



Macromolecules of Biochemical Interest

SC/CHEM (BIOL/BCHM) 3051 3.0

Fall 2016

Course Description

A discussion of the structures and functions of naturally occurring macromolecules including nucleic acids, proteins, polysaccharides and related macromolecular conjugates.

Prerequisites: SC/CHEM 2021 & either SC/CHEM 2050 or SC/BCHM 2020 or SC/BIOL 2020

Credit Exclusions: SC/CHEM 3150, SC/BIOL 3051, SC/BCHM 3051

Lectures: Monday, Wednesday, and Friday 9:30-10:20, Steadman Lecture Hall F

Office Hours: Mondays & Wednesdays 12:30 – 1:30 pm, LSB 213

Course Director: Gerald Audette
Office: LSB 327C / E-mail: audette@yorku.ca

Important Dates:

September 8	First Day of Classes
October 5	Last Day to Enrol in Course with Permission of CD
Oct. 27 – 30	Fall Reading Days
November 11	Last Day to Drop Course without Receiving a Grade
December 5	Last Day of Classes
December 7-22	Final Examination Period for F16 Courses

Registrar's Calendar: <http://registrar.yorku.ca/enrol/dates/fw16>

Purpose and Objectives of the Course:

The purpose of the course is to expand the student's knowledge into the chemical, biochemical and structural properties of biologically relevant macromolecules. In particular, attention will be given to the chemical, biochemical and structural characteristics of carbohydrates, nucleic acids, proteins, as well as macromolecular complexes of these molecules, and both recent advances and landmark reports in the literature will be discussed. At the end of the course, the students should be able to:

1. Communicate effectively with chemists and biochemists in the field using proper nomenclature.
2. Identify structural characteristics of carbohydrates, nucleic acids and proteins in isolation and in complex with other macromolecules.
3. Explain which and how analytical tools can be used to probe the structural features of macromolecules.
4. Read, understand and summarize important points from scientific literature.

Evaluation: Mid-Term Exams (2) 30% each = 60% total (held in class)

Final Exam 40%

Grading Scheme:

The grading scheme for the course conforms to the point system used in other undergraduate programs at York (A⁺=9, A=8, B⁺=7, B=6, C⁺=5, C=4, D⁺=3, D=2, E=1, F=0). A letter grade for the course will be assigned based on the final percentage grade (A⁺=90-100, A=80-89, B⁺=75-79, B=70-74, C⁺=65-69, C=60-64, D⁺=55-59, D=50-54, E=40-49, F=0-39). The final grade for the course will be calculated using the weightings listed above under **Evaluation**.

Missed Exams:

- A medical certificate and Attending Physician's Statement must be submitted for any missed midterm/quiz. This documentation must be submitted within 3 working days of the missed exam.
- There will be no make-up for a missed midterm/quiz. For a missed exam (with appropriate documentation) the value of that exam will be added to the final exam.

Remarking Policy:

- If, after graded exams are returned, there is a question concerning the grading of the exam, the entire exam should be returned for remarking.
- All requests for remarking must be made in writing and must be submitted to the CD no later than the end of lecture 1 week after the exam is returned in class. The request should include your name, student number, date of request, identify the question of concern and briefly explain the scientific reason why your answer merits further consideration.
- Note that the *entire* exam will be remarked and that any exams, or portions of exams written in pencil will not be re-graded.
- The Course Director will NOT negotiate in regards to grades, but is happy to remark a test/exam.

Academic Integrity:

York students are expected to maintain high standards of academic integrity and to abide by rules set forth by York University. Any cases of academic misconduct will be treated accordingly. Ignorance of the Policies is not an acceptable excuse and students are strongly encouraged to become familiar with such Policies. The link to the Academic Integrity for Students web-site (www.yorku.ca/academicintegrity/students/index.htm) is provided for convenience. Students MUST also complete the Academic Integrity Tutorial (www.yorku.ca/tutorial/academic_integrity/) if they haven't already done so.

Counselling and Disabilities:

According to York University policy arrangements for students with disabilities should be made before the start of the academic term (www.yorku.ca/web/futurestudents/requirements/disabilities.html). Failure to notify the CD to your needs in a timely manner may jeopardize the opportunity to arrange for academic accommodation.

Attending university and coping with all the expectations, over and above other responsibilities you may have outside school, can be very challenging. A number of options are available to you, on and off campus, to help you deal and cope with difficult situations. For example, York University offers personal counselling services (www.yorku.ca/cds/pcs). They are located in the Bennett Centre for Student Services and can be reached at ext. 55297. Alternatively, postsecondary students in Ontario can call 1-866-925-5454 to reach the Good2Talk helpline (www.good2talk.ca).

Website:

A Moodle site has been set up for this course (<https://moodle.yorku.ca/>) and will contain material and announcements pertinent to the course. This includes lecture notes, the course outline (this document), the Attending Physician Statement form, etc.

Email Policy:

Course related e-mail communications should be sent from your my.yorku.ca account, and should include “Chem 3051” in the subject line. Messages which originate from other accounts (Hotmail, Yahoo, etc.) and/or do not include “Chem 3051” in the subject line may not receive a reply. Messages will be replied within 24 hours, except during week-ends or holidays.

The course Moodle site can be used to contact the course director – The Forum on the Moodle site is an excellent way to discuss questions among your peers. Any administrative questions should be addressed to the Undergraduate Program Assistant in the Chemistry Building (CB 124).

Textbook, Library Material and Course Readings:

- The recommended textbook for Chem 3051 is *Lehninger Principles of Biochemistry*, Nelson & Cox, 6th ed., and is available at the York U. Bookstore in several formats (eg. print and e-book). This is the same textbook for SC/BIOL 2020.
- Students should also possess or have access to an organic chemistry textbook (i.e. Wade).
- A number of biochemistry textbooks are available in the Steacie Library including: *Biochemistry*, Horton, Moran, *et al.*; *Biochemistry*, Stryer and Berg; *Fundamentals of Biochemistry*, Voet, Voet & Pratt; *Introduction to Protein Structure*, Branden & Tooze.
- Several textbooks on Nucleic Acids are available in the Steacie Library including: *Nucleic Acids in Chemistry and Biology* by Blackburn & Gait and *Principles of Nucleic Acid Structure* by W. Saenger.
- If a specific reading is required for coverage during lectures, for example a scientific paper, these items will be available through the course's website (Moodle).

Course Outline

1. Carbohydrates
 - Chemistry, primary structure determination and a survey of representative polysaccharides
2. Nucleic Acids
 - RNA and DNA chemistry, sequencing and three-dimensional structure.
3. Proteins and Macromolecular Complexes
 - Chemistry and three-dimensional structures of proteins
 - A discussion of protein-DNA, protein-RNA, and protein-carbohydrate complexes
4. Lipids
 - A discussion of the chemistry, structures and biologically relevant interactions
5. Biochemically Important “Small” Macromolecules
 - Molecules such as the vitamins and important co-factors etc.
6. Scientific Literature
 - A discussion of relevant scientific literature, both current and “classic”, will be ongoing throughout the course