

The University of Western Ontario
Chemistry 9665T, Winter 2022
Scanning Electrochemical Probe Methods

Instructor:

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Description:

Scanning electrochemical probe methods (SEPM) enable the visualization of interfacial physicochemical processes with high spatial resolution. The goal of this quarter survey course is to gain an understanding of different scanning electrochemical probe methods through discussion of each technique's theory and operating principles, instrumentation, probe preparation, implementation, and limitations. Exciting applications of SEPM will be discussed through recent cases in the literature, highlighting examples in materials science, bioelectrochemistry, and analytical methodology development. The topics covered in this course will prepare students for their final project, where they will propose a SEPM experiment to answer a research question and justify their rationale through written and oral communication.

Topics include:

- Macroscale vs. microscale electrochemical fundamentals
- Introduction to scanning probe microscopy instrumentation and principles
- Scanning electrochemical microscopy (SECM)
- Scanning ion conductance microscopy (SICM)
- Scanning electrochemical cell microscopy (SECCM)
- Local electrochemical impedance spectroscopy (LEIS)
- Scanning vibrating electrode technique (SVET)
- Hyphenated SEPM methods

Lectures/Seminars: Tentatively: Mon/Wed 12-1:30pm (room ChB 115)

Evaluation

In-class participation (10%)

Assignments (30%)

Final project: Presentation and report (30% each)

Resources:

There is no required textbook for this course. All course material will be provided as we progress through the course.

Course attendance and missed/late assignments

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

Notes on Academic Honesty

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:

www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Health and Wellness

As part of a successful graduate student experience at Western, it is encouraged that students make their health and wellness a priority. Western provides several on campus health-related services to help students achieve optimum health and engage in healthy living while pursuing their graduate degree. For example, to support physical activity, all students, as part of their registration, receive membership in Western's Campus Recreation Centre.

Numerous cultural events are offered throughout the year. For example, please check out the Faculty of Music web page <http://www.music.uwo.ca/>, and our own McIntosh Gallery <http://www.mcintoshgallery.ca/>. Information regarding health- and wellness-related services available to students may be found at <http://www.health.uwo.ca/>. Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as their faculty supervisor, their program director (graduate chair), or other relevant administrators in their unit. Campus mental health resources may be found at http://www.health.uwo.ca/mental_health/resources.html.