Chemistry 3210: Main group and materials chemistry

Class times: MWF 11–11:50 am, C3033 (*)
Lab: Tues 2–5pm, C5001/C4017/...

Instructors:
Class: Erika Merschrod, erika@mun.ca, C2019
Lab: David Stirling, dstirlin@mun.ca, C4026
Silvana Rodrigues Pereira, srp112@mun.ca

Office hours: by appointment

Reference books: Shriver & Atkins’ Inorganic Chemistry, Atkins et al.
Properties of Materials, M. A. White
and others on reserve and in the resource room

Course webpage: http://online.mun.ca (D2L)

Evaluation scheme:
Midterm test 10 % Mon Oct 16
Laboratory 20 %
Paper/presentation 20 %
Final exam 50 %

There are no make-up tests or supplementary exams. Given a valid and properly documented excuse, the value of a missed test will be added to that of the final exam. Laboratory attendance is mandatory, and laboratory material is testable. You must pass the lab in order to pass the course. Please refer to the Department webpage and the University Calendar for a refresher on other academic policies.

Course outline:

This course provides an introduction to Main Group and Materials Chemistry. Traditionally Structure is taught before Properties, but I’ve found it more fun to do it the other way around. So we’ll likely start at the bottom of the list and work up! In addition to the topics listed below, you will also receive instruction in literature searching and related library skills, effective written and oral communication, and specific laboratory techniques.

- Structure
  - Point-group symmetry
  - Crystal structure
  - Lower-dimensional structures
  - Electronic structure: bonds to bands

- Properties
  - Electronic properties
  - Optical properties
  - Thermal properties
  - Magnetic properties
  - Mechanical properties

* I will try to find a nicer classroom; I’ll keep you posted!
Laboratory:

The laboratory component of the course is built around 3 topics: computational modeling, nanoparticles, and polymers. Each student will select one aspect of one topic to explore further, subject to approval by the instructional staff. This may involve variations on the preparation of a material, different characterization methods, etc. You will lead your classmates in carrying out your project and then prepare a paper and presentation on your results. (See below for details on the paper and presentation.)

You must indicate your project area (computational, nanoparticles, polymers) on the appropriate D2L discussion board by Monday, Sept 11. There are a limited number of students who can choose each area, so make your selection early to be sure to obtain your first choice.

Each week you will be assigned a mark out of 10; these points will together comprise the 20% laboratory portion of your total grade. The weekly mark will consist of 5 points for properly maintaining your lab notebook and general performance in the lab, and 5 points for the quality of your work (appropriate and correct analysis of data, sufficient planning and preparation for subsequent experiments).

Paper and presentation:

Your paper and presentation will describe the unique experiments which you designed and carried out in the lab. The paper will be written in stages, and the presentations will take place in class toward the end of the term. All stages of the paper must be submitted electronically. The work on the paper is front-loaded for several reasons: many other classes will have more work toward the end of the term; we must make sure that you have a sound project before you implement it; and we must comply with the MUNSU-drafted policy on providing a certain percentage of marks before the drop date. If you choose to take an extension (dates at right), you may be opting out of receiving some of your marks before the drop date.

If you would like feedback before submitting a given part, please submit by Wednesday before the due date. In that case your final due date will be the following Monday.

<table>
<thead>
<tr>
<th>Points</th>
<th>Component</th>
<th>Due date</th>
<th>Extensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>proposal</td>
<td>Sept 15</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>experimental section</td>
<td>Sept 22</td>
<td>Oct 6 (nano)</td>
</tr>
<tr>
<td>10</td>
<td>introduction section</td>
<td>Sept 29</td>
<td>Oct 13 (nano)</td>
</tr>
<tr>
<td>10</td>
<td>results</td>
<td>Nov 3</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>discussion/conclusion</td>
<td>Nov 10</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>paper to classmate</td>
<td>Nov 17 (or earlier)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>comments for classmate</td>
<td>Nov 24 (or earlier)</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>presentation</td>
<td>Nov 28</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>final paper</td>
<td>Dec 1</td>
<td></td>
</tr>
</tbody>
</table>

These 100 points form the 20% paper/presentation portion of your total grade. You will be assessed on the quality of your work at every stage, and you are encouraged to seek feedback from me and from the Writing Centre well before the due dates. Material from the student presentations forms part of the laboratory component of the course and is therefore testable.