UNIVERSITY OF VICTORIA
Faculty of Science
Department of Chemistry

CHEMISTRY 234 – Organic Chemistry with Biological Applicaitons

Course Outline and Syllabus – Fall 2020

CHEM 234 A01 (CRN 10523)

Pre-requisite:	CHEM 102 and CHEM 231 (or equivalent from another institution).
Instructor:	Dr. Harmen Zijlstra, harmenszijlstra@uvic.ca
Tutorial Instructors:	Matthew Wiebe, wiebem@uvic.ca
	Shaun MacLean, ummacles@uvic.ca
Lectures:	T, W, F 9:30-10:20 am, online
Office hours:	T and Th 11:00-12:00, online

CHEM 234 is the second half (Chem 231 is the first half) of a one-year introduction to organic chemistry. Organic chemistry is relevant in everyday life and is an important pre-requisite for the health sciences. You will learn about the chemistry of alcohols, ethers, conjugation, aromaticity, chemistry of aromatic compounds, aldehydes and ketones, carboxylic acids and their derivatives, reactions of enols and enolates and their application in organic synthesis. Chem 234 has no lab component. If you wish to gain organic laboratory experience (may be required for entry to some health professions), you should take Chem 260 down the road. Like Chem 231, the course is fast-paced and requires significant amount of study in order to keep up and do well. The material can only be learned by constant practice, by working on assigned quizzes and chapter problems with pencil and paper. Course activities include lectures, 3 assignments, tutorials, 10 online quizzes using WileyPlus, and 2 midterm tests and a final exam.

1. Websites

Brightspace: https://bright.uvic.ca/d2l/home/51928

WileyPlus: www.wileyplus.com/class/781445

2. lecture information

All lectures, tutorials and office hours will be delivered via zoom. Applicable links will be provided via Brightspace. Lectures will be recorded and posted on Brightspaces. Lectures will be delivered live as much as possible and will be uploaded as prerecorded lectures otherwise.

3. Grading

Term test 1 (TBA, in class, 50 min)	20 %
Term test 2 (TBA, in class, 50 min)	20 %
Final Exam (3 hours, final exam period, TBA)	35 %
e-Learning (10 WileyPlus quizzes)	10 %
3 assignments (5% each)	15%
Total	100 %

(exams will be posted on brightspaces, written at home, and submitted as pdf)

If a student does not participate in a scheduled quiz, test or lab, a grade of zero will be recorded for those components.

In the event that a student does not participate in a scheduled quiz, in-term test, final exam, or lab for medical reasons the following information applies:

The student may apply for an excused absence within one week of the missed quiz or test. To apply, the student must email the instructor (harmenszijlstra@uvic.ca) with details describing the missed quiz or test.

- An excused absence will only be considered for a maximum of two quizzes. For each subsequent quiz the student misses, a grade of zero will be recorded. There are no makeup quizzes.
- An excused absence will only be considered for a maximum of one in-term test and one assignment. For each subsequent in-term test or assignment that the student misses, a grade of zero will be recorded.

Appropriate documentation for the missed final exam should be submitted with a "Request for Academic Concession (Deferred exam)" to the Undergraduate Records Office as described in the University Calendar. The RAC form is at https://www.uvic.ca/registrar/assets/docs/record-forms/rac.pdf**

When a medical excuse is provided for a missed midterm, the weighting for that missed component will be added to the weighting of the remaining midterms. Make-up midterms are not given**

4. Tutorials

CHEM 234 has scheduled, non-mandatory tutorials. Tutorials start the week of September 14th. While attendance is not mandatory, it is highly recommended as this will be a place where concepts introduced in class will be applied to exam-like questions. You can attend tutorials other than the one in your schedule but be mindful of the fact that students enrolled in that section will have priority.

5. Course materials

A. Required materials for the **Lecture** component of the course
All the **required** course materials for the lecture component are contained in the "**CHEM 231/232 Bundle"** available from the UVic Bookstore. If you purchased it for CHEM 231 in September 2017, it is also good for CHEM 234. If you took CHEM 231at UVic prior to September 2017, contact Dr. Peter Wan at pwan@uvic.ca for more information. If you took the equivalent of CHEM 231 at another university, you will need to purchase the "CHEM 231/232 Lecture Book" bundle.
The bundle includes:

i. **CHEM 231/232 Lecture Book** (2017 edition) which contains the PowerPoint slides used in both courses. The lecture book complements the textbook and it is not designed to replace it.
ii. An access code for WileyPlus.

WileyPlus is an online resource from the textbook publisher, that will be used for quizzes and access to the e-text. Purchase of WileyPlus is mandatory for access to the 10 assigned quizzes. If you do not wish to purchase the CHEM 231/232 Lecture Book Bundle, you will need to purchase WileyPlus in order to access the quizzes. To access CHEM 234 in WileyPlus go to: www.wileyplus.com/class/781445
If you have already created an account for CHEM 231 in Sept 2017 or later, use the same login and password. Once in WileyPlus, you have online access to Solomons 12 ed. **full textbook** and to the assigned **quizzes**.
There will be **ten (10) quizzes** that will cover the major topics of the course. The quizzes will become available as the semester progresses. Avoid waiting until the last possible day to complete the quiz as no excuses will be accepted for missing the deadline, including computer and software glitches, etc. The quizzes are designed to review your **basic** understanding of the material and they are not a substitute for the assigned end-of-chapter problems (i.e., **both** must be attempted). The quizzes should be considered as only **minimal** preparation for the term tests and the final examination.

Print copies of Solomons 12ed. textbook may be available for purchase in the Bookstore but one should also check out other vendors such as SubText in the SUB, etc.

iii. An access code for VitalSource Bookshelf (i.e., Wiley e-text) that provides you with a complete electronic version of the textbook (Solomons 12 ed.) in pdf format, and integrated solutions to all text questions.

Note: Many issues in WileyPlus can be solved by "clearing the cache" on your browser.

B. Molecular Models (recommended)

Visualization of molecules in 3-D is important for the understanding of the structure–reactivity relationship in organic chemistry. Molecular models are an allowed (and encouraged) resource during examinations. They can be bought at the university bookstore.

6. Academic Integrity

It is expected that all students will conduct themselves in accordance with the university's Policy on Academic Integrity. See pages 45-47 of the Academic Calendar.

7. Equity and Human Rights

The University promotes a safe, respectful and, supportive learning, working and living environment. University policies prohibit discrimination, harassment and criminalized violence. We understand that such behaviours can undermine student success. The Equity and Human Rights Office (EQHR) is a resource for all UVic community members, including students. EQHR provides education, information, assistance and advice in aid of building a supporting, inclusive and respectful campus. When issues and concerns arise, EQHR assists those involved through the range of support and resolution options available under the Sexualized Violence Prevention and Response policy and Discrimination and Harassment policy. EQHR staff are available by appointment – contact information and resources can be found at uvic.ca/equity.

The **Department of Chemistry** expects everyone participating in university activities in the department to model respectful behavior and abide by applicable university policies. For more information please contact Sandra Carlson via e-mail at dsecchem@uvic.ca or in person at Elliot 302.

8. Sexualized Violence Prevention and Response at UVic

University of Victoria takes sexualized violence seriously, and has raised the bar for what is considered acceptable behavior. We encourage students to learn more about how the university defines sexualized violence and its overall approach by visiting www.uvic.ca/svp. If you or someone you know has been impacted by sexualized violence and needs information, advice, and/or support please contact the sexualized violence resource office in Equity and Human Rights (EQHR). Whether or not you have been directly impacted, if you want to take part in the important prevention work taking place on campus, you can also reach out:

Where: Sexualized violence resource office in EQHR, Sedgewick C119
Phone: 250.721.8021
Email: svpcoordinator@uvic.ca
Web: www.uvic.ca/svp

CHEM 234 SYLLABUS – Fall 2020
(Numbered headings below refer to the chapters in SOLOMONS 12th EDITION)

[Chem 231 provided an introduction to the fundamentals of organic chemistry that included some organic reactions. We start Chem 234 with the chemistry of alkenes, alcohols and ethers where we will have an opportunity to review some materials leaned in Chem 231 and move forward from there. We will see why alcohols are of central importance and how they are related to carbonyl compounds. We will start to appreciate and learn the large number of organic reactions available and encounter the Grignard Reaction, one of the most useful in organic chemistry]

7. ALKENES AND ALKYNES I. (2 hr)
Chapter 7. 7.1-7.18 ***(Problems 7.28-7.35, 7.37-7.39, 7.48)***

8. ALKENES AND ALKYNES II. (4 hr)
Chapter 8. 8.1-8.20 ***(Problems 8.26-8.33, 8.39-8.40, 8.44, 8.45)***
In addition, you should do all the relevant in-chapter practice problems for each chapter!

11. ALCOHOLS AND ETHERS. (3 hr)
11.1-11.15
(Problems 11.25-11.34, 11.37)

12. ALCOHOLS FROM CARBONYL COMPOUNDS. (2 hr)
12.1-12.8
(Problems 12.9-12.14, 12.17, 12.23, 12.26)

[The course continues with new concepts: first, the concept of conjugation of π systems, then introduce the concept of aromaticity, followed by a central tropic in the chemistry of aromatic compounds: electrophilic aromatic substitution]

13. CONJUGATED UNSATURATED SYSTEMS. (3 hr)
13.1-13.7, 13.9-13.10.
The assigned problems below are found at the end of the chapter.
(Problems 13.18-13.22, 13.25, 13.28, 13.29, 13.30, 13.38-13.44)

14. AROMATIC COMPOUNDS. (3 hr)
14.1-14.7A, 14.7D, 14.7E, 14.8A, 14.9.
(Problems 14.16-14.21, 14.26, 14.27)

15. REACTIONS OF AROMATIC COMPOUNDS. Electrophilic Aromatic Substitution (4 hr)
15.1-15.12.
(Problems 15.20-15.22, 15.24-15.25, 15.26, 15.28, 15.31-15.32, 15.33-15.34, 15.37)

[Chapters 16-19 cover the chemistry of the carbonyl (C=O) group. Many students find these chapters to be the most challenging in the course. After learning the basic reactions of aldehydes, ketones, carboxylic acids and derivatives, we will learn (chapters 18/19) all the important classical methods used to make C-C bonds. We will then construct some reasonably complex and relevant organic molecules which will wrap up the course!]

16. ALDEHYDES AND KETONES. (3 hr)
16.1-16.8A/B/C, 16.9-16.10A, 16.11, 16.15.
(Problems 16.22-16.27, 16.29a-g, 16.30a,b,d, 16.33-16.35)

17. CARBOXYLIC ACIDS AND DERIVATIVES. (4 hr)
17.1-17.2A-I, 17.3- 17.8, 17.10, 17.12.
(Problems 17.17-17.19, 17.21-17.38)

18. REACTIONS AT α-CARBON OF CARBONYL COMPOUNDS. (3 hr)
18.1-18.7 (skip 18.3D, 18.6A), 18.10.
(Problems 18.15-18.16, 18.18-18.24, 18.26-18.27a-d)

19. CONDENSATION AND CONJUGATE ADDITION REACTIONS OF CARBONYL COMPOUNDS. (3 hr)
19.1-19.7, 19.9.
(Problems 19.23-19.28, 19.33-19.37a,b, 19.41, 19.45)

(Total number of hours in the course = 36 hr; each lecture is considered to be "1 hr")

Print copies of the Solomons text (12e, 11e or 10e) may be available for purchase in SubText in the SUB, Amazon.ca, etc. If you are using the 10th or 11th edition of the print copy, contact me (harmenszijlstra@uvic.ca) for the corresponding syllabus.

The two biggest challenges in learning organic chemistry

1. The visualization, comprehension, and drawing of 3-dimensional organic structures and how they relate to chemical stability and reactivity.

2. Learning and recalling organic reactions.

Some Time-Tested Advice

1. **Read the text ahead of time and work the problems with a pencil**. Do not read the book casually. Test yourself at all times by doing the problems as assigned. Don't look at the answers. That is, "read the text with pencil and paper". Just "highlighting" parts of the text may not be good enough. You must draw it out and test yourself…….do as many of the assigned problems as possible. Repeat as necessary.

2. **Organic chemistry is 90% visualization.** We draw what we mean and we mark what you've drawn. Drawing molecules in various formats is an essential component of the course. If you are not adept in graphical illustrations, you will need constant practice.

3. **Don't try to memorize text and figures photographically or memorize tricks.** Try to understand what is going on. Ask yourself what principle is being taught. If you don't get it, ask for help.

4. **Work in groups.** Form a formal "study group" or study with friends. You can book study rooms for meetings in the University Library.

5. **Take advantage of the resources available to you**: the tutorials, the instructor, and your study group (if you have one). If you think you need a private tutor, don't wait until it is too late. The Chemistry department has a list of potential private tutors. The more effort you make, the better you will do in this course.

6. **Don't fall behind**. If you take a week off, you may never be able to catch up. The material will rapidly accumulate. Stay ahead of the instructor – it will guarantee success! If you follow the advice above, discipline yourself to stay on track, you can succeed in this course.