Welcome to Chemistry 3601

Chemistry 3601.03 – January 2017
Chemistry of Living Systems

Professor: Robert L. White, Room 527, Chemistry Building
902-494-6403 (answering machine)
robert.white@dal.ca
(Place Chem 3601 in the subject line)

Office Hours: Mon, Wed & Fri 9:30–10:00 am & 12:30–1:30 pm (or by appointment)

Lectures: Mon, Wed & Fri 8:35 – 9:25 am
Room 226, Chemistry Building

Social Etiquette: No cell phone use (including no texting) in class, please.

Class Web Site: Brightspace

Prerequisite: Chemistry 2402

Chem 3601 – Course Description

Structure, including stereochemistry, and mechanism (i.e., arrow-pushing) are emphasized in discussions of the behavior of organic compounds in nature (living systems). The structures of small and large molecules will be described along with the reactivity of small molecules in living systems. The catalytic role of enzymes and coenzymes as catalysts will be examined from a mechanistic perspective. Overall, the material presented will illustrate the fundamental relationship between chemistry and the existence of all living organisms.
Chem 3601 – Class Description

Key Knowledge or Skills Expected
Key concepts presented in Introductory Organic Chemistry, especially reaction mechanisms and use of arrow-pushing. A working knowledge of the chemical principles related to acid-base and nucleophilic-electrophilic reactions is assumed.

Course Goals or Outcomes
- To be familiar with the structure and stereochemistry of molecules found in living systems.
- To be familiar with reactions used by or used to study living systems.
- To appreciate that chemistry is fundamental to biological processes supporting all living systems.

Chem 3601 – Lecture Outline

Part 1 Introduction
- Overview
- Hydrogen Bonding
- Stereochemistry

Part 2 Proteins/Nucleic Acids
- Amino Acids & Peptides
- CO₂H Reactivity
- Peptide Synthesis
- Nucleic Acids
- Protein Biosynthesis
- Protein Structure
- Bioconjugation
- Proteomics & Peptide Sequencing

Part 3 Structure
- Prochirality
- Lipids
- Carbohydrates

Part 4 Enzymes
- Enzymes as Catalysts
- Coenzymes: Redox
- Coenzymes: Decarboxylation
- Coenzymes: Amino Acids
- Enzymes in Synthesis

Chem 3601 – Materials

Textbook: Organic Chemistry
Paula Y. Bruice, 8th, 7th or 6th edition
Prentice Hall, 2016, 2014 or 2011
This textbook has been used for Chem 2401/2402. For some topics in Chem 3601, it may be helpful to consult a standard biochemistry textbook. For a few topics, there is no suitable textbook.

Notes: Templates for writing lecture notes can be downloaded from the class website.
Practice Problems: Relevant practice problems from the textbook will be listed in the lecture notes at the beginning of each topic. Those given at the end of the lecture notes are to be completed and handed in for comment. Other practice problems with solutions are provided in the supporting information for each topic. The practice problems simulate test/exam questions.

Chem 3601 – Course Assessment

Component: % of Final Grade | Date (2017)
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Quizzes: 12 Lecture time (best 6 of 7)
Term Test #1: 20 Fri. February 10 (8:25 – 9:25 am)
Term Test #2: 20 Wed. March 22 (8:25 – 9:25 am)
Final Exam: 48 April 12 – 26 (set by registrar)
Total: 100

The Dalhousie Common Grade scale will be used to convert percentages into letter grades:

A+ (90–100) B+ (77–79) C+ (65–69) D (50–54)
A (85–89) B (73–76) C (60–64) F (<50)
A- (80–84) B- (70–72) C- (55–59)
Chem 3601 – Course Policies

- The quizzes, term tests and the final exam will be written, closed book evaluations.
- Dates and material covered for each quiz will be announced in class. To allow for an unavoidable absence or a poor performance, the best six of seven quiz marks will be counted.
- Term Test #2 will be based on topics presented in class, but not evaluated on Term Test #1; the final exam will cover all topics presented.
- Marked quizzes and term tests will be returned to the student. Solutions will be posted on Brightspace after the quizzes and term tests have been marked.
- Students seeking an adjustment of a quiz or term test mark must contact Prof. R.L. White within two weeks of the date on which the quiz or term test was written.

Chem 3601 – Course Policies (cont’d)

- In the case of a weather-related or other closure of Dalhousie University, a scheduled quiz or term test will be postponed to the next scheduled class.
- Each quiz and term test will only be given at the time scheduled. No make-ups will be available.
- Students who miss a term test and produce an original medical certificate will have their final grade calculated using a revised formula in which the missing mark is replaced by a weighted average of the marks attained on their other test and final exam.

ACCOMMODATION POLICY FOR STUDENTS

Students may request accommodation as a result of barriers related to disability, religious obligation, or any characteristic protected under Canadian Human Rights legislation. Student Accommodation Policy: [http://www.dal.ca/campus_life/student_services/academic-support/accessibility.html](http://www.dal.ca/campus_life/student_services/academic-support/accessibility.html)

Students who require accommodation for classroom participation or the writing of tests and exams should make their request to the Advising and Access Services Centre (AASC) prior to or at the outset of the regular academic year. More information and the Request for Accommodation form are available at [www.dal.ca/access](http://www.dal.ca/access).

Chem 3601 – Course Policies (cont’d)

- Students who are ill for the final exam and produce an original medical certificate will have an opportunity to write a make-up exam. (The timing of the make-up exam will be at the discretion of Prof. R.L. White.) See Section 16.8 of the University Regulations at [http://academiccalender.dal.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=57&chapterid=2523&topicgroupid=10074&loaduseredits=False](http://academiccalender.dal.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=57&chapterid=2523&topicgroupid=10074&loaduseredits=False)
- Also, effective September 1, 2014, the Department of Chemistry policy for all Chemistry courses at the 2000–4000 level is that a minimum grade of 50% on the written test/final exam component is required in order to pass the course (i.e., ≥44/88 for Chem 3601).
ACADEMIC INTEGRITY

Academic integrity, with its embodied values, is seen as a foundation of Dalhousie University. It is the responsibility of all students to be familiar with behaviours and practices associated with academic integrity. Instructors are required to forward any suspected cases of plagiarism or other forms of academic cheating to the Academic Integrity Officer for their Faculty.

Policy on Intellectual Honesty and Faculty Discipline Process: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

STUDENT CODE OF CONDUCT

Dalhousie University has a student code of conduct, and it is expected that students will adhere to the code during their participation in lectures and other activities associated with this course.


COPYRIGHT

All members of the Dalhousie community are expected to comply with their obligations under Canadian copyright law. Dalhousie copyright policies and guidelines, including our Fair Dealing Guidelines, are available at http://www.dal.ca/dept/copyrightoffice.html.
SERVICES AVAILABLE TO STUDENTS

The following campus services are available to all Dalhousie students. Unless noted otherwise, the services are free.

<table>
<thead>
<tr>
<th>Service</th>
<th>Support Provided</th>
<th>Location</th>
<th>Contact</th>
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<tbody>
<tr>
<td>General Academic Advising</td>
<td>Help with</td>
<td>Killam Library Ground floor</td>
<td>In person: Killam Library Rm G28</td>
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<td>- understanding degree requirements and academic regulations</td>
<td>Rm G28</td>
<td>By appointment:</td>
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<td>- choosing your major</td>
<td>Bissett Centre for Academic Success</td>
<td>- e-mail: <a href="mailto:advising@dal.ca">advising@dal.ca</a></td>
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<td>- achieving your educational or career goals</td>
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<td>- Phone: (902) 494-3077</td>
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<td>- dealing with academic or other difficulties</td>
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<td>- Book online through MyDal</td>
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<td>Dalhousie Libraries</td>
<td>Help to find books and articles for assignments Help with citing sources in</td>
<td>Killam Library Ground floor Librarian</td>
<td>In person: Service Point (Ground floor)</td>
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<td>the text of your paper and preparation of bibliography</td>
<td>offices</td>
<td>By appointment:</td>
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<td>Identify your subject librarian (URL below) and contact by email or</td>
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<td>phone to arrange a time:</td>
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<td>Studying for Success (SFS)</td>
<td>Help to develop essential study skills through small group workshops or one-on-</td>
<td>Killam Library 3rd floor Coordinator</td>
<td>To make an appointment:</td>
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<td>one coaching sessions</td>
<td>Rm 3104</td>
<td>- Visit main office (Killam Library main floor, Rm G28)</td>
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<td>Match to a tutor for help in course-specific content (for a reasonable fee)</td>
<td>Study Coaches Rm 3103</td>
<td>- Call (902) 494-3077</td>
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<td>- e-mail Coordinator at: <a href="mailto:sfs@dal.ca">sfs@dal.ca</a> or</td>
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<td>All information can be found on our website:</td>
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<td><a href="http://www.dal.ca/sfs">www.dal.ca/sfs</a></td>
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<td>Writing Centre</td>
<td>Meet with a tutor to discuss writing assignments (lab report, research paper,</td>
<td>Killam Library Ground floor Learning</td>
<td>To make an appointment:</td>
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<td>thesis, poster)</td>
<td>Commons &amp; Rm G25</td>
<td>- Visit the Writing Centre in the Killam Learning Commons (Rm G40) and</td>
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<td>- Learn to integrate source material into your own work appropriately</td>
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<td>- Learn about disciplinary writing from a peer or staff member in your field</td>
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<td>- Call (902) 494-1963</td>
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<td>- e-mail <a href="mailto:writingcentre@dal.ca">writingcentre@dal.ca</a></td>
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<td>We are open six days a week</td>
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<td>See our website: writingcentre.dal.ca</td>
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