Department of Chemistry, Michigan Technological University
Chemistry 2420, Organic Chemistry II (Spring 2012)

Syllabus

View this class as a milestone toward your degree at Michigan Tech and your career goal

Time and Place: M W F 02:05 PM-02:55 PM; Dow Env. Sci. and Eng. Building, Room 08-0641

Instructor: Dr. Shiyue Fang
Tel: 487-2023, Email: shifang@mtu.edu
CH2420 List Email: @mtu.edu

Office Hours: M, W 3:00 PM – 4:00 PM in room 19-620C, or by appointment or stop by my office at any time

Primary Textbook (Required): Organic Chemistry, 4th edition by Janice Gorzynski Smith; Publisher, McGraw-Hill; Available in MTU bookstore; 3rd edition of the book is also acceptable; the lecture will follow 3rd edition, which is about the same as the 4th edition.

Useful Reference Book:

Prerequisite: CH2400 or CH2410

Course Description: Continuation of CH2410. Covers more functional group chemistry; emphasize reaction mechanisms; more involved in multi-step synthesis; introduction to carbohydrates, amino acids, and proteins.

Homework: Homework for each chapter will be online in Sapling Learning (see below for information about Sapling Learning). They will be graded. Please pay attention on grading policy before attempting the questions. For multiple choice questions, each wrong trial will result in a reduction of points. I will not accept any excuse for making up points lost this way. In the first three assignments, for questions other than multiple choice ones, you do not get penalty for wrong trials. After the third assignment, the grading policy is changed. A 5% point penalty will be given for each wrong trial for all questions, which means for multiple choice questions, the penalty for wrong trials are higher than 5%. The due time is always set to Tuesday night at 11:55 pm, so, please always double check on Tuesdays to see if there is any homework due. Many times, homework for more than one chapter may be due on a single Tuesday. If a due date is set different from this, I will send an email to remind you. If you miss a due time, your score for that assignment will be zero.

Some materials, on which certain homework is based, may not be covered in class. This is intentionally left so to cultivate your self-study habit.

When working on the online homework, even though they are graded, you can discuss with your classmates, chemistry learning center coaches and other people. However, just taking other people’s answers without working out the problems together is considered cheating. Moreover, doing so will result in low scores in the exams because most questions will be based on online homework. Do not try to memorize the answers because
that will not work for you. The formats and the contents of the questions will be changed when putting them in
the exams.

Exams: There will be 3 exams, which are 2 mid-terms (1 hour in an evening) and 1 final (2 hours). All exams
will be comprehensive. Most questions (not all) for the exams will be a revised version of the questions from
the online homework. Other questions will be from your note in class, the PowerPoint slides discussed in class,
and SI sessions (see the Chemistry Learning Center section). More than 2/3 questions will be multiple choices;
the remaining will require short answers, mostly writing an organic reaction mechanism (curved arrow
pushing). For the 2 mid-terms, I will probably give 15 to 20 multiple choice questions and 2 to 3 short answer
questions. For the final exam, I will probably give 30 to 40 multiple choice questions and 2 to 6 short answer
questions. I must emphasize that I may NOT follow this plan. After the exams, keys will be posted in Canvas.

We will grade the exams and quizzes as soon as possible. Once finished, your score will be posted in Canvas.
You can pick up your exam from chemistry learning center in room 19-208 (see their updated schedule at
http://www.chemistry.mtu.edu/pages/clc/index.php). Any questions on the grading should be first directed to
TAs who are responsible for grading.

If you cannot take an exam due to illness or family emergency or other reasons, you must inform me before
them. I will arrange a makeup or other options for you. Your score will not be higher than the highest one other
student obtained in the scheduled exams. If you failed to inform me on time, zero points may be assigned.

The 3 exams are closed book tests, cheating may result in serious consequence for your career (not just the
grade of this class), please never even think of taking a chance!

Grading: Total 1000 points

- 1000-850 A
- 849-800 AB
- 799-750 B
- 749-700 BC
- 699-650 C
- 649-600 CD
- 599-500 D

Exam 1, 200 points (February 12, 7:00 – 8:00 pm, exam rooms will be announced)
Exam 2, 200 points (March 26, 7:00 – 8:00 pm, exam rooms will be announced)
Final, 300 points (April 28, 3:00 – 5:00 pm, exam rooms will be announced)
Online homework, 300 points (due on Tuesdays at 11:55 pm)

Points of online homework will be determined by: [(total points you earned)/(total points of online homework)]
× 300 = your points of online homework

Instruction Methods: PowerPoint presentation and writing using a projector. The PowerPoint slides will be
posted in Canvas (they can be found by clicking on “Assignments” under “Course Tools”), so you may not need
to try to record into your note. In the past, some students printed the slides, and took notes on the printed slides.
That is a good option. If I find that many students do not attend the lectures due to the availability of slides, I
may choose not to post them. In any case, you need to record what I write and draw over the projector. These
notes will not be posted or provided to you. The only way to have it is to write and draw with me. I do not
prevent you from getting notes from your classmates however. All questions in the exams will be from the notes and PowerPoint slides, and the online homework.

**Sapling Learning:** Sapling's chemistry questions are delivered in a web browser to provide real-time grading, response-specific coaching, improvement of problem-solving skills, and detailed answer explanations. Dynamic answer modules enable one to interact with 3D models and figures, utilize drag-and-drop synthetic routes, and draw chemical structures - including stereochemistry and curved arrows. Altogether, Sapling is cheaper than a tutor, provides more value than a solutions manual, and goes beyond a mere assessment exercise to give a learning experience.

We will be using Sapling Learning for our homework. To get started:

1. Go to [http://saplinglearning.com](http://saplinglearning.com) and click "US Higher Ed" at the top right.
2. Sign in
   a. If you already have a Sapling Learning account, log in and skip to step 3.
   b. If you have a Facebook account, you can use it to quickly create a Sapling Learning account. Click “Create an Account”, then “Create my account through Facebook”. You will be prompted to log into Facebook if you aren't already. Choose a username and password, then click “Link Account”. You can then skip to step 3.
   c. Otherwise, click "Create an Account". Supply the requested information and click "Create my new account". Check your email (and spam filter) for a message from Sapling Learning and click on the link provided in that email.
3. Find your course in the list (listed by subject, term, and instructor) and click the link.
4. If your course requires a key code, you will be prompted to enter the case-sensitive code.
5. If your course requires payment, select a payment option and following the remaining instructions.

Once you have registered and enrolled, you can log in at any time to complete or review your homework assignments.

During sign up – and throughout the term – if you have any technical problems or grading issues, send an email to support@saplinglearning.com explaining the issue. The Sapling Learning support team is almost always faster and better able to resolve issues than your instructor.

**Canvas:** You can find the scores of the three exams in Canvas after one or more days. You should expect a slight delay of the reports of your scores due to the large size of the class. A copy of the syllabus is also posted in this site for your record. As told above, the PowerPoint slides may be posted here if this will not affect the attendance of the class. You can login using the same user name and password as your MTU email at [https://mymichigantech.mtu.edu:8447/cas-web/login?service=https%3A%2F%2Fmtu.instructure.com%2Flogin%2Fc](https://mymichigantech.mtu.edu:8447/cas-web/login?service=https%3A%2F%2Fmtu.instructure.com%2Flogin%2Fc).

**Chemistry Learning Center:** The Chemistry Learning Center provides walk-in, individual appointments and study groups for organic chemistry courses. Importantly, someone is there to help you individually to solve any problem for the class including those in the graded online homework. There is no charge for the help. The place is room 19-208, Chem. Sci. & Eng. Bldg. You will have to visit their website to find updated hours. You can also contact the director Ms. Lois Blau for any information; room 19-206A, phone 906-487-2297, email lablau@mtu.edu. The website is [http://www.chemistry.mtu.edu/pages/clc/overview.php](http://www.chemistry.mtu.edu/pages/clc/overview.php)

A Teaching Assistant will teach supplementary instruction sessions each week. He or she will let you know the time and place. *It is very important for you to attend these sessions.* These sessions are free. The method of instruction will be different from mine. In my class, I must cover sufficient materials so that most of the
students have the knowledge base in organic chemistry for their future studies toward their degrees and for the future career goals. As a result, my pace of teaching is relatively fast, and I will have less interaction with you such as asking questions and directing a practice on blackboard. The sessions of TA do not have the obligation to cover all materials. He or she can focus on specific subjects that require more attention. As a result, these sessions will be slower and probably approach materials in a different angle that is preferred by some students. In addition, you will have more chances to ask questions and to practice. To encourage you to attend these sessions, I may incorporate questions discussed in them into the exams.

**Study Suggestions:** You should spend at least 12 hours (3 in class, 9 outside class to review materials) per week for this course. Make sure to come to class every time even though you have difficulty to follow me. It is very common for students not being able to understand everything in the class. In class, for materials I put on the projector in class, you should record to your notebook even though you can find them in the textbook. The goal is to help you to practice drawing reaction mechanisms, which cannot be done by reading book or other means; it is not for keeping something on paper. For materials I show with PowerPoint, you may choose not to record them because you may not have time to do so. I may put the slides in Canvas. If I change this policy, I will inform you in advance. Once I posted, I will not withdraw until after the final exam. It is very important for you to preview relative sections of the book before each class; few students can get a good score without doing this. *After the class, you must review your note and slides, and read the materials covered in the book no later than two days!* If you find something difficult to understand, please find help in the Chemistry Learning Center, or ask classmates or me timely; never let questions to build up, as this will make your study more and more difficult! Finish your homework timely (well ahead of due date is suggested because the due date is normally set far behind the date we finish the chapter; otherwise, you will find very busy toward the end of the semester). Keep a record on the questions that you lost points or you feel difficult. Before each exam, review your note, the PowerPoint slides and the online homework (especially the questions you marked difficult). So the study suggestions can be summarized as:

1. Preview by reading book sections (and PowerPoint slides)
2. Attend class and take notes
3. Review notes and slides, and read book sections within 2 days
4. Finish homework timely, mark difficult questions, if find difficult, ask for help
5. Prepare for exams by reviewing notes, slides and homework, reading book; put emphasis on the questions you marked difficult
**Tentative Schedule** (I am sure that we cannot follow exactly):

Graded online homework assignments are due on Tuesdays at 11:55 pm unless noted otherwise

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Chapter Title</th>
<th>Tentative Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Alkynes</td>
<td>01/13 (discuss syllabus), 01/15, 01/17, [01/20, Martin Luther King Jr. recess, no class]</td>
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<tr>
<td>12</td>
<td>Oxidation and Reduction</td>
<td>Covered in Org I, will not cover again</td>
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<tr>
<td>13</td>
<td>Mass Spectrometry and Infrared Spectroscopy</td>
<td>Covered in Org I, will not cover again</td>
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<tr>
<td>14</td>
<td>Nuclear magnetic resonance spectroscopy</td>
<td>01/22, 01/24, 01/27</td>
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<tr>
<td>15</td>
<td>Radical reactions</td>
<td>01/29, 01/31</td>
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<tr>
<td>16</td>
<td>Conjugation, resonance, and dienes</td>
<td>02/03, 02/05, [02/7, Winter Carnival recess, no class], 02/10</td>
</tr>
<tr>
<td>17</td>
<td>Benzene and aromatic compounds</td>
<td>02/12, 02/14 (02/12, 7:00 – 8:00 pm, evening exam 1)</td>
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<tr>
<td>18</td>
<td>Electrophilic aromatic substitution</td>
<td>02/17, 02/19, 02/21</td>
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<tr>
<td>19</td>
<td>Carboxylic acids and the acidity of the O-H bond</td>
<td>02/24, 02/26</td>
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<tr>
<td>20</td>
<td>Introduction to carbonyl chemistry; organometallic reagents; oxidation and reduction</td>
<td>02/28, 03/03, 03/05, 03/07, [03/10-03/14, spring break, no class]</td>
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<tr>
<td>21</td>
<td>Aldehydes and ketones-nucleophilic addition</td>
<td>03/17, 03/19, 03/21, 03/24,</td>
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<tr>
<td>22</td>
<td>Carboxylic acids and their derivatives-nucleophilic acyl substitution</td>
<td>03/26, 03/28, 03/31, 04/02 (03/26, 7:00 – 8:00 pm, evening exam 2)</td>
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<td>23</td>
<td>Substitution reactions of carbonyl compounds at the α carbon</td>
<td>04/04, 04/07</td>
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<tr>
<td>24</td>
<td>Carbonyl condensation reactions (if time allows)</td>
<td>04/09, 04/11</td>
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<tr>
<td>25</td>
<td>Amines (if time allows)</td>
<td>04/14, 04/16, 04/18, 04/21</td>
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<tr>
<td>26</td>
<td>Carbon-carbon bond-forming reactions in organic synthesis (if time allows)</td>
<td>04/23, 04/25 (04/28, 3:00-5:00 pm, final exam)</td>
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<tr>
<td>27</td>
<td>Carbohydrates (if time allows)</td>
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<tr>
<td>28</td>
<td>Amino acids and proteins (if time allows)</td>
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