereochemical outcomes, and propose mechanisms for radical halogenation reactions, allylic bromination, and radical addition of HBr to alkenes.
- Propose multi-step syntheses of compounds using any combination of the reactions learned in the course.

Tentative Schedule

Week	Day	Date	Topic	Reading	Suggested Problems
1	M	8.31	Introductions; **Bonding I:** Review of Lewis structures, formal charges	**1:** 01-04	**1:** 3–6, 8, 9, 11–14
	W	9.02	**Bonding II:** VBT, MO, HAO, VSEPR	**1:** 06-10	**1:** 21–29, 41, 49, 50, 51, 54, 55, 56, 58, 59
	F	9.04	**Bonding III:** Polar covalent bonds, polarity, intermolecular forces	**1:** 05, 11, 12	**1:** 15–17, 31–34, 37, 38, 43, 48(a-e, g, h), 52, 53, 57, 60, 61, 62, 63, 64, 65
	Integrated and Challenge Problems: **1:** 66, 71, 79, 80, 81				
2	M	9.07	**No Class - Labor Day**		
	W	9.09	**Notation I:** Drawing and interpreting bond-line structures, functional groups	**2:** 01-06	**2:** 1–5, 7–10, 34, 37, 38, 39, 40, 43, 44, 45, 48, 49, 50, 54, 55
	F	9.11	**Notation II:** Resonance contributors, curved arrow notation, resonance hybrid	**2:** 07-10, 12, 13	**2:** 12–16, 18–25, 29, 31–33, 41, 46, 47, 52, 53, 56, 57, 58, 59, 60, 61, 63
	Integrated and Challenge Problems: **2:** 64–67, 70, 81				
3	M	9.14	**Acid/Base I:** Bronsted-Lowry acidity, Lewis Acidity, equilibrium position I	**3:** 01-04, 09	**3:** 1–11, 13–25, 32, 34, 35, 36, 37, 41, 42, 43, 44, 47, 48
	W	9.16	**Acid/Base II:** Equilibrium position II, leveling effects, counterions	**3:** 05–08	**3:** 27–31, 38, 39, 40, 46
	Integrated and Challenge Problems: **3:** 49, 52–54, 60–62, 72				
	F	9.18	**Alkanes I:** nomenclature, constitutional isomers, relative stabilities	**4:** 01, 02 (except bicyclic compounds), 03, 04	**4:** 1, 2, 4, 5, 8–10, 14, 36(a–i), 37, 39, 40(a-b)

4	M	9.21	**Alkanes II:** Newman, conformational analysis of alkanes	**4:** 06–08	**4:** 16–20, 38, 41, 42, 45, 47a, 48a, 49, 53, 55–57
	W	9.23	Review		
	Integrated and Challenge Problems: **4:** 61, 63(a,c,d,i), 65, 66				
	F	**9.25**	**LECTURE EXAM 01**	**Weeks 1–4**	
5	M	9.28	**Alkanes III:** conformational analysis of cycloalkanes, substituted cyclohexanes	**4:** 09-13	**4:** 21–27, 47(b-c), 48(b–d), 51a
	W	9.30	**Stereo I:** Introduction to stereoisomerism, Cahn-Ingold-Prelog system	**5:** 01-03	**5:** 1–2, 4, 6–7, 31, 32, 34, 35, 39 (a–e, g) 50
	F	10.02	**Stereo II:** Optical activity, enantio-/diastereomers, symmetry, chirality	**5:** 04-06	**5:** 17, 18, 19 (c–e), 21–23, 24 (b, c), 36 (a–d, f–h), 37, 38(a–c, e), 40, 41, 42, 43, , 45 (a, c), 46ab, 49, 51, 52, 54, 55(b–e), 56
6	M	10.05	**Stereo III:** cyclic systems, chiral compounds without chiral centers, E/Z	**4:** 13, 14; **5:** 08, 09, 11	**4:** 28–30, 32, 44(b–d), 50, 51(b-d), 52, 58; **5:** 19 (a, b), 24 (a, d, e), 28–30, 36e, 44 (b, c), 45 (b, d), 55(a, f–i)
	Integrated and Challenge Problems: **4**: 62, 63(b–h,j,k), 67; **5:** 57abfgh, 61–64, 66– 68, 72, 78				
	W	10.07	**Reactivity I:** Review of ΔS, ΔH, ΔG, K_{eq} *k*, Ea, reaction coordinate diagrams	**6:** 01-06	**6:** 1–4, 6 (a, b, c), 7, 19–26
	F	10.09	**Reactivity II:** nuc & elec, arrow pushing	**6:** 07-12	**6:** 8–15, 17, 18, 27–41
	Integrated and Challenge Problems: **6:** 42–46, 48, 51a, 57 (a, c)				
7	M	10.12	**Sub/Elim I:** S_N2	**7:** 01, 02 (structure) 03–04	**7:** 2–6, 8–9, 51–57
	W	10.14	**Sub/Elim II:** E2	**7:** 06–08	**7:** 11, 15–19, 21, 23–25, 58–67, 69, 72d, 75, 79
	F	10.16	**Sub/Elim III:** S_N1/E1, mechanisms	**7:** 09	**7:** 27–28, 30–31, 33–34, 70(c–d), 73
8	M	10.19	**Sub/Elim IV:** S_N vs E	**7:** 11, 13	**7:** 37, 44–45, 76 (a–i), 77, 78
	W	10.21	Review		
	Integrated and Challenge Problems: **7:** 80, 81, 82, 85, 90, 91				
	F	**10.23**	**LECTURE EXAM 02**	**Weeks 5–8**	
9	M	10.26	**Alkenes I:** thermo, hydrohalogenation,	**8:** 01, 03-04	**8:** 1–7, 41, 44(c–d), 61, 64, 71, 72
	W	10.28	**Alkenes II:** acid-catalyzed hydration, Oxymercuration-demercuration	**8:** 05-06	**8:** 8–13, 44(a–b), 54, 56, 57b
	F	10.30	**Alkenes III:** hydroboration-oxidation, catalytic hydrogenation	**8:** 07-08	**8:** 14–16, 18–19, 48, 53, 57c, 58, 67
10	M	11.02	**Alkenes IV:** halogenation, halohydrin formation, anti-dihydroxylation	**8:** 09-10	**8:** 20–25, 55, 57d, 59, 65
	W	11.04	**Alkenes V:** syn-dihydroxylation, oxidative cleavage, synthetic strategies	**8:** 11-14	**8:** 27–29, 31–33, 35, 37–40, 42–43, 45–47, 49, 50, 52, 60, 62–63, 68–70
	Integrated and Challenge Problems: **8:** 74, 76–78, 79a, 80, 81, 83,				
	F	11.06	**Alkynes I:** acidity, preparation, reduction	**9:** 01, 03-05	**9:** 5–11, 34, 35, 38, 42, 53
11	M	11.09	**Alkynes II:** hydrohalogenation, hydration, halogenation, ozonolysis	**9:** 06-09	**9:** 13–22, 24, 39, 44b, 50, 51
	W	11.11	**Alkynes III:** alkylation, synthetic strategies	**9:** 10-11	**9:** 27, 29, 30, 36, 37, 41, 45, 48, 49, 52, 54, 56
	Integrated and Challenge Problems: **9:** 57, 59, 61–65, 70, 72				

	F	11.13	**Alcohols I:** structure, properties, oxidation states, preparation	**12:** 01 (except nomenclature), 02-05	**12: 5,** 7–11(abc**),** 30, 31, 36, 42, 43c, 47, 48
12	M	11.16	**Alcohols II:** Sn/E, oxidation	**7:** 12; **12:** 09-10	**7:** 41–43, 70(a–b), 71, 72(a–c); **12:** 17–21, 22, 32, 33, 37b, 38, 39, 43(a–b), 44, 45abd, 49
	W	11.18	Review		
	Integrated and Challenge Problems: **7:** 83, 87, 89, 98; **12:** 53, 54(a, c, e, k, l, m, p), 55, 56, 62, 63, 67				
	F	**11.20**	**LECTURE EXAM 03**	**Weeks 9–12**	
THANKSGIVING BREAK! Nov 23rd – 27th					
14	M	11.30	**Ethers and Epoxides:** structure, properties, preparation, epoxide ring opening	**13:** 01, 03, 05, 08, 10	**13:** 5–6, 13–14, 16(b–f), 18, 29, 34, 35, 36, 37bc, 38(b–f), 42, 45
	Integrated and Challenge Problems: **13:** 46, 47, 48, 49, 51(e–k, o, r–u), 57, 59				
	W	12.02	**Radicals I:** common patterns in radical mechanisms, chlorination of methane	**10:** 01-03	**10:** 1–11, 23, 24, 25
	F	12.04	**Radicals II:** Thermodynamic considerations, selectivity, and stereochemistry of radical halogenations	**10:** 04-06	**10:** 12–14, 33(a–c, f), 34, 39, 40
15	M	12.07	**Radicals III:** Allylic bromination, Radical hydrobromination, synthetic considerations	**10:** 07, 10, 13	**10:** 16, 21–22, 27, 29, 32, 33(d–e), 35, 37, 38
	Integrated and Challenge Problems: **10:** 42–50, 61a				
	W	12.09	Review		
	F	12.11	Review / Exit		