

CHEM3600 (Winter) 2025

Introduction to Nanotechnology

We, the people of the Faculty of Science at Carleton University, acknowledge that our campus is located on the traditional, unceded territories of the Algonquin Anishinaabeg people. Miigwetch for your hospitality and stewardship of this territory and the teachings that come from it. We are grateful for this land, the air that we breathe, and the water that sustains us all as well as for the animals, plants and other living beings: these enable us to research, teach, mentor, support, study, and learn. We recognize our responsibility to our natural environment and to reconciliation with Indigenous peoples.

Course Instructor: Peter Gordon

How to address me: Peter, Dr.Gordon

Gender Pronouns: (he/him/his)

Email: peter.gordon@carleton.ca

Note: If you have or question or would like to talk with me, you can send an email or approach me after lecture.

Best Ways to be in Touch: in class, via email

Office Location: Room 414, Steacie Bldg

Class Location: Please check Carleton Central for the room location.

Class Times: M, W / 1:05-2:25 PM

Prerequisites: CHEM 3100

Preclusions: n/a

Department/Unit: Chemistry

Topics Covered and Learning Outcomes

Course Description

Nanoscale units, bulk properties vs. nanoscale properties, electrons, atoms and ions, metals, band structure, electrical conduction, biosystems, molecular devices, quantum mechanics and optics, tools for measuring nanostructures. Production of nanostructures: self assembly, nanoscale crystal growth, polymerization. Applications to sensors, magnets, electronics, drug delivery. Toxicology of nanostructures.

Prerequisite(s): CHEM 3100.

Topics to be Covered

"Week"	Topic/Content
1	Scale and Dimensionality
2	Top-down vs. Bottom-up
3	Characterization Methods
4	Nanoparticles
5	Quantum Dots
6	Nanotubes and Nanowires
7	Nanofilms
8	Bionanotechnology
9	Nanoelectronics
10	Environmental and Health Implications of Nanotechnology

Important dates and deadlines can be found here:

<https://carleton.ca/registrar/registration/dates/academic-dates/>, including class suspension for fall, winter breaks, and statutory holidays.

Assessments

Grade Breakdown

COMPONENT	GRADE VALUE	DATE
ASSIGNMENTS	30 %	Throughout term
IN-CLASS MIDTERM	20%	Feb 20

PRESENTATION(S)	(part of “Assignments”)	TBD
PAPER	10%	April 4 th
FINAL EXAM	40%	April 5 th (assigned, due the 16 th)

Late and Missed Work Policies

Late Work

-10% / day for assignments, -100% for all else.

Missed Work

See [academic considerations form](#) and [longer-term accommodation](#) .

Learning Material(s) and Other Course/Lab-Related Resources

There are no ancillary fees associated with this course, e.g., textbooks, course packs, lab manuals, field work, online resources, etc. Free material will be provided as needed.

Again, to be clear: **Students are not required to purchase textbooks or other learning materials for this course.**

Academic Accommodations and Regulations

Carleton is committed to providing academic accessibility for all individuals. You may need special arrangements to meet your academic obligations during the term. The accommodation request processes are outlined on the Academic Accommodations website (<https://students.carleton.ca/course-outline/>).

Statement on Chat GPT/Generative AI usage (See the *Sample Syllabus Statements for AI use in Courses* [document](#) for examples)

As our understanding of the uses of AI and its relationship to student work and academic integrity continue to evolve, students are required to discuss their use of AI in any circumstance not described here with the course instructor to ensure it supports the learning goals for the course. Use of AI is encouraged; expectations regarding its use will be discussed in the first class.

Statement on Academic Integrity

Students are expected to uphold the values of academic integrity, which include fairness, honesty, trust, and responsibility. Examples of actions that compromise these values include but are not limited to plagiarism, accessing unauthorized sites for assignments or tests, unauthorized collaboration on assignments or exams, and using artificial

intelligence tools such as ChatGPT when your assessment instructions say it is not permitted.

Misconduct in scholarly activity will not be tolerated and will result in consequences as outlined in Carleton University's Academic Integrity Policy. A list of standard sanctions in the Faculty of Science can be found here.

Additional details about this process can be found on the Faculty of Science Academic Integrity website.

Students are expected to familiarize themselves with and abide by Carleton University's Academic Integrity Policy.

Student Rights & Responsibilities

Students are expected to act responsibly and engage respectfully with other students and members of the Carleton and the broader community. See the 7 Rights and Responsibilities Policy for details regarding the expectations of non-academic behaviour of students. Those who participate with another student in the commission of an infraction of this Policy will also be held liable for their actions.

Mental Health and Wellness:

As a student you may experience a range of mental health challenges that significantly impact your academic success and overall well-being. If you need help, please speak to someone. There are numerous resources available both on- and off-campus to support you. For more information, please consult <https://wellness.carleton.ca/>.

Student Concerns

If a concern arises regarding this course, **your first point of contact is me**: Email or drop in during student hours and I will do my best to address your concern. If I am unable to address your concern, the next points of contact are (in this order):

Note: You can also bring your concerns to Ombuds services.



Assistance for Students

Writing and Learning Support: <https://carleton.ca/csas/support/>

Peer Assisted Study Sessions (PASS): <https://carleton.ca/csas/pass/>

Math Tutorial Centre: <https://carleton.ca/math/math-tutorial-centre/>

Science Student Success Centre: <https://sssc.carleton.ca/>