CHEM3107 Winter 2026

Experimental Methods in Nanoscience

Instructor: Anatoli Ianoul *(he/him)*

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Best Ways to be in Touch: in class, by email, or by appointment

Office Location: Room 227 Steacie Building

Class Location: Please check Carleton Central

Class Times: Wednesdays 13:35 – 17:35

Prerequisite: CHEM3100

Department: Chemistry

Lab Coordinator: Kyle Fournier *(he/him)*

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Best Ways to be in Touch: in class, by email, or by appointment.

Office Location: Room 237 Steacie Building

Electron Microscopy Technician:
Jianqun (JJ) Wang *(he/him)*
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Topics and Assessments

Topics to be Covered

Experiment	Topics
1 – NP	Spherical metal nanoparticles, properties and stability of colloids, Localized Surface Plasmon Resonance, and electron microscopy.
2 – CS	Composite inorganic nanoparticles.*
3 – DNA	Modifications of metal nanoparticles, DNA as a nanomaterial, and experimental design for real-world applications.*
4 – SAM	Association of nanoparticles; chemistry and kinetics of self-assembly.*
	** CS, DNA, and SAM will all revisit and build on the topics introduced in NP.*
5 – FF	Superparamagnetism, crystal structure, and magnetic domains.
6 – NW	1-D metal nanowires, electrodeposition, and template-directed synthesis.
7 – QD	Quantum confinement of fluorescence in semiconductors.
8 – ETCH	Metal-assisted chemical etching, crystal structure, and anisotropy.

Schedule and Due Dates

Week of (Wed)	Experiment	Characterization	Assessment Due	Due Date
Jan 07	Intro	--	--	--
Jan 14	NP	TEM, UV-Vis	--	--
Jan 21	CS	TEM, UV-Vis	NP short report	Jan 23, 23:59
Jan 28	DNA	TEM, UV-Vis	CS short report	Jan 30, 23:59
Feb 04	SAM	SEM, UV-Vis, AFM	DNA interview	Feb 04 – 06, TBD
Feb 11	--	--	SAM short report	Feb 13, 23:59
Feb 18	*Winter Break*	--	--	--
Feb 25	--	--	Summative Presentation	Feb 25, 13:00
Mar 04	FF	TEM	--	--
Mar 11	NW	SEM	FF short report	Mar 13, 23:59
Mar 18	QD	UV-Vis, Fluoro	NW short report	Mar 20, 23:59
Mar 25	ETCH	SEM	--	--
Apr 01	--	--	ETCH interview	Apr 01 – 03, TBD
Apr 08	--	--	QD formal report	Apr 06, 23:59

Important details:

- The intro meeting will be in room 115 Steacie Building during the normal lab time.
- A pre-lab assignment for each experiment will be due at the start of the lab.
- Characterization appointments will be scheduled for the Thursday or Friday following the experiment. TEM and SEM are done in room 222 Steacie, all others are done in room 237 Steacie.
- Interviews will be scheduled within the given timeframe based on availability.
- The summative presentation will be in room 115 Steacie during the normal lab time.
- The last day to submit course work is Tuesday April 08. Late submissions cannot be accepted after this date per University rules.

Grade Breakdown

Component	Grade value	Number	Total
Pre-lab prep notes	3 %	8	24 %
Lab performance	1.5 %	8	12 %
In-lab discussions	1.5 %	8	12 %
Short reports	5 %	5	25 %
Interviews	5 %	2	10 %
Presentation	8 %	1	8 %
Formal report	9 %	1	9 %

Late and Missed Work Policies

Late Work

Unless other arrangements are agreed to, the following policies apply:

- Late pre-labs will be assigned a grade of zero.
- Late lab reports will be assigned a penalty of -15% per day late up to three days, including weekends. After the third day, they will be assigned a grade of zero.
- Missed interviews and presentations will be assigned a grade of zero.

If you did or will miss a deadline due to illness or other extenuating circumstances, you must submit the academic considerations form as soon as possible and no later than 24 hours after the original deadline. The approval and nature of any alternative arrangements will be at the discretion of the instructor and lab coordinator on a case-by-case basis.

We understand that life happens, and there are many valid reasons why anybody can find themselves struggling more than they expected. If you feel you will be unable to meet an upcoming deadline for reasons that aren't considered "extenuating circumstances", you are still welcome to reach out to us to discuss possible extensions, provided you contact us during business hours two or more days before the original deadline.

Missed Experiments

A minimum of 7 out of 8 experiments must be performed to receive credit in this course. If you miss an experiment, you must submit the academic considerations form as soon as possible and no later than 13:30 on Friday the week of the experiment. If your submission of valid extenuating circumstances is approved, a make-up experiment will be rescheduled as soon as possible and will include all deferred characterizations and assessments.

If you do not provide valid extenuating circumstances on-time, or if you miss or fail to submit any part of a rescheduled make-up experiment, you will be assigned a grade of zero for all components of that experiment (a minimum of 11% of your final course grade).

Unless truly exceptional circumstances apply, if you miss two or more experiments you will be assigned a grade of F in the course.

Learning Materials and Other Resources

Students are not required to purchase textbooks or other learning materials for this course.

All experiment manuals are available electronically through brightspace. All journal articles or other literature to be studied will be accessible through the Library.

A lab coat, safety goggles, lab notebook, and pen are required for all experiments. You may reuse yours from prior courses as long as they are clean and functional.

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.

Use of ChatGPT/Generative AI in this Course

You may use AI tools in this course for sharing ideas, organizing and getting started on projects, clarifying challenging concepts, and support in completing process-based activities. Some acceptable uses include:

- Brainstorming ideas (e.g., generating discussion topics with ChatGPT)
- Creating outlines (e.g., using Microsoft Word's Outline View with AI suggestions)
- Generating creative content (e.g., using PowerPoint's Designer feature to create visually appealing presentations)
- Data analysis (e.g., using Excel's AI-powered data analysis tools like Ideas to generate insights and visualizations)
- Summarizing large volumes of text (e.g., using Word's Smart Lookup and Researcher to condense research articles)
- Improving explanations of complex concepts (e.g., using Microsoft Word's Researcher tool to find relevant information, or using ChatGPT to help with wording)

Documenting Use of AI

It is necessary to document your use of AI in this course, using the following guidelines:

- Provide a detailed description of AI usage and proper citation (e.g., 'AI-assisted data analysis performed using Excel's Ideas tool/Python with AI-driven libraries')
- Review, edit, and ensure accuracy of all AI-generated content
- Ensure critical thinking and personal insight are evident in all submitted work
- AI-generated content should not replace meaningful analysis or primary arguments

Why have we adopted this policy?

This policy allows you to leverage AI for more complex tasks, promoting collaboration between human intelligence and AI. It ensures you learn to effectively integrate AI into your work while maintaining intellectual contributions and critical thinking. By using AI to handle routine or supplementary tasks, you can (and are expected to) focus more on deeper learning and analysis in your assignments.

This policy is adapted from standard guidelines recommended by Teaching and Learning Services. 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 clearly described here with the course instructor to ensure it supports the learning goals for the course.

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 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 in ways not permitted by the course policy or assignment instructions.

Misconduct in scholarly activity will not be tolerated and will result in consequences as outlined in Carleton University's Academic Integrity Policy. Students are expected to familiarize themselves with and abide by this policy. A list of standard sanctions and additional details about the process in the Faculty of Science can be found here.

Student Rights & Responsibilities

Students are expected to act responsibly and engage respectfully with other students and members of both 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.

Student Concerns

If a concern arises regarding this course, **your first point of contact is Kyle or Anatoli**. Email us or speak to us in the lab and we will do our best to address your concern. If we are unable to address your concern, the next points of contact are (in this order):

1. Kyle or Anatoli (Lab Coordinator or Instructor for this course)
2. Seán Barry (Chemistry Department Chair)
3. Office of the Dean of Science (ODScience@carleton.ca)

Note: You can also bring your concerns to Ombuds services for assistance and guidance.