Chem 2003B Course Outline (2016–17)
Organic and Biological Chemistry for Food Science

Welcome to Chem 2003B! Please read and keep this course outline handy, because it is an official document that contains important course information.

Prerequisites and Antirequisites

Prerequisite: Chem 1301A/B and 1302A/B, or the former Chem 1100A/B and 1200B, or the former Chem 1050. Antirequisites: Chem 2213A/B, 2223B, 2273A, 2283G.

Unless you have either the prerequisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Accessibility

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 ext. 82147 if you have questions regarding accommodation.

Support Services

Learning-skills counsellors at the Student Development Centre (http://www.sdc.uwo.ca) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Students who are in emotional/mental distress should refer to Mental Health@Western (http://www.health.uwo.ca/mental_health) for a complete list of options about how to obtain help.

Additional student-run support services are offered by the USC, http://westernusc.ca/services.

The website for Registrarial Services is http://www.registrar.uwo.ca.
**Course Website**

News and updates will be posted on OWL (http://owl.uwo.ca). This is the primary method by which information will be disseminated to everyone in the class.

**Learning Outcomes**

Broadly speaking, a student receiving credit for the course will be expected to demonstrate competence in his or her ability to:

- Recognize the importance of organic chemistry in everyday life and its interdisciplinary nature.
- Think critically about, explain, integrate, and apply chemical principles, laws, and theories.
- Solve a variety of novel problems, both qualitative and quantitative.
- Safely execute a variety of experimental procedures and explain the theory behind them.
- Use a variety of laboratory equipment and instrumentation.
- Draw scientific conclusions from experimental results or data.
- Examine, integrate, and assess any provided or collected chemical data.
- Communicate scientific thoughts and ideas in writing.
- Obtain, evaluate, and integrate information from various sources, and determine its relevance.
- Analyze and critically assess problems, and take a systematic approach to solving them.
- Prioritize a set of tasks and manage the use of his or her time.

**Class and Instructor Information**

<table>
<thead>
<tr>
<th>Section</th>
<th>Time (MWF)</th>
<th>Room</th>
<th>Instructor</th>
<th>Office</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>11:30 – 12:20</td>
<td>SEB 2200</td>
<td>Dr. Mark Milne</td>
<td>CHB 016</td>
<td><a href="mailto:mmilne8@uwo.ca">mmilne8@uwo.ca</a></td>
</tr>
</tbody>
</table>

If you find yourself not understanding the lectures, assigned readings, or problems, please visit the Resource Room or set up an appointment with me by sending me an email from your Western email account with the term CHEM2003 in the subject line. Questions related to course material can also be posted on the OWL discussion board.

**Resource Room**

The Resource Room (MSA 1205) provides you with an informal environment to ask questions related to lecture material. We recommend that you use it regularly to help build your knowledge base and problem-solving ability. A schedule will be posted on OWL.
**Course Materials**

In addition to proper lab attire, the materials below are required and are available at the bookstore.

- *Essential Organic Chemistry*, 3rd edition, by Paula Bruice. Please note that there is no need to purchase the solutions manual, because we have obtained permission from the publisher to post the solutions manual on OWL free of charge.

**Laboratory Sections and Schedule**

Laboratory sections are shown below. You must attend the section in which you are registered. Section changes must be completed prior to the end of the university-designated add/drop period (January 13).

<table>
<thead>
<tr>
<th>Lab sections</th>
<th>Lab Time</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>013 and 014</td>
<td>Monday, 2:30 – 5:20 pm</td>
<td>Chem 074</td>
</tr>
<tr>
<td>021 and 022</td>
<td>Tuesday, 9:30 am – 12:20 pm</td>
<td>Chem 074</td>
</tr>
<tr>
<td>023 and 024</td>
<td>Tuesday, 2:30 – 5:20 pm</td>
<td>Chem 074</td>
</tr>
</tbody>
</table>

The laboratory schedule is shown below. There are no labs during the week of February 20. Please follow the schedule carefully, because there are no make-up labs. A missed lab will result in a mark of zero unless academic accommodation has been granted.

<table>
<thead>
<tr>
<th>Experiment</th>
<th>Sections 013, 021, 023</th>
<th>Sections 014, 022, 024</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Recrystallization and Melting Point</td>
<td>Week of January 16</td>
<td>Week of January 23</td>
</tr>
<tr>
<td>2. Acid-Base Extraction</td>
<td>Week of January 30</td>
<td>Week of February 6</td>
</tr>
<tr>
<td>3. TLC Analysis</td>
<td>Week of February 13</td>
<td>Week of February 27</td>
</tr>
<tr>
<td>4. Carbohydrates</td>
<td>Week of March 6</td>
<td>Week of March 13</td>
</tr>
<tr>
<td>5. Fats, Oils, Soaps, and Detergents</td>
<td>Week of March 20</td>
<td>Week of March 27</td>
</tr>
</tbody>
</table>

All lab-related enquiries should be directed to the Chem 2003B Laboratory Coordinator:

- Sandra Zakaria Holtslag MSA 1235 szakaria@uwo.ca

** Students who arrive late, or in inappropriate attire, for a lab will receive a zero for that lab; there are no make-up labs, and no credit will be given for the prelab exercises. Plagiarism on the prelab exercise or the data sheets will result in a minimum penalty of a mark of zero on that portion of the lab report. More details and additional lab policies are found in the lab manual.
Anticipated Class Topics

<table>
<thead>
<tr>
<th>Chapter</th>
<th>General description</th>
<th>Approx classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Structure and Bonding (review of 1st year; self-study section)</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Acid-Base Reactions (some material from 1st year)</td>
<td>1.5</td>
</tr>
<tr>
<td>3 and 4</td>
<td>Structure of Organic Compounds Functional groups, physical properties, nomenclature, alkanes, cycloalkanes, conformations, isomerism</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Alkenes and Introduction to Reactivity (some material from 1st year)</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Midterm Test #1

| 6       | Reactions of Alkenes & Alkynes | 3             |
| 7       | Delocalization, Stability, and Aromaticity (some material from 1st year) | 3             |
| 8       | Alkyl Halides – Substitution and Elimination | 2.5           |
| 9       | Alcohols, Amines, Ethers, and Epoxides | 2.5           |

Midterm Test #2

| 11–13   | Compounds with Carbonyl Groups | 6             |
| 16      | Carbohydrates                 | 3             |
| 17      | Amino Acids                   | 2             |
| 20      | Lipids                        | 2             |
| 18      | Overview of Enzymes and Coenzymes | 1             |

In all of the topics, the primary focus is on the understanding of the concepts. Please try to garner a thorough, in-depth understanding of the material, because that is what allows success in chemistry.

Evaluation

Components

Tests and exams are necessary to assess your mastery of core concepts. The overall course grade, out of 100, will be calculated as listed below.

<table>
<thead>
<tr>
<th>Component</th>
<th>Notes</th>
<th>Normal Value</th>
<th>Test 1 Missed</th>
<th>Test 2 Missed</th>
<th>Tests 1+2 Missed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test #1*</td>
<td>Saturday, Feb. 4th, 7:00 - 8:15 pm</td>
<td>20</td>
<td>--</td>
<td>20</td>
<td>--</td>
</tr>
<tr>
<td>Test #2*</td>
<td>Saturday, Mar. 11th, 7:00 - 8:15 pm</td>
<td>25</td>
<td>35</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Final Exam</td>
<td>Scheduled by the Registrar</td>
<td>40</td>
<td>50</td>
<td>65</td>
<td>85</td>
</tr>
<tr>
<td>Laboratory</td>
<td>Five experiments (3.00 each)</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>
* Tentative dates and times.

To be fair to everyone in the class, none of the components will be “dropped,” and it is not possible to have the components reweighted unless they were legitimately missed.

**There are no make-up labs or tests.** See Missed Course Components for more details.

**To obtain credit for the course, all three requirements below must be met:**

1. Obtain a minimum of 50% on the overall course grade.

2. Obtain a minimum of 50% on the laboratory component (7.50 out of 15). This mark is calculated from all five experiments. A missed experiment is assigned a mark of zero unless it has been “excused” (see section on Missed Course Components).

3. Miss no more than two experiments, whether excused or not.

Students who fail to meet requirement #2 or #3 will receive a course grade no greater than 40% (even if the calculated course grade is higher) and will not receive credit for the course.

**Important Legalities**

It is Department of Chemistry policy that any student repeating a chemistry course must repeat the entire course, including the lab component. There are no lab exemptions.

No electronic devices may be in your possession during tests and exams.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at this website: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

Computer-marked, multiple-choice tests and exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

**Missed Course Components**

If you are seeking academic accommodation because of a medical (physical or mental) illness, please begin by contacting the Academic Counselling Office of your home faculty (or affiliated college). Western’s policy on academic accommodation for illnesses can be found at http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf.

**All requests for academic accommodation must go through your faculty’s Academic Counselling Office, so please contact them and *not* your instructor.**

If you are a science student, the Academic Counselling Office of the Faculty of Science is located in WSC 140, and can be contacted at 519-661-3040 or scibmsac@uwo.ca. Their website is http://www.uwo.ca/sci/undergrad/academic_counselling/index.html.
If you are a Brescia student, the Academic Counselling Office is located at The Hive in the St. James Building, and they can be contacted at 519-858-5151 or brescia@uwo.ca. Their website is http://brescia.uwo.ca/thehive.

A student requiring academic accommodation due to illness must use the Student Medical Certificate (http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf) when visiting an off-campus medical facility.

Missed Labs

**There are no make-up labs, and it is not possible to reschedule them.** If you miss a lab for any reason, you will be assigned a mark of zero for that lab. If the missed lab is due to a reason that is approved by your faculty’s Academic Counselling Office, the zero will be replaced by a mark of EXCU (excused), which shifts the weight of the missed lab onto all of the other labs.

You must, *as soon as you’re able to do so*, submit documentation to your faculty’s Academic Counselling Office. If they approve your circumstances, we will be notified.

Tests and exams will contain questions related to the theoretical aspects of the experiments. You are responsible for the material pertaining to the missed labs.

Missed Test or Final Exam

**Please note that there are no make-up tests.** If your faculty’s Academic Counselling Office has approved your circumstances, the value of the missed test will be reallocated as described in the evaluation scheme.

If you miss the Final Exam, contact your faculty’s Academic Counselling Office as soon as possible. They will assess your eligibility to write the Special Exam (the name given by the university to a makeup Final Exam) in May.

You may also be eligible to write the Special Exam if you are in a “Multiple Exam Situation” (see http://www.registrar.uwo.ca/examinations/exam_schedule.html).

**How to Achieve Your Goals in Chem 2003B**

1. **Staying on top of the material is the most important thing to do!**

   Organic chemistry is cumulative. Concepts build on top of previously learned concepts. Former Chem 2003B students have said that virtually all of their friends who stayed on top of the material performed well. Likewise, 95% of the students who performed poorly in the course admitted that it was because they either fell behind or didn’t put much effort into the course.

2. **Learn and understand the course material – don’t just memorize it.**
Our studies have shown that students who learn the course material by memorizing it or studying it superficially perform worse than students who examine the material in detail and thoroughly understand it. Learn why something is the way it is, not just what it is.

3. Focus on the “big picture” and make connections.

Look for similarities between different organic reactions. Use fundamental principles to explain the reactivity of functional groups. How does one chapter relate to the next?

4. Learn from the textbook and old-exam questions — don’t just figure out what the answer is.

When working on questions from the textbook and the old exams, your objective should not be to simply get the answer. Rather, focus on the concepts, the approach, the thought process, how to arrive at the answer, and of course, why the answer is the answer!

5. Don’t just come to class – get something out of coming to class!

Be attentive. Listen. Participate. Think. Write down important points. However, try to avoid spending so much time writing that you’re not thinking.

6. Take an interest in the material, or at least appreciate its importance.

Organic chemistry is the basis for life on earth. Think about all the organic molecules around you, all the enzyme-catalyzed reactions that are taking place inside our bodies, and how a tiny change to a single, simple functional group in a protein could result in a serious disease.

7. If you have questions about the course material, do not wait until shortly before the midterm.

Ask questions as soon as they arise. Take advantage of the Resource Room. Also note that if you wait until just before the midterm, the Resource Room and your instructor will be swamped.

This course is supported by the Science Student Donation Fund. If you are a BSc or BMSc student registered in the Faculty of Science or Schulich School of Medicine and Dentistry, you pay the Science Student Donation Fee. This fee contributes to the Science Student Donation Fund, which is administered by the Science Students' Council (SSC). One or more grants from the Fund have allowed for the purchase of equipment integral to teaching this course. You may opt out of the Fee by the end of September of each academic year by completing paperwork in the Faculty of Science Dean’s Office. For further information on the process of awarding grants from the Fund or how these grants have benefitted undergraduate education in this course, consult the chair of the department or email the Science Students’ Council at ssc@uwo.ca.