

Chemistry 4493B

Chemistry of Biological Macromolecules

Winter 2026

Course Outline

1. Course Information

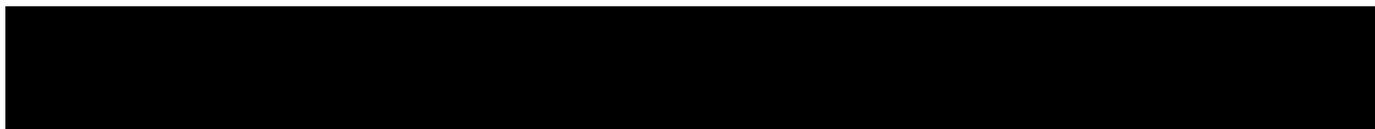
Course Information



Prerequisite(s): [Chemistry 2283G](#) or [Chemistry 2223B](#). [Chemistry 3373F](#) is advantageous, but not required.

Unless you have either the prerequisites for this course or written special permission from the Department of Chemistry to enroll in it, you may be removed and withdrawn from this course in accordance with university policy. This may be done after the add/drop deadline of the academic term, and the course will be marked as withdrawn (WDN) on your academic record. This decision may not be appealed.

2. Instructor Information



Students must use their Western (@uwo.ca) email addresses when contacting their instructors; subject line must contain “4493”.

3. Course Syllabus, Schedule, Delivery Mode

Course Description: A survey of the chemistry of monosaccharides, amino acid and nucleosides with modern synthetic methods to oligosaccharides, polypeptides and polynucleotides.

In person delivery with Brightspace distribution of documents.

Course Topics

- 1) Introduction: course overview; biological macromolecules and their constituents
- 2) **Protecting group chemistry**, polymer-supported chemistries, and automation in synthesis
- 3) **Amino acids to oligopeptides**: structure, properties and selected reactions of amino acids; selected historical and modern chemical synthesis of oligopeptides; synthetic peptides and peptidomimetics
- 4) **Carbohydrates**: structures, representations and selected reactions of monosaccharides; approaches to the chemical synthesis of oligosaccharides
- 5) **Nucleic Acids**: chemical synthesis of nucleosides, oligonucleotides and analogues.

Learning Outcomes

- Students will be able to describe, define, identify (including stereochemical elements) and name common amino acids, nucleosides and monosaccharides.
- Students will learn the basic principles and applications of protecting group chemistry and solid-phase methods and apply this knowledge to propose reasonable synthetic approaches to oligomeric biomolecules.
- Students will learn to analyse complex biomacromolecules and outline their synthesis.
- Students will communicate solutions to questions related to the synthesis of biomacromolecules in clear, rational terms, explain and defend their answers and learn to evaluate and critique others' solutions.

4. Course Materials

All course material will be posted to OWL: <https://westernu.brightspace.com/>. Supplemental handouts may also be provided in-class.

There is no required textbook; your previous organic chemistry textbooks will provide a solid background. Various other sources will be used throughout the course and citations given at the time. Journal articles may be assigned for reading and discussion. Notes will be written on the chalk board and you are responsible for taking/making your own notes.

If students need assistance with the course OWL site, they can seek support on the [OWL Brightspace Help](#) page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

5. Methods of Evaluation

Grading Scheme and Assessment Dates

Tutorials/Assignments. Five in-person tutorials are scheduled throughout the term. Questions for discussion will be distributed; solutions *must be submitted thorough OWL prior to start of the tutorial* to receive credit for having completed the assignment. In addition, to the submitted solutions, both attendance of the tutorial and participation in the discussion counts toward the grade. Tutorials are designed to be live, interactive, group problem-solving and discussion sessions and cannot be replicated

for missed instances. If a tutorial is missed for a valid reason, then the weight will be transferred to the final exam.

Tutorials/assignments, 3% x 5: 15%

Tentative dates/topics:

Friday, Jan. 23, Protecting group chemistry

Friday, Feb. 6, Peptide chemistry

Friday, Mar. 13, Carbohydrates

Monday, Apr. 1, Nucleic Acids

Monday, Apr. 6, Summary and Review

In-Class, Midterm Test, 2 x 50 min.

Friday, Feb. 13 (protecting groups and peptides): 20%

Friday, Mar. 20 (carbohydrates): 20%

Final Exam (3 hour), cumulative, date set by Registrar: 45%

Use of Generative AI Tools

The use of generative AI tools (e.g., ChatGPT, Copilot, Gemini) are **prohibited** for each assessment.

General information about missed coursework

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs*, posted on the Academic Calendar:

https://uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person.

The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult [Accessible Education](#).

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage: https://registrar.uwo.ca/academics/academic_considerations/

All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

Missed assignments. There are no make-up assignments. If you miss an assignment and are granted consideration, the weight of the missed assignment will be transferred to the Final Exam.

Late assignments. Late assignments are not accepted. Students with disability accommodations who ask for a longer extension will be excused instead.

Missed midterm test. If you miss a midterm test and are granted consideration, the weight of the midterm will be transferred to the Final Exam. If you miss both midterm tests, a cumulative make-up test will be offered.

All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request **without supporting documentation** in this course. However, the following assessments are excluded from this and, therefore, always require formal supporting documentation:

- Examinations scheduled during official examination periods (Defined by policy)

When a student *mistakenly* submits their one allowed Academic Consideration request **without supporting documentation** for the assessments listed above or those in the **Coursework with Assessment Flexibility** section below, the request cannot be recalled and reapplied. This privilege is forfeited.

When a student misses the Final Exam and their Academic Consideration has been granted, they will be allowed to write the Special Examination (the name given by the University to a makeup Final Exam). See the Academic Calendar for details (under [Special Examinations](#)), especially for those who miss multiple final exams within one examination period.

6. Additional Statements

6.1 Religious Accommodation

When a recognized religious holiday or observance conflicts with an examination, test, or other scheduled academic obligation, students must request accommodation via the University's Student Absence Portal (SAP). This request should identify the conflict and specify which course component(s) (e.g. test, midterm, exam) are affected.

Students are encouraged to submit the SAP request as early as possible, but no later than two weeks before any examination, or one week before any mid-term test or quiz, to allow sufficient time for adjustment.

The SAP request serves as official notification to both the course instructor and the Academic Advising Office, in accordance with University policy:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

The Faculty of Science considers religious accommodations as scheduling conflicts. Instructors should provide either a make-up exam or an earlier sitting of the same exam to accommodate the student.

For more information on recognized religious holidays, please visit the Diversity Calendar posted on the Equity, Diversity & Inclusion website - <https://www.edi.uwo.ca>

6.2 Academic Accommodation Policies

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf.

6.3 General Academic Policies

The website for Registrar Services is <https://www.registrar.uwo.ca/>.

Use of @uwo.ca email: In accordance with policy, https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf, the centrally administered e-mail account provided to students will be considered the individual's official university email address. It is the responsibility of the account holder to ensure that emails received from the University at their official university address are attended to in a timely manner.

Requests for Relief (formerly known as “appeals”)

Policy on Request for Relief from Academic Decision:

https://uwo.ca/univsec/pdf/academic_policies/appeals/requests_for_relief_from_academic_decisions.pdf

Procedures on Request for Relief from Academic Decision (Undergraduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/undergrad_requests_for_relief_procedure.pdf

Procedures on Request for Relief from Academic Decision (Graduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/graduate_requests_for_relief_procedure.pdf

6.4 Scholastic Offences

Policy on Scholastic Offences:

https://uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_offences.pdf

Procedures on Scholastic Offences (Undergraduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/undergrad_scholastic_offence_procedure.pdf

Procedures on Scholastic Offences (Graduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/graduate_scholastic_offence_procedure.pdf

Use of Electronic Devices During Assessments

In courses offered by the Faculty of Science, the possession of unauthorized electronic devices during any in-person assessment (such as tests, midterms, and final examinations) is strictly prohibited. This includes, but is not limited to: mobile phones, smart watches, smart glasses, and wireless earbuds or headphones. **Unless explicitly stated otherwise in advance by the instructor, the presence of any such device at your desk, on your person, or within reach during an assessment will be treated as a *scholastic offence*, even if the device is not in use.** Only devices expressly permitted by the instructor (e.g., non-programmable calculators) may be brought into the assessment room. It is your responsibility to review and comply with these expectations.

Use of Generative AI Tools

Unless otherwise stated, the use of generative AI tools (e.g., ChatGPT, Microsoft Copilot, Google Gemini, or similar platforms) is **not permitted** in the completion of any course assessments, including but not limited to: assignments, lab reports, presentations, tests, and final examinations. Using such tools for content generation, code writing, problem solving, translation, or summarization—when not explicitly allowed—will be treated as a **scholastic offence**. If the use of generative AI is permitted for a particular assessment, the conditions of use will be specified by the instructor in advance. If no such permission is granted, students must assume that use is prohibited. It is your responsibility to seek clarification before using any AI tools in academic work.

6.5 Support Services

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

Western is committed to reducing incidents of gender-based and sexual violence (GBSV) and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced GBSV (either recently or in the past), you will find information about support services for survivors, including emergency contacts, at:

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

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. If you have any questions regarding accommodations, you may also wish to contact Accessible Education at

http://academicssupport.uwo.ca/accessible_education/index.html

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