# COURSE CHEM/ENCH 421
## ADVANCED TECHNIQUES IN PHYSICAL CHEMISTRY

## GENERAL INFORMATION

| Course instructor | Dr. Gregory Jerkiewicz  
| CHE 311, Chernoff Hall  
| Phone: 533-6413  
| E-mail: gregory.jerkiewicz@queensu.ca |
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| Web site | onQ |
| Lectures | Room: CHE 211  
| Schedule:  
| Mondays 13:30  
| Wednesdays 12:30  
| Fridays 13:30 |
| Office hours | An office hour that suits the class and the instructor will be established at the beginning of the course |
| Gregory Jerkiewicz, *Lecture Notes* |
| Marking | Midterm examination: 30%  
| In-class Presentation: 20%  
| Final examination: 50%  
| Total 100% |
**Academic Integrity & Plagiarism**

The Senate document on Academic Dishonesty states that "Plagiarism means presenting work done (in whole or in part) by someone else as if it were one's own." Plagiarized work could result in an automatic failure in any Chemistry course and a subsequent request to withdraw from the program. Students should consult the Senate document [http://www.queensu.ca/secretariat/senate/policies/acaddish.html](http://www.queensu.ca/secretariat/senate/policies/acaddish.html) or talk to the course instructor when in doubt about how best to refer to the work of others.

**Course Outline**

**Part 1. Surface Chemistry (weeks 1 – 6; CHEM 421)**


**Part 2. Surface and Materials Characterization Techniques (weeks 7 – end of term; CHEM 421 and CHEM 810)**


**Part 3. Materials Science and Experimental Techniques (weeks 7 – end of term; CHEM 421 and CHEM 810)**


**Suggest Subjects for Written Essays and In-Class Oral Presentations**

1. Synchrotron, synchrotron radiation and application (see the Canadian Light Source);
2. Small angle X-ray scattering (SAXS);
3. Near-field scanning optical microscopy (NSOM);
4. Glow Discharge-Optical Emission Spectroscopy (GD-OES);
5. Static and dynamic contact angle, its measurements and instrumentation;
6. Constant pressure and constant volume viscosity and their determination;
7. Focused Ion Beam (FIB): the technique and its applications;
8. Scanning electron microscopy (SEM);
9. Transmission electron microscopy (TEM) and its application;
10. X-ray fluorescence (XRF);
11. Surface-enhanced Raman spectroscopy (SERS);
12. Neutron diffraction and reflectivity;
13. Scanning electrochemical microscopy;
14. Ellipsometry;
15. Langmuir-Blodgett troughs and their applications;

Oral Presentation Evaluation Criteria
1. Length: 20 min (17 + 3)
2. Structure
3. Clarity and quality of the oral presentation
4. Dynamism and pace of presentation
5. Level of difficulty
6. Body language and eye contact
7. Quality and structure of slides; relevance of information

Midterm Exam: TBA
Final Exam: TBA