

The University of Western Ontario
Chemistry 9653R, Fall 2025
Polymers: Synthesis to Function

Instructor: Joe Gilroy, MSA 3206, joe.gilroy@uwo.ca

Description:

This 0.25 course will explore modern approaches to polymer synthesis (e.g., ionic, radical, and ring-opening polymerization) and characterization methods (e.g., NMR spectroscopy, Gel Permeation Chromatography, Thermal Analysis). Through the discussion of recent examples from the literature, the ability of these techniques to provide custom functional materials for various applications will be explored.

Course-Based Learning Outcomes:

Upon completion of Chem 9653, students will be able to....

- describe the scientific principles governing polymer synthesis and characterization and apply these principles to problems.
- use their knowledge of polymer chemistry to predict and rationalize properties, mechanisms, and patterns of reactivity.
- apply methodologies in order to conduct polymer synthesis, analyses, or other chemical investigations.

Course Syllabus:

1. Introduction to polymers - basic terms and concepts
2. Free radical polymerization - conventional and controlled/living
3. Ionic polymerization
4. Ring-opening polymerization
5. Metal-catalyzed polymerization
6. Common polymer characterization techniques

Course Materials:

The course notes are the primary resource for this course. Journal articles related to the course content will be circulated via OWL Brightspace. There is no required textbook for this course.

Lectures / seminars:

Days: M, W, F (approx. Oct. 27 – Dec. 5)
Time: 11:30–12:20, MSA 3204

Methods of Evaluation:

Assignments (2 × 30%, due dates tba)	60%
Final Examination (date tba)	40%

Course attendance and missed/late assignments:

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved, and the instructor has been informed.

Work will be penalized 20% per day (one day of a weekend will count) that an assignment is late. Due dates/times will always be at the BEGINNING of a lecture period unless otherwise stated. The penalty will be applied until either 80% credit has been lost at which point no credit will be given, or no credit will be given after the material has been returned to the rest of the class (whichever comes first).

Statement on Use of Electronic Devices:

The use of a basic scientific calculator is permitted during tests and examinations.

Statement on the Use of Generative Artificial Intelligence (AI):

The use of generative artificial intelligence (AI) tools/software/apps is permitted for editing purposes but should not be used to generate original responses to assignment questions or written passages of text for this course.

Statement on Academic Offences:

Scholastic offences are taken seriously, and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following website:

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

Support Services

The website for the Office of the Registrar is: <http://www.registrar.uwo.ca>

Students who are in emotional/mental distress should refer to Mental Health@Western <http://www.uwo.ca/uwocom/mentalhealth/> for a complete list of options about how to obtain help.”

Statement on Gender-Based and Sexual Violence:

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