Department of Chemistry and Biochemistry
Syllabus

1. CHMI 3227 EL – Experimental Biochemistry (Winter 2017)

2. Coordinator:
   Dr. Stefan Siemann
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   Web: www.bioinorganic.ca
   Office Hours: Mondays and Tuesdays from 1:30 to 3:00 p.m.

3. Course description (from Calendar), including prerequisites.
   This course will give students hands-on experience with the techniques used in the biochemistry laboratory. The following techniques will be introduced: cell fractionation, protein and nucleic acid extraction and analysis, use of radioisotopes in biochemistry, spectroscopic techniques, preparation and characterization of liposomes and recombinant DNA techniques. PREREQ: successful completion of the second year in the biochemistry program and CHMI 3226. (lab 6) cr 3. Lab (3. 00).

   Class Hours: Wednesdays and Thursdays from 1:00 to 3:50 p.m. (S-217 or designated lab)
   Class Website: http://www.bioinorganic.ca/teaching/chmi3227.html

4. Learning objectives
   • To engage students in biochemical research using state-of-the-art research techniques and instrumentation
   • To develop skills in the oral presentation of scientific material related to a biochemical research technique and its applications
   • To develop skills in the collection of scientific data and its critical analysis
   • To develop skills in the recording of experimental data into a lab notebook
   • To actively engage in scientific discussions

5. Outline of Topics:
   Students will participate in four one-week lab rotations to gain experience in various biochemical techniques. The experiments are supervised by a number of faculty members of the department. The titles/topics of the experiments are dependent on the supervisors participating in this course, and will vary from year to year.
6. **Methods of Evaluation:**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Lab reports on four 1-week experiments</td>
<td>50% (12.5% each)</td>
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<tr>
<td>Oral presentation of a biochemical technique</td>
<td>15%</td>
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<tr>
<td>Lab notes</td>
<td>15%</td>
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<tr>
<td>Experimental skills and performance</td>
<td>20% (5% per lab)</td>
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7. **Methods of Delivery or method of teaching**

- **On-campus**

8. **Learning outcomes**

*At the end of this course, students will be able to*

- Critically analyse and interpret acquired experimental scientific data
- Effectively communicate the background, the methodology, experimental data, and its analysis/interpretation in form of a written “scientific paper style” lab report
- Effectively communicate (in oral form) the theory and fundamental applications of techniques currently employed in state-of-the-art biochemical research
- In an organized manner, record experimental protocols/details and acquired data in a laboratory notebook so that other researchers/peers have sufficient methodological details to reproduce the experiment

9. **Readings/Textbooks necessary**

- Reading material suggested or supplied by the supervisors
- Articles from the scientific literature pertinent to the performed experiments

10. **Policies**

- **Students must be familiar with the major University Policies, including**
  - Policy on academic honesty: follow the training under self-registration in D2L;
  - Program regulations: [http://laurentian.ca/program-regulations](http://laurentian.ca/program-regulations), look under student responsibility (should be verified before using as the registrar’s page is undergoing changes)

11. **Important Dates**

<table>
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<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>January 11, 2017</td>
<td>Introductory session</td>
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<tr>
<td>January 12, 2017</td>
<td>Introduction into the format and style of scientific journal articles</td>
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<td>January 25 &amp; 26, 2017</td>
<td><strong>Oral presentations</strong></td>
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<td>February 01, 2017</td>
<td>Start of 1-week lab rotations</td>
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<tr>
<td>February 21-24, 2017</td>
<td>Study week – No lab sessions!</td>
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<tr>
<td>March 16, 2017</td>
<td>Last day of lab sessions</td>
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<tr>
<td>March 30, 2017</td>
<td>Last session; Submission of Lab Notebook</td>
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12. Other

One-week lab rotations:
In CHMI 3227 EL, students will gain hands-on experience in a wide array of current techniques used in biochemical research. Students will be divided into groups of three, and will participate in four one-week lab rotations. The one-week experiments are supervised by a number of faculty members of the department. Prior to starting the lab, the students will be given an outline of the experiments. Furthermore, this outline may contain questions/exercises which must be answered/completed before the lab starts. Thus, students are required to be prepared for the lab before starting any experiments!

Lab Reports:
Within two weeks of completion of a 1-week lab, students are required to submit a formal lab report. The structure of the lab report should be as follows:
1. Title of the experiment(s), student’s name, name of supervisor, date (all on first page)
2. Abstract: 100-200 words
3. Introduction into the topic of the experiments, and outline of the techniques involved, objectives/hypothesis
4. Experimental section (describe experimental details, such as materials used, employed methods, specific parameters on instruments, etc.)
5. Results (describe your results and observations, incorporate figures, tables, schemes, etc.)
6. Discussion* (discuss your results in the context of your observations and what is known from the literature, comment on procedural errors, finish with a short conclusion)
7. References (list references in a uniform format)

* The Discussion section can potentially be combined with the Results section.
A more thorough outline of what is expected in a lab report can be found online in the Marking Sheet for Lab Reports.

Oral presentation on a biochemical technique:
Students will present a talk on a selected biochemical technique. The oral presentation should be in PowerPoint format and be 18-20 minutes in length. Each presentation should cover the fundamental principles of the technique, its general application in the biochemical laboratory, and a few (carefully) selected examples from the literature illustrating the usefulness of the technique in biochemical research. Following each presentation, there will a question period of about 5 minutes.

The PowerPoint presentations will be made available to all students enrolled in the course. As such, each presentation needs to be sent, per email and preferably in handout pdf format, to the coordinator who will then post the presentations on the class website.

Note: The presentation slides should be numbered. In addition, proper references (in a uniform format; e.g. Alpha, A. and Beta, B. (2007) J. Biol. Chem. 285, 1588-1596) should be included on the applicable slide(s).
**Lab Notes:**
In order to properly document performed experiments and to record observations, each student will receive a lab notebook. Details on how and what to include in the lab notes will be given during the first (information) session. At the end of each day of lab experiments, your supervisor should sign his/her name into your lab book (if he/she forgets, please remind him/her). The completed notebooks need to be submitted to the coordinator at the end of the term **(by 1 p.m. on Thursday, March 30, 2017)**, and will be evaluated according to clarity, accuracy of information, and comprehensiveness.

**Experimental skills and performance:**
Each student’s experimental skills and performance during the lab sessions will be judged by the supervising faculty members and their staff.