

**CHEM421: Advanced Topics in Physical Chemistry
Winter 2022**

Mondays 1:30 to 2:30 PM (EST)
Wednesdays 12:30 to 1:30 PM (EST)
Fridays 11:30 to 12:30 PM (EST)

Queen's University is situated on traditional territory of the Haudenosaunee and Anishinaabek. As an uninvited guest, I am grateful for the opportunity to live and learn in this land.

Instructor Name: Dr. Paul Duchesne
Office Location: 306 Chernoff Hall
Office Hours: Flexible (please contact via email)
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Course Description

This course introduces modern methods for the structural and electronic characterization of surfaces and materials, including X-ray and synchrotron-based spectroscopies, surface spectroscopic methods, and scanning probe methods. Following an initial introduction to solid materials, this course will explore each method from fundamental principles to technical applications.

Learning Outcomes and Assessment

Upon successful completion of this course, students will be able to:

1. Understand and explain the physical and chemical principles underlying several useful characterization methods
2. Identify and describe the strengths and limitations of each method
3. Research, understand, and explain novel applications of such methods in modern research

These skills are broadly applicable and will be invaluable for students choosing to pursue careers in scientific research, education, and more. Students' understanding of course material will be evaluated based on assignments and a final written/oral presentation exploring an advanced characterization technique.

Class Format

This class is divided into three weekly one-hour sessions. Wednesday and Thursday sessions will consist of oral lectures. Thursday sessions will be used to cover any remaining lecture content and allow students to work on their weekly assignments. Due to the ongoing COVID-19 pandemic, all sessions will be held virtually using Microsoft Teams. Lectures will be recorded and made available for any students who have scheduling conflicts.

Course Materials

Content will be provided in the form of PowerPoint presentations, with content taken from various sources. Recommended (**not** required) textbooks for further reading include:

[*Physical Chemistry*, P. Atkins and J. de Paula, 8th ed.](#)

[*Properties of Materials*, M.A. White, 1st ed.](#)

Lecture recordings and any supplementary course content will be made available through onQ (<https://onq.queensu.ca/d2l/home>). Best onQ performance is achieved when using the most recent version of the web browsers, Chrome or Firefox. Safari and Edge are strongly discouraged, as these web browsers are known to cause issues with onQ.

Copyright of Course Materials

All course materials are copyrighted, including assignments, emails, documents, and content provided on the onQ website. These materials are provided exclusively for the use of students registered in this course, and are not to be distributed elsewhere in any form. Violation of these regulations constitutes a breach of copyright and may also fall under violation of academic integrity, as per the University Senate's Academic Integrity policy statement.

Course Timeline

| Assessment | Deadline (11:59:59 PM) |
|-----------------------------------|---|
| Assignment 1 | January 20th |
| Assignment 2 | January 27th |
| Assignment 3 | February 3rd |
| Assignment 4 | February 10th |
| Assignment 5 | February 17th |
| Assignment 6 | March 3rd |
| Assignment 7 | March 10th |
| Assignment 8 | March 17th |
| Assignment 9 | March 24th |
| Assignment 10 | March 31st |
| Final Project (Written) | April 2nd |
| Final Project (Oral Presentation) | *April 3rd to April 14th |

* Students will present their work during class time within this span of dates.

Grading Scheme

Student performance will be evaluated according to the following scheme:

| | |
|--------------------|------|
| Weekly Assignments | 60% |
| Final Project | 40% |
| Total | 100% |

Assessments will be assigned numerical grades. A student's final letter grade will be assigned according to their numerical grade as per the Queen's Official Grade Conversion Scale.

| Grade | Numerical Course Average (Range) |
|--------------|---|
| A+ | 90 to 100 |
| A | 85 to 89 |
| A- | 80 to 84 |
| B+ | 77 to 79 |
| B | 73 to 76 |
| B- | 70 to 72 |
| C+ | 67 to 69 |
| C | 63 to 66 |
| C- | 60 to 62 |
| D+ | 57 to 59 |
| D | 53 to 56 |
| D- | 50 to 52 |
| F | 49 or less |

Statement on Academic Integrity

Students should familiarize themselves with proper academic conduct and understand the various forms of academic integrity offences: plagiarism (including self-plagiarism), use of unauthorized materials, facilitation, forgery, and falsification. Please ensure that all submitted work meets Queen's University's Academic Integrity standards (<https://www.queensu.ca/artsci/students-at-queens/academic-integrity>).

Turnitin Statement

This course makes use of *Turnitin*, a third-party application that helps maintain standards of excellence in academic integrity. Normally, students will be required to submit their course assignments through *onQ* to *Turnitin*. In doing so, students' work will be included as source documents in the *Turnitin* reference database, where they will be used solely for the purpose of detecting plagiarism.

Turnitin is a suite of tools that provide instructors with information about the authenticity of submitted work and facilitates the process of grading. *Turnitin* compares submitted files against its extensive database of content, and produces a similarity report and a similarity score for each assignment. A similarity score is the percentage of a document that is similar to content held within the database. *Turnitin* does not determine if an instance of plagiarism has occurred. Instead, it gives instructors the information they need to determine the authenticity of work as a part of a larger process.

Please read [Turnitin's Privacy Pledge, Privacy Policy, and Terms of Service](#), which governs users' relationship with *Turnitin*. Also, please note that *Turnitin* uses cookies and other tracking technologies; however, in its service contract with Queen's *Turnitin* has agreed that neither *Turnitin* nor its third-party partners will use data collected through cookies or other tracking technologies for marketing or advertising purposes. For further information about how you can exercise control over cookies, see [Turnitin's Privacy Policy](#):

Turnitin may provide other services that are not connected to the purpose for which Queen's University has engaged *Turnitin*. Your independent use of *Turnitin's* other services is subject solely to *Turnitin's* Terms of Service and Privacy Policy, and Queen's University has no liability for any independent interaction you choose to have with *Turnitin*.

For submission instructions and further information, please visit [Queen's University Turnitin for Students](#). If you object to the use of this service, you must inform the course instructor within one week of the beginning of the course (*i.e.*, before January 10th, 2022), and an independent Academic Integrity assessment will be carried out by the course instructor.

Notice of Recording

Synchronous (live) classes will be delivered in this course through a video conferencing platform supported by the University (MS Teams, Zoom). Steps have been taken by the University to configure these platforms in a secure manner. Classes will be recorded with video and audio (and in some cases transcription) and will be made available to students in the course for the duration of the term. The recordings may capture your name, image or voice through the video and audio recordings. By attending these live classes, you are consenting to the collection of this information for the purposes of administering the class and associated coursework. If you are concerned about the collection of your name and other personal information in the class, please contact the course instructor to identify possible alternatives.

To learn more about how your personal information is collected, used and disclosed by Queen's University, please see the general Notice of Collection, Use and Disclosure of Personal Information.

Accommodations Statement

Queen's University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability and think you may need accommodations, you are strongly encouraged to contact Student Wellness Services (SWS) and register as early as possible. For more information, including important deadlines, please visit the Student Wellness website (<https://www.queensu.ca/studentwellness/accessibility-services>)

Missed Classes/Evaluations

Students should inform the instructor of any situations that may have a negative impact on their academic performance and request any considerations or accommodations as soon in advance as is possible. Please visit the Queen's Student Accessibility Services website for more specific instructions (www.queensu.ca/artsci/undergrad-students/academic-consideration-for-students).