Organic chemistry II has an associated laboratory course, Chem 2204. The course is a separate registration. The two parts are to be taken concurrently, but credit for them is earned independently.

Course Prerequisites: Successful completion of Organic Chemistry I (2201) and the Organic Chemistry Lab I (2203) with both grades C- or better is a prerequisite.

Course Summary: Organic chemistry is one of the hardest undergraduate subjects to study because it has linguistic, artistic, and conceptual aspects that require memorization, application, and even manual dexterity. A lot of commitment goes into learning organic chemistry on a short time-frame, and success comes to those who are disciplined, detail-oriented, and not easily intimidated.

Dr. Rarig’s Tips for Success:
- Attend all lectures and stay focused. Try to think of it as a vacation from everything else.
- Keep up. It is extremely easy to fall behind in the class, and once behind it is extraordinarily difficult to catch up. Commit to reading 30-45 minutes per day for this course.
- Keep perfection as an aspiration, but not an expectation. The expectation of perfection in this course is an unrealistic one that historically causes more depression than motivation.
- Identify your weaknesses and turn them into strengths. Embrace mistakes as learning opportunities.
- Work a few of the assigned problems every day at a pace to cover them all over the course of a week. It is much more effective to ask a question about material you have already tried to apply; that way your instructors can help pinpoint and trouble shoot your specific misunderstanding.
- Use the supplemental resources as often as possible.

Goals and Objectives: The primary goal of this course is to understand organic chemistry and to develop critical thinking skills related to the subject matter. The specific objectives are:

- To learn the nomenclature of aromatic rings and carbonyl compounds.
- To learn properties of aromatic and carbonyl compounds, carbohydrates, amino acids.
- To learn the mechanisms of a variety of organic reactions.
- To learn to apply molecular orbital analysis to these reaction mechanisms.
- To be familiar with the nomenclature, preparation and reactions of the functional groups: aromatic rings, aldehydes, ketones, carboxylic acids, and the acid derivatives.
- To understand the three-dimensional shapes of simple organic molecules and how those shapes affect reactivity.
- To use information from Organic Chemistry I and II in multiple step transformations of simple organic molecules.
- To be familiar with the analytical tools used to identify organic compounds.
Student Learning Outcomes:
Students will be able to:
• Recognize aromatic compounds, aldehydes, ketones, carboxylic acids, and the acid derivatives and know the shape of each functional group.
• Name in a systematic manner simple organic compounds such as carbonyl compounds.
• Construct three-dimensional models of these organic compounds.
• Interpret simple spectral data.
• Understand the following mechanisms: electrophilic aromatic substitution, nucleophilic addition to carbonyl compounds, addition-elimination reactions with acid derivatives.
• Know about organic reactions from O-Chem I and II that are useful in organic synthesis.
• Recognize the organic reactions from Organic Chemistry I and II that are involved in biochemical pathways.

Temple University Chemistry Department’s Tips for Success
Organic chemistry is a fascinating subject. Depending on how well you understood O-Chem I, O-Chem II might be a more challenging course. If you have learned how to “push electrons,” then you are in good shape for the additional information that will be presented in this second semester. You can make O-Chem easier by:

1. **Doing additional problems.** Do as many problems as you have time for, beyond those assigned. Even if they are from another book, the practice will help.
2. **Studying regularly.** If you fall behind, it's hard to catch up. Some students will need to work on organic chemistry 10-15 hours per week outside of class. Some will be able to understand the material with 2-3 hours per week. It has been my experience that: a) paying attention to detail and b) wanting to learn why things happen, are the most common characteristics of students who do well in O-Chem.
3. **Understanding the theory and method.** You may try to memorize definitions and summaries at the end of each chapter, but there is too much material to memorize it all, particularly in O-Chem II.
4. **Working together.** Study groups are very helpful. Be an active contributor in your group.
5. **Seeking help immediately** if you have trouble. Make use of instructor office hours and additional time that your instructor can give you. **Don't wait until the last minute!** A lot of the material taught in this course is cumulative and you need to understand material throughout the course to understand later material.
6. **Using the language of O-Chem.** Organic Chemistry is like learning a new language. There is fundamental terminology that must be incorporated in your vocabulary. Then there are concepts you will learn and you will be asked to apply the concepts in scientific analysis. These types of questions are not handled well by memorization. Unlike many other courses, the concepts introduced each week of the class will remain important during the remainder of the course, including material from O-Chem I.
7. **Get Help!** Make certain you take full advantage of all the academic support services available at Temple. These include instructor office hours, TA office hours, the Center for Learning and Student Success (CLASS) located at 1810 Liacouras Walk, 2nd floor, as well as supplemental help sessions. The services provided at the CLASS include one-on-one tutoring, computer lab, weekly group tutorials/supplementary instruction, final exam review sessions, and a resource library. The center is open 6 days a week. For additional information check [http://www.temple.edu/class/](http://www.temple.edu/class/). The reserve desk in the Paley Library has several organic chemistry texts, including the Jones/Fleming text, and study guides that are available for limited time checkout. There are several copies of the American Chemical Society Official Guide “Preparing for Your ACS Examination in Organic Chemistry” in the reserve collection.
Course Resources

Canvas™: A Canvas site will be set up for this course. Please check that you are registered and can access this course on Canvas™. Announcements and e-mails will be sent out via Canvas™ so it is imperative that you check this web site and your Temple email account on a regular basis. Supplemental materials, messages and schedule adjustments will be posted there. Your exam scores will be posted on this site so you can get a feel for how you are doing in the course.

Recitation Class: Each of you has a recitation section and a TA. We recommend that you attend recitation classes because the class sizes are smaller than lecture class. You can interact more with the TA in that setting. The format will be question & answer-type, not a lecture format. You will get the most out of recitation if you have read the material and tried the problems before attending.

Lecture Class: Your attendance at all lectures and recitations is expected and essential to your success in this course. In case of emergency, you may attend a lecture or recitation section other than your assigned one. Each chapter should be read before it is covered in the lecture (see attached calendar). This is your preparation for the lecture class. If you don’t understand the material after you have read it, the lecture may clarify the material. If you still don’t understand the material, you can ask questions during lecture and recitation sessions. If you are late for class, take a seat that does not interrupt the lecture or disturb other students. Please be sure your cell phone is off during class.

Quizzes and Homework: Many quizzes will be given during the semester. These quizzes are designed to prepare you for examinations and to make sure you understand key materials and concepts. Quiz dates may be announced and the lowest quiz score dropped, depending on the instructor. The total quiz and homework score will be 200 points. Quiz questions will be similar to the problems covered in class.

Practice Exams: Practice will be posted on the course Canvas site 1 week before all exams. The proper way to utilize this resource is to mimic the exam conditions. Do not use your notes. Do not use your textbook. Allot yourself 75 minutes of uninterrupted time. After you have completed the exam, then pursue your notes and text for assistance. Answer keys will not be posted but video walk through will be.

Dr. Rarig: I have weekly office hours Wednesdays & Fridays from 3:00-4:30 PM. Additionally, you are welcome to arrange time to meet with me to discuss course content, your current performance, to solicit suggestions on improving your learning experience, or anything else pertaining to Chem 2202. Email is the best way to arrange such appointments.

Bilal Hoblos, your TA

Exam Q & A Sessions: I hold a Q & A sessions two nights before each exam, even if that night is a Sunday.

Textbook: Solomons, Fryhle, and Snyder, Organic Chemistry, 12th Ed., Wiley, 2016 (ISBN 9781119442844) is required. This is in the bookstore and it is a package that includes the textbook (looseleaf), ebook, “WileyPlus” organic online homework system, and solutions manual. It is the book you likely used for Chem 2201. If you choose not to purchase the solutions manual, then the ISBN is 9781119442868. Copies of the textbook and the solutions manual are on reserve in the Paley Library. A molecular model kit, available in the bookstore for about $20 or from the student club (TUCS, 228BE) for $15, is also strongly recommended. The
model set, regardless of where you purchased it, can be returned to the TU Chemical Society (student club) for refund at the end of the spring semester. The text “Organic Chemistry” 5th Ed., WWNorton by Jones and Fleming (ISBN 978-0-393-91303-3) provides more depth on organic chemistry and it is also available at the reserve desk in the Library.

Grading:

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<th>Points</th>
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<tbody>
<tr>
<td>Midterm Exam 1:</td>
<td>200</td>
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<tr>
<td>Midterm Exam 2:</td>
<td>200</td>
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<tr>
<td>Midterm Exam 3:</td>
<td>200</td>
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<tr>
<td>Final:</td>
<td>200</td>
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<tr>
<td>Quizzes &amp; Homework</td>
<td>200</td>
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<tr>
<td>Total:</td>
<td>1000</td>
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Grades will be based on the natural breaks.

Academic Integrity: All students are expected to adhere to the highest levels of academic integrity. Any students found cheating (i.e. copying answers to exam, quiz, or homework; submitting experimental data that they did not collect; presenting graphs and calculations; or otherwise taking credit for work that they did not perform) will receive a failing grade in the course. They will also be reported to the Dean's office in the College of Science and Technology. There are dire consequences. Please do not give cause to suspect cheating. Cheating can be detected during and after tests are handed in.

Testing Policy: All tests are given in a "Closed Books" environment. No books, notes, or reference material may be consulted during any test. You can use model sets during the exam. Giving or receiving information during examinations is a violation of the Temple Student Discipline Code and will result, at minimum, in a grade of F for this course. Electronic devices, including calculators, phones, and PDA's are not permitted in the exam room. You will be held responsible for all the material and assigned problems in the scheduled chapters, except for any sections that Dr. Rarig specifically tells you that you may exclude. Cell phones are to be turned off during exams.

1. No electronic devices may be used during an exam. Calculators are not needed in this course.
2. During testing situations, you have completed the test when you leave the room. Visit the restroom facilities before sitting for your exams.

Exams: There will be three midterm exams and a final exam. Unless other plans have been made, the exams will be administered in the classroom where the regular lectures take place. Exam questions will be similar to problems you will see in the book, in class, and on quizzes. Each midterm exam will be 200 points. The final exam will be 200 points and is an ACS cumulative standardized exam, covering ALL materials taught in this course as well as material from Organic Chemistry I. There are several copies of the American Chemical Society Official Guide “Preparing for Your ACS Examination in Organic Chemistry” in the reserve collection of the Paley Library.

Make-up Exams/Quizzes: There are no make-up exams or quizzes. If you miss a quiz, then it will be the low quiz that you drop. Dr. Rarig will work with you in the event of a serious problem.
## Course Schedule:
This schedule is tentative and subject to change. Please be alert to announced changes in class and on Canvas.

<table>
<thead>
<tr>
<th>Dates</th>
<th>Topics</th>
<th>Relevant Problems</th>
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</thead>
<tbody>
<tr>
<td>Jan 16 &amp; 18</td>
<td>Review &amp; Chapter 13: Conjugated Systems</td>
<td>(13) 1-50</td>
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<tr>
<td>Jan 23 &amp; 25</td>
<td>Chapter 14: Aromaticity</td>
<td>(14) 1-38</td>
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<tr>
<td>Jan 30 &amp; Feb 1</td>
<td>Chapter 15: Aromatic Substitution</td>
<td>(15) 1-56</td>
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<td>Chapter 20; Sections 6-8: Diazonium Salts</td>
<td>(20) 11-15, 21-25,31</td>
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<td>Feb 6</td>
<td>Midterm Exam 1</td>
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<tr>
<td>Feb 8, 13, &amp; 15</td>
<td>Chapter 16: Ketones &amp; Aldehydes</td>
<td>(16) 1-55</td>
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<td>Chapter 12: Alcohols from Carbonyls</td>
<td>(12) 1-5, 7-10, 12, 18-19, 22-26, 28-32, 36-37</td>
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<tr>
<td>Feb 20, 22, 27, &amp; Mar 1</td>
<td>Chapter 17: Carboxylic Acids &amp; Their Derivatives</td>
<td>(17) 1-49</td>
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<tr>
<td>Mar 6 &amp; 8</td>
<td>No Class: Spring Break</td>
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<tr>
<td>Mar 13</td>
<td>Chapter 17 review</td>
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<td>Mar 15</td>
<td>Midterm Exam 2</td>
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<tr>
<td>Mar 20, 22, 27, 29, &amp; Apr 3</td>
<td>Chapters 18 &amp; 19: Chemistry at the (\alpha)-Position</td>
<td>(18) 1-37</td>
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<td>(19) 1-60</td>
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<tr>
<td>Apr 5, 10, &amp; 12</td>
<td>Chapter 22: Carbohydrates</td>
<td>(22) 1-42</td>
</tr>
<tr>
<td>Apr 17 &amp; 19</td>
<td>Chapter 24: Amino Acids (also Reviewing Chapter 20)</td>
<td>(24) 1-23</td>
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<tr>
<td>Apr 24</td>
<td>Midterm Exam 3</td>
<td></td>
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<tr>
<td>Apr 26</td>
<td>Chapter 23: Lipids</td>
<td>(23) 1-25</td>
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<tr>
<td>May 7</td>
<td>ACS Final (3:30 PM; Location TBA)</td>
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The assigned homework problems in the book are listed in the Course Schedule given above. Answers to all assigned problems can be found in the Study Guide that accompanies the textbook. It is important that you work through each problem and understand the theory and methods used for its solution, and do this before the recitation in which it is discussed. Copying the answer from the Study Guide into your notebook is not likely to help much. In order to obtain a practical understanding of the material, you will need to work through the assigned problems. You should be ready to discuss the homework when your recitation class is scheduled to cover the chapter material (see attached schedule). The listed problems represent the minimum necessary for you to develop a working foundation in chemistry. Experience has shown that students who do more than the assigned problems do well in this course. You are encouraged to work additional problems and seek help outside the classroom.
On-Line Tools:

- Practice Quizzes:  [http://www.chemhelper.com/practicetests.html](http://www.chemhelper.com/practicetests.html)
- Organic reactions Quizzes and Summaries: [http://pages.towson.edu/ladon/orgrxs/reactsum.htm](http://pages.towson.edu/ladon/orgrxs/reactsum.htm)
- Electronic Flashcard: [http://www.chemistry.ohio-state.edu/organic/flashcards/](http://www.chemistry.ohio-state.edu/organic/flashcards/)
- **Online Homework**: WileyPlus is our web-based, online homework system. Online homework using the WileyPlus system might be available in your course. Your instructor will give you a code for your course if he/she chooses to use this learning tool. There will be assignments for each chapter found by going to the WileyPlus Login page which will be provided for you. You will be able to get assistance for the online homework from the Sp 2017 Diamond Peer Teacher for organic chemistry (tuf07975@temple.edu). There is also an online help desk that can be accessed (http://hesupport.wiley.com). The “WileyPlus” program has a self-assessment tool called Orion that will show how you are doing throughout the semester.

Disability Resources and Services: Any student who has a need for accommodation based on the impact of a disability should contact their instructor privately to discuss the specific situation as soon as possible. Contact Disability Resources and Services at 215-204-1280 in 100 Ritter Annex to coordinate reasonable accommodations for students with documented disabilities. ([http://www.temple.edu/disability/](http://www.temple.edu/disability/))

Non-Course Content Problems: You should first attempt to resolve any problems that you are having with your class or recitation instructor. If speaking with the instructor does not resolve the issue, then you should speak with the course coordinator (Prof. Steve Fleming, 344 BE). The coordinator will attempt to mediate, consistent with department policy. However, if you are having problems with the professional conduct of your instructor you should contact the department chair directly.

Drop/Add: Drop/Add actions are possible during the first two weeks of classes. Academic Advising must be consulted to take any of these actions. Your instructors are not a part of this process. The Temple University policy should be reviewed if you contemplate such action. The University has set the last date to drop to be Monday, January 29th.

Withdrawals: Withdrawals are possible after the drop deadline. The university has set the latest date to be Wednesday, March 21st. Note that a withdrawal (W) is an institutional procedure that does not involve your instructors in any way. This is not complete until the withdrawal form has been signed by academic advising and submitted to the Registrar's office. Temple University Policy (#02.10.14) on Withdrawal should be consulted. Please click ([http://www.temple.edu/registrar/students/excusedwithdrawal.asp](http://www.temple.edu/registrar/students/excusedwithdrawal.asp)) to view the policy.

Incompletes: Please note that an "Incomplete" or "I" is only to be given in accord with institutional procedures. An “I” cannot be assigned until the specific requirements have been met, and an Incomplete Contract has signed and submitted. This course is governed by Temple policy see: [www.temple.edu/vpus/documents/UniversityIncompleteForm.5.25.06.doc](http://www.temple.edu/vpus/documents/UniversityIncompleteForm.5.25.06.doc) for more info. To obtain an "incomplete" designation, at least 50% of the work of the course must be completed and there is a valid
reason acceptable to academic advising for missing the remainder of the course. The student's accumulated total to that point must be more than 75% of the possible points.

For those students who are assigned a grade of "I", all previous scores will stand and be used in the calculation of the final score when the course is completed. Students wishing to pursue an incomplete must obtain an Instructor Approval for an Incomplete Form (available from the web page) that the student and instructor must complete, before presentation to academic advising for final approval. No “I” designation may be requested after the final exam of the student’s section of this course has been administered.