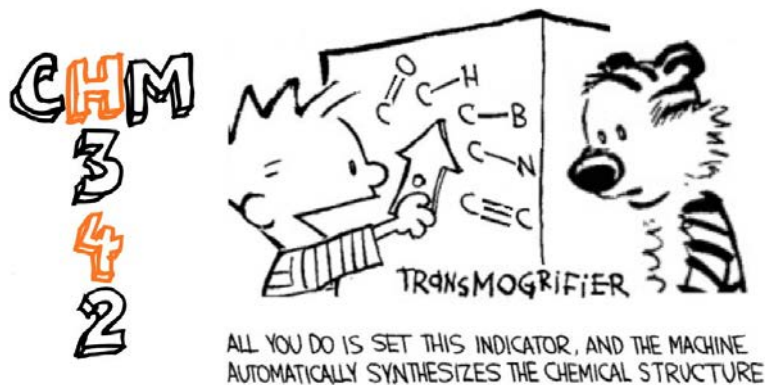


# CHM 342H: Modern Organic Synthesis

## Fall 2021 Semester Course Syllabus



### I TEACHING TEAM

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#### INSTRUCTOR:

Name: [Robert Batey](#)

Email: [rob.batey@utoronto.ca](mailto:rob.batey@utoronto.ca)

Office: LM 151

Online student hours: Tues 9:30-10:30 am and Thurs 4:30-5:30 pm  
or by appointment

I'm originally from England, from what was once an industrial area known as the Black Country (named because of the soot-dust covered buildings). I am trained as an organic chemist. I obtained a B.A. degree in Chemistry at Oxford University and then studied as a graduate student at Imperial College London. Following Post-Doctoral Fellowships at the University of Pennsylvania and the Upjohn Company (back then a major Pharma company) I became a faculty member at UofT in 1994. It is my honour to serve as the current Chair of the Department of Chemistry (since 2013).



My group has [research interests](#) in the area of organic synthesis and its application to medicinal chemistry and chemical biology problems, particularly targets involved in protein degradation relevant to anti-cancer and anti-infective development. These interests encompass the development of new organic reactions, the synthesis of alkaloid and macrocyclic natural products, and the use of new enabling technologies in synthesis.

Outside of the University and scribbling chemical structures, I enjoy exasperating my family members with eclectic tastes in music (see Spotify playlists under "rob batey - ca"), movies, and cooking. Finally, inspired by basketball-crazy kids, I have been a proud, albeit often confused, **Raptors** fan for a number of years.

#### TUTORIAL TA:

Name: [Cody Wilson-Konderka](#)

Email: [c.wilsonkonderka@mail.utoronto.ca](mailto:c.wilsonkonderka@mail.utoronto.ca)

Office: LM 370

Student hours: TBA

**OCCASIONAL COURSE ASSISTANT:**

Name: [Arya Batey](#)

Email: woof

Office: N/A, however please respect her territory

Student hours: see below

Named by my kids after the Game of Thrones Character.

She enjoys long walks, running around in concentric circles, "human" food, being tickled, and, most of all, napping. Mischievous and tenacious, she is, as yet, unfulfilled in her unceasing quest to catch a squirrel.

Arya may make occasional appearances and vocalizations during virtual student/office hours (pet zoom-bombing is always welcome). Although

preposterously indifferent to the concerns of organic chemistry, she is generously offering her time for this task. Together we very much look forward to making your acquaintance and getting to know you better in the semester ahead.



## II COURSE OVERVIEW

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**COURSE DESCRIPTION:**

CHM342F provides an overview of modern methods for the preparation of complex organic molecules. The course uses and builds upon the course content of CHM247/249, including reactions and mechanisms. In CHM342F achieving selective transformations, the control of stereoselectivity and the planning of multistep synthesis will be emphasized. The course is used as preparation for the course CHM440F, and is designed to complement the practical and technical aspects of the course CHM343S. Together these courses prepare for research / career in the areas of organic, synthetic and medicinal chemistry.

**PREREQUISITE COURSE(S):**

This course assumes you have a basic understanding of introductory organic chemistry. Either of the courses CHM249H or CHM247H or their equivalents serve as prerequisite for this course.

**STUDENT LEARNING OUTCOMES:**

During the course you will expand your understanding of (i) reaction mechanisms and functional group reactivity, (ii) modern synthetic organic reactions, (iii) synthetic planning, and (iv) develop non-quantitative problem solving skills.

In the first part of the course it is essential to ensure that you understand and be able to apply the core concepts and terminology of organic chemistry (e.g., understanding structure and bonding, electronic / inductive / resonance / steric effects, reaction types, nucleophiles, electrophiles, oxidants, reductants, acids, bases, arrow-pushing mechanisms).

In the early stages of the course I would urge you to review all of the review files, including "1<sup>st</sup> and 2<sup>nd</sup> Year Review Materials and Glossary of Terms", a review of top 10 things to know from first year chemistry, a review of arrow-pushing (including some questions), a review of second year organic reactions, understanding organic reactions, and help drawing organic structures. Particularly please attempt the arrow pushing and self-review questions found under this section.

Building upon these core concepts we will aim to develop problem solving particularly in the areas of stereoselective synthesis, multi-step synthetic synthesis, and mechanistic understanding.

Additionally, you will gain experience working with the chemical drawing program **ChemDraw** (which requires a Mac/PC program download), and using online literature/structure searches, such as **SciFinder** and **Web of Science**. These will require action from you, and I encourage you to familiarize yourself with these tools as early as you can.

Download instructions for ChemDraw are available here:

<https://chemistry.library.utoronto.ca/research/chemdraw>

Connect to SciFinder through:

<https://chemistry.library.utoronto.ca/research/scifinder>

Connect to Web of Science through:

<https://chemistry.library.utoronto.ca/research/web-science>

### **MOLECULAR MODELS:**

Stereochemical issues will be emphasized in this course, and molecular models can be very useful in visualizing molecules in three dimensions. Molecular models are allowable aids for assessments and tests. You are free to use the models of your choice (many of you will already own or can easily borrow a set), but I'd recommend the Darling Molecular model sets. These are available through the UofT bookstore or Amazon.

### **TEXTBOOK:**

In addition to the class notes there is also a recommended (not required) course textbook, which serves as a valuable resource for the course. (Please note that in preparing for exams you should prioritize the online content as being more important than the course textbook). For anyone wishing to continue in organic synthesis, this is the one text that I'd recommend as essential from a learning perspective.

[Clayden, J.; Greeves, N.; Warren, S. \*Organic Chemistry\*, Oxford University Press 2012. 2<sup>nd</sup> Edition](#)

The following online, but older, text is also available to UofT students (within UofT) network and has some good examples:

Francis A. Carey and Richard J. Sundberg. New York: Springer, 2007.

[Advanced Organic Chemistry. Part A: Structure and Mechanisms](#)

and

[Advanced Organic Chemistry. Part B: Reactions and Synthesis](#)

## **III COURSE ORGANIZATION**

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This course involves lectures, online content, tutorials, and student/office hours.

The lectures will be held in person in **Room LM158 of the Lash-Miller Chemistry Building** (80 St. George St.). We will see as the semester progresses whether this will continue to be possible due to COVID-19 considerations. The course will also be available online for the first 2 weeks of class, and possibly beyond. At the current time, I plan to record the lectures whenever possible and post them later on the course website. Please note that technical gremlins do occasionally occur and can prevent or affect recording quality (either audio or video). Therefore, you are urged to participate in a synchronous fashion whenever possible.

Copies of the course notes will be provided as pdf files. This material will be available through the course website. Although these notes are quite extensive and can be considered as the primary content, not all information is included on the notes. Thus, some sections of the notes will require you to write in content, explanations, mechanisms, problem solving, etc. It is strongly recommended to review the course notes *before* coming to the class.

There will additionally be some online pre-recorded video content to review outside of class.

### EXPECTATIONS:

Over the course of each week, you are expected to:

- (i) Participate in the classes and tutorials
- (ii) Prepare ahead of time for these
- (iii) Review content (notes, videos, past tests and exams) from classes as well as from the course website
- (iv) Practice on synthetic and mechanistic problems

To keep on top of the material, you are advised to develop a study flow that will ensure that you can review course notes and online materials in both a timely and organized manner.

### COURSE SCHEDULE & RELEVANT SESSIONAL DATES:

DATES	WEEK	Additional Notes
Sept 13 / 15	1	
Sept 20 / 22	2	
Sept 27 / 29	3	
Oct 4 / 6	4	Oct 6/7 <sup>th</sup> = <b>Quiz 1</b>
Oct 13	5	Oct 11 <sup>th</sup> = <b>Thanksgiving</b>
Oct 18 / 20	6	
Oct 25 / 27	7	
Nov 1 / 3	8	Nov 3/4 <sup>th</sup> = <b>Mid Term</b>
Nov 8 / 10	<b>Reading Week</b>	Nov 8 <sup>th</sup> = Drop Date
Nov 15 / 17	9	
Nov 22 / 24	10	
Nov 29 / Dec 1	11	Dec 1/2 <sup>nd</sup> = <b>Quiz 2</b>
Dec 6 / 8 / 9	12	Dec 9 <sup>th</sup> = <b>Assignment Due</b>
Dec 10 – 21		Final Assessment (Date TBA)

### CHM342H LECTURES:

The course lectures will be accessible using the Zoom platform on Mon / Weds 1:10-2:00 pm for the first two weeks of the semester and likely for the remainder of the course. The zoom link is shown below and is also accessible directly via the course navigation bar on Quercus.

<https://utoronto.zoom.us/j/88053585942>

Meeting ID: 880 5358 5942

Passcode: 731568

**ROB BATEY STUDENT (OFFICE) HOURS:**     *“Yeah, well, that’s just, like, your opinion, man.”*

These will be held virtually using the Zoom platform on Tues 9:30-10:30 am and Thurs 4:30-5:30 pm or by appointment. Please take advantage of my virtual student hours, I am always very happy to meet with students and to discuss chemistry! The zoom link is shown below and is also accessible directly via the course navigation bar on Quercus.

<https://utoronto.zoom.us/j/96614736806>

Meeting ID: 966 1473 6806

Passcode: 220945

#### **TUTORIAL OBJECTIVES:**

Tutorials will be held in two sections. The content in each section will be the same.

Section A: Mondays, 2:10–3:00 PM (first tutorial: Week 2, Sept 20th 2021)

Section B: Wednesdays, 10:10–11:00 AM (first tutorial: Week 2, Sept 22<sup>nd</sup> 2021)

Tutorials will provide you with an opportunity to participate in problem solving, which is an **essential** aspect of this course. The tutorials will involve learning how to solve problems and questions in mechanism and synthetic planning. These will also provide an opportunity to prepare for quizzes, assessments, and the final assignment. Students are expected to actively participate in one of the two tutorials. The tutorials will require preparation ahead of time. You are encouraged to ask questions and bring additional problems to the tutorials.

<https://utoronto.zoom.us/j/8920180687>

Meeting ID: 892 018 0687

Passcode: CHEM342

**COURSE WEBSITE:**     <https://q.utoronto.ca/courses/235477>.

You should check the course website periodically for announcements related to exams, assignments, etc. as well as posted course materials. Most notes and past exams, etc. will be posted under the modules section of the website. A glossary of terms used in the course as well as review materials are also provided here.

#### **SUPPORTS:**

Join or Lead a [Recognized Study Group](#) (RSG). Participate in *Meet-to-Complete* daily study-with-me sessions available to Faculty of Arts and Science Students. For details of these see the end of this document (see Section X of this document).

## **IV EVALUATION/GRADING SCHEME**

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<b>GRADING SCHEME:</b> <sup>†</sup>	Mid-Term Test (Weds/Thurs Nov 3/4 <sup>th</sup> )	20%
	Quizzes (Weds Oct 6/7 <sup>th</sup> & Weds Dec 1/2 <sup>nd</sup> )	20%
	Assignment (Thurs Dec 9 <sup>th</sup> )	25%
	Final Assessment (TBD)	<u>35%</u>
		100%

<sup>†</sup> Note 1: The quizzes and mid-term test will be run through Quercus.

† Note 2: if an unexpected technical issue occurs with a university system (e.g., Quercus services, network outage) that affects availability or functionality, it may be necessary to revise the timing or weighting of the assessments.

† Note 3: We want to grade you on your best effort. Accordingly, the value of the final assessment may be modified to between 25 or 40% of the final grade (and the values of the higher or lower of the term test/quizzes modified accordingly) if this adjustment results in an improved “raw score” for the student. Essentially a series of raw scores that each deemphasize one of the scoring elements for the tests/quizzes/exams will be generated. The *highest* of these scores will be used to determine any final grade.

#### **MISSED EXAMS:**

Since there are numerous opportunities for student evaluation in the class, there will not be any ‘make-up tests’ for students who are absent for medical or other reasons. Instead, the weighting of the remaining evaluation methods will be increased equally to compensate for the missed test. Students should both advise the course instructor and will need to report their absence through the **online absence declaration** (available through ACORN).

#### **ASSIGNMENT:**

There will be one graded assignment worth 25% during the semester. The assignment will be focused upon aspects of synthetic planning using multistep synthesis.

The due date for this assignment (submitted through Quercus) is **4 p.m. on Thursday Dec 9th 2021**. Late assignments will be penalized at the rate of 15% per day. **Earlier submissions are encouraged**

#### **FINAL ASSESSMENT:**

A final assessment will be held during the Faculty of Arts & Science final assessment period. The final assessment will be comprehensive and cover all course content.

#### **DROP DATE:**

Monday November 8<sup>th</sup> 2021 is the last day to drop F section code courses from academic record and GPA. After this deadline a mark is recorded for each course.

## **V COURSE POLICIES**

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Each member of this course is expected to maintain a:

- (i) professional and respectful attitude during all course activities, including classes, tutorials, office hours, and online activity.
- (ii) personal calendar/schedule/organizer to ensure that all course activities are completed, and due dates are met.
- (iii) collection of notes recorded independently based on concepts covered in course activities (students registered with Accessibility Services requiring a class note-taker will have access to this accommodation)
- (iv) familiarity with the university policy on Academic Integrity (see below)

The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another’s differences. As a Course Instructor, I will neither condone nor tolerate behaviour that undermines the dignity

or self-esteem of any individual in this course and wish to be alerted to any attempt to create an intimidating or hostile environment. It is our collective responsibility to create a space that is inclusive and welcomes discussion. Discrimination, harassment and hate speech will not be tolerated. If you have any questions, comments, or concerns, we encourage you to reach out to the staff in our Equity Offices.

**E-MAIL POLICY:**

I am happy to respond to course-related e-mail inquiries. Please include the course code CHM342F in the title of your e-mail, and use your UTOR e-mail account to send the message. I will endeavour to respond to emails within a timely manner during work days (i.e., 24-48 h). In the not entirely inconceivable circumstance of not hearing back from me within 3 days (I receive a lot of email!), please send a follow-up email (I will appreciate the reminder!). Answers to most organizational and course outline questions can be found in this syllabus. I don't offer advice on technical set-up questions.

**ONLINE/VIDEO POLICY:**

Aspects of this course, including your participation, will be recorded on video and will be available to students in the course for viewing remotely and after each session.

**COPYRIGHT:**

Course materials including all notes, videos, exams/tests, answer guides, etc. belong to me, the University, and are protected by copyright. In this course, you are permitted to download session videos and materials for your own academic use, but you should not copy, share, or use them for any other purpose without my explicit permission. For questions about recording and use of videos in which you appear please contact me. More information regarding this is available here: <https://teaching.utoronto.ca/ed-tech/audio-video/copyright-considerations/>

This course is an iteration of a 3rd Year organic synthesis course that has been taught at UofT for over 25 years. The structure of the course has benefitted from input from several individuals, and in particular the Fall 2010 course notes of Prof. Mark Taylor. His materials have been significantly added to and adapted, but original elements remain. Some of the course materials make use of images under Fair Use and Copyright for Online Education. These images are being made available for teaching, study, and research purposes only, and are not intended for distribution to students outside of the course or to be used for any other purpose other than in this course.

## **VI TECHNOLOGY REQUIREMENTS**

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Specific guidance from the U of T Vice-Provost, Students regarding student technology requirements is available here: <https://www.vicprovoststudents.utoronto.ca/covid-19/tech-requirements-online-learning/>

Advice for students more broadly regarding online learning is available here: <https://onlinelearning.utoronto.ca/getting-ready-for-online/>

This course requires the use of computers, and technical issues are possible. When working on a piece of academic work, students are responsible for scheduling enough time to allow for reasonable delays due to technical difficulties to be overcome, so such issues will not be acceptable grounds for deadline extension. Particularly, maintaining an up-to-date independent backup copy of your work is strongly recommended to guard against hard-drive failures, corrupted files, lost computers, etc.

You may require the ability to use videoconferencing software through a web browser. The use of a wired rather than a wireless connection is generally recommended. Zoom is the primary technology platform that will be used for any online content in CHM342H (e.g., Student Hours). Zoom is available for free for all UofT students using your UofT credentials. To download Zoom on your computers/devices, see:

<https://zoom.us/support/download>

or

[https://utoronto.zoom.us/download#client\\_4meeting](https://utoronto.zoom.us/download#client_4meeting)

For instructions on using and configuring Zoom, see:

<https://utm.library.utoronto.ca/students/canvas/zoom>

<https://support.zoom.us/hc/en-us/articles/201362193-How-Do-I-Join-A-Meeting->

For lectures the zoom link is set-up such that students can only login to the room once the host (the instructor) has logged in to Zoom. If the instructor has not logged in then you must wait to log in. There is a single meeting ID for the lectures – when you login to the meeting you must enter the provided passcode.

The default is such that your camera and microphone are not connected on login. Unless you are asking a question keep your microphone turned off (i.e., muted).

In the event of classes being taken entirely online, Zoom will be used. Questions are encouraged and the use of the “raised hand” feature of Zoom is helpful to gain attention (un-raise your hand once your question has been addressed). The “chat” feature can also be used to ask questions. Both of these features are accessed at the bottom of the Zoom window. Be respectful of others in any form of communications with the class during lectures, office hours, chats, etc.

#### **LECTURE RECORDINGS:**

Screen recordings of the lectures will be recorded and will be uploaded to MS Streams for viewing once they are available. The lectures will be automatically although somewhat poorly transcribed. Any student with UofT credentials can access these videos. **Lecture recordings can be accessed via the Pages sidebar link in the Quercus Course Homepage.**

#### **ONLINE ETIQUETTE:**

We will follow the University guidelines regarding etiquette/participation in online activities, including classes, tutorials, and office hours. The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another’s differences. UofT does not condone discrimination or harassment against any persons or communities.

## **VII INSTITUTIONAL POLICIES & SUPPORT**

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### **ACADEMIC INTEGRITY**

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student’s individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto’s Code of Behaviour on Academic Matters ([governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019](http://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019)) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

On quizzes and term tests:

1. Using or possessing unauthorized aids. **Please note that the use of websites (such as Chegg.com or the course discussion board) to post quiz/term test questions or to post/access answers to questions is an academic offence under the University of Toronto’s Code of Behaviour on Academic Matters. Alleged instances of this nature are forwarded to the Faculty of Arts & Science Student Academic Integrity office.**



2. Looking at someone else's answers or collaborating/discussing answers during a quiz or term test.
3. Misrepresenting your identity.

In general academic work:

1. Falsifying institutional documents or grades.
2. Falsifying or altering any documentation required by the University.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from other institutional resources (see: [www.academicintegrity.utoronto.ca/](http://www.academicintegrity.utoronto.ca/)).

#### **USE OF UNIVERSITY OF TORONTO'S PLAGIARISM DETECTION TOOL:**

Normally, students will be required to submit their course assignment to the University's plagiarism detection tool for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the tool's reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of this tool are described on the Centre for Teaching Support & Innovation web site (<https://uoft.me/pdt-faq>).

#### **ACCESSIBILITY NEEDS:**

Students with diverse learning styles and needs are welcome in this course. The University of Toronto is committed to accessibility: if you require accommodations for a disability, or have any other accessibility concerns about the course, please contact [Accessibility Services](#) as soon as possible. Accessibility services provides supports including advisors, note-takers, peer mentors, etc. Please note that materials presented during the course will be made available online including annotated notes and lecture recordings.

#### **ACCOMMODATIONS FOR RELIGIOUS OBSERVANCES:**

Following the University's policies, reasonable accommodations will be made for students who observe religious holy days that coincide with the due date/time of an assignment, tutorial, class or laboratory session. Students must inform the instructor **before** the session/assignment date to arrange accommodations.

#### **ADDITIONAL SERVICES & SUPPORT:**

The following are some important links to help you with academic and/or technical service and support:

<https://www.artsci.utoronto.ca/current/academic-advising-and-support/online-resources-students>

- General student services and resources at [Student Life](#)
- Full library service through [University of Toronto Libraries](#)
- Resources on conducting online research through [University Libraries Research](#)
- Resources on academic support from the [Academic Success Centre](#)
- Learner support at the [Writing Centre](#)
- Information for [Technical Support/Quercus Support](#)

#### **ACKNOWLEDGEMENT OF TRADITIONAL LANDS:**

We wish to acknowledge this land on which the University of Toronto operates. For thousands of years, it has been the traditional land of the Huron-Wendat, the Seneca and, most recently, the Mississaugas of the Credit River. Today, this meeting place is still the home to many Indigenous people from across Turtle Island and we are grateful to have the opportunity to work on this land.

For more information on the land acknowledgement and the Indigenous History of Tkaronto, see:

<https://indigenous.utoronto.ca/about/land-acknowledgement/>

<https://guides.library.utoronto.ca/Toronto>

## VIII ADVICE

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Success in the course is generally achieved more through application of your knowledge and problem solving skills rather than rote memorization.

Although the class notes/content are fairly thorough, please take note that not all of the material discussed in class will be directly given on the pdf copies of the class notes. Indeed, there is a considerable amount of very important material that does not, so I would advise you to follow lectures closely and write additional notes. Conversely, there will be sections or examples in the class notes that we may not have time to discuss in class. You will be expected to be familiar with these sections.

Recognizing what are the most important concepts, reactions, mechanisms, etc., from the provided class notes is often apparent only during the class. ***Thus, although the notes are extensive, they are not a substitute for participating in classes.***

Working on problems is an essential aspect of the course and will provide you with the problem solving skills necessary to master synthetic organic chemistry.

The initial part of the course will include the review of material from CHM247/249 (along with some new material). We will go through these classes rather rapidly as a result.

***Finally, the knowledge base of organic chemistry is a cumulative one. It is akin to learning a language and requires practice.*** Therefore, this is not a course where “cramming” the night or even the week before is a good strategy! Keep on top of the course material! I would encourage forming study groups to discuss the chemistry in this course. Working with peers can improve your understanding and problem solving.

***The best advice I have for succeeding in the course is to work through problems and not to be left hanging when it comes to studying ... don't leave things to the last minute.***



[“Safety Last” starring Harold Lloyd, 1923]

## IX ADDITIONAL STUFF

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### **Building an Essential Library (for students interested in pursuing organic synthesis as a career):**

While nowadays most books can be accessed online through the UofT website, I often get asked for advice on what books would form the basis of an essential library for prospective and ongoing graduate students. In addition to my first choice book (the recommended text for this course), the list would comprise the following additional 4 books. You will notice that none of these are organic synthesis texts, but instead they focus on fundamental aspects of organic chemistry.

- *Advanced Practical Organic Chemistry* by John Leonard, Barry Lygo, and Garry Procter (ISBN-10: 1439860971 / ISBN-13: 978-1439860977). The essential desk reference of practical chemistry. A classic.
- *Modern Physical Organic Chemistry* by Eric V. Anslyn and Dennis A. Dougherty (ISBN-10: 9781891389313 / ISBN-13 : 978-1891389313). There are some other good choices for physical organic chemistry books, but this monster has it all.
- *Molecular Orbitals and Organic Chemical Reactions: Reference Edition* (or the more affordable Student Edition) by Ian Fleming (ASIN: B01MZ3QO2V). This book is available in pdf form through the UofT library.
- *Basic One- and Two-Dimensional NMR Spectroscopy*, 5<sup>th</sup> Edition, by Horst Friebolin (ISBN-10 : 9783527327829 / ISBN-13 : 978-3527327829). A translation from the German edition.

### **Advanced Level Organic Synthesis References:**

With the exception of the first book listed here, which would be useful as reference for this course, these recommended organic synthesis books are intended more for graduate students:

- Warren, S.; Wyatt, P. *Organic Synthesis: The Disconnection Approach*, Wiley **2008**.
- Nicolaou, K. C.; Sorensen, E. J. *Classics in Total Synthesis*, Wiley **1996**.
- Kurti, L.; Czako, B. *Strategic Applications of Named Reactions in Organic Synthesis*, Academic Press, **2005**.
- Corey, E. J.; Cheng, X.-M. *The Logic of Chemical Synthesis*, Wiley, **1995**.
- Carreira, E. M.; Kvaerno, L. *Classics in Stereoselective Synthesis*, Wiley-VCH, **2009**.

### **Here are Some Blogs / Websites I Recommend:**

- For penetrating insights into science, chemistry, and the Pharmaceutical and Biotech Sectors, where many students of organic synthesis find employment, please see the always informative *In The Pipeline*: <http://blogs.sciencemag.org/pipeline/>
- For a useful overview of drug discovery resources, see: <https://www.cambridgemedchemconsulting.com/resources/>
- For those needing demystification of the practical aspects of organic synthesis, see the *Not Voodoo* site: <http://www2.chem.rochester.edu/~nvd/>
- For those craving food ideas, see: <https://food52.com>
- More food inspiration from *the Food Lab* and *Serious Eats*: <https://www.seriousseats.com>
- For those wishing to optimize their experiences on Mac computers (I've been hooked since the days of the 8-bit Apple II), see: <https://www.macrumors.com>

- For those seeking current news, see: <http://www.guardian.co.uk>
- For sublime inspiration: <https://www.youtube.com/watch?v=4xgx4k83zzc>
- And, now for something completely different:  
<https://www.youtube.com/watch?v=tWe3mbHxJ3I>

## X RECOGNIZED STUDY GROUP (RSG)

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### **Lead a Recognized Study Group (RSG) for this course**

Apply now to be an RSG Leader for this course. RSGs are peer-led study groups of up to 8 students enrolled in the same A&S course.

Volunteering to be an RSG Leader is a great way to:

- Make friends in your courses
- Gain new leadership and group-facilitation skills
- Increase your understanding of course material
- Prepare for test and exams
- Boost your resume
- Earn a Co-Curricular Record (CCR) credit

Over 1,000 students volunteered to be an RSG Leader last year. Volunteer to be an RSG Leader this term with the support and training of Upper-year Arts & Science students! No experience is necessary.

**[Sign up to be an RSG Leader now.](#)**

**Looking to join an RSG?** RSGs available for this course will be posted starting September 15<sup>th</sup> on the [Sidney Smith Commons Online](#).

Find more information, visit: <https://uoft.me/recognizedstudygroups> or [@sidneysmithcommons](#)

**Looking for more ways to study with other students?** Join [Meet to Complete](#), daily study-with-me sessions just for Arts & Science students!