Biochemistry 3380G: Biochemistry Laboratory
Winter Term 2019

In this course you will perform laboratory exercises designed to illustrate principles taught in biochemistry lecture courses. Your hands-on training will give you experience with techniques and equipment commonly used in biochemistry and molecular biology research, including spectrophotometry, mass spectrometry, enzyme assays, protein purification, protein and gel electrophoresis, and recombinant DNA technology. You will also develop your skills at searching the scientific literature for information and communicating your results in writing in an accepted scientific format.

Schedule
Section 1&3: Thursdays, 1:30-5:30 pm in MSB 120.
Section 2&4: Fridays, 1:30-5:30 pm in MSB 120.

You must attend all sessions, unless I give you special permission, which may require documentation to be submitted to the office of the Dean of Science (see The Fine Print below). You are expected to be familiar with the day’s work when you arrive.

Instructor
Dr. Derek McLachlin
Medical Sciences Building Room 349 (office) or 127 (lab)
Telephone: 519-661-3072
E-mail: derek.mclachlin@schulich.uwo.ca

I have no set office hours this term. If you want to see me, phone me or send an e-mail and we can arrange an appointment time. Spontaneous visits are also fine, but I may not be in my office when you come!

Course materials
The required lab manual is available in the bookstore. Students must record data in a bound notebook (but not necessarily a new one). Students should bring a lab coat and safety glasses, and wear them at all times while in the lab. For advice on report writing, see Mimi Zeiger’s book “Essentials of Writing Biomedical Research Papers,” 2nd edition, available at Taylor Library.

Course objectives
The experiments in this course are intended to introduce you to some of the methods and equipment used in biochemical and molecular biological research, and to illustrate some of the principles taught in the biochemistry lecture courses. An important part of the research process is communicating findings. You will learn to write a laboratory report in an accepted scientific format. You will be assessed on these written reports and on your understanding of the techniques and the principles behind them.

By the end of this course, you should be able to:
1. Safely perform basic biochemical laboratory procedures such as micropipetting, spectrophotometry, gel electrophoresis, DNA purification, polymerase chain reaction, and column chromatography, and interpret the results obtained.
2. Explain the theory behind the basic biochemical laboratory procedures performed in the course, and apply these procedures to solve problems.
3. Work in a biochemistry laboratory and interact with colleagues in a professional manner.
4. Locate, understand, and evaluate papers published in the biochemical literature that relate to a topic of interest, and properly cite those papers in written work.
5. Communicate experimental results in a style and format appropriate to the primary biochemical literature.

**Evaluation**
The final grade will be assigned as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
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<tr>
<td>Based on 5 online report-writing quizzes</td>
<td>2%</td>
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<tr>
<td>Based on 3 assignments</td>
<td>7%</td>
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<tr>
<td>Based on 6 written submissions</td>
<td>53%</td>
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<tr>
<td>Based on 3 ComPAIR tasks</td>
<td>3%</td>
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<tr>
<td>Professionalism and performance</td>
<td>10%</td>
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<tr>
<td>Final exam</td>
<td>25%</td>
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**Report-writing Modules**
Six modules have been posted to OWL to explain concepts in writing reports: Ethical Responsibility, Abstract, Introduction, Materials & Methods, Results, and Discussion. The modules consist of text explaining different aspects of report-writing. Five of the modules include quizzes with multiple choice or short-answer questions based on the readings. The five modules must be completed online by **11:55 pm on Friday, January 25**. Correct answers and feedback will be available shortly after the deadline. Each quiz is worth 0.4% of your final mark, and they contain valuable advice for preparing the lab reports.

**Assignments**
Students will submit three assignments. The Lab 1 assignment (see end of Lab 1) gives you practice generating figures and tables. The second assignment (posted online) relates to literature searching strategies; answers to this assignment will be used in the Library Workshop on the second week. The third assignment (see end of taste receptor module) is designed to lead you through data analysis or important concepts related to the taste receptor module and Lab 4.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Due date</th>
<th>Value</th>
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<tr>
<td>Assignment #1: Lab 1</td>
<td>Jan 17</td>
<td>Jan 18</td>
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<tr>
<td>Assignment #2: Literature searching</td>
<td>Jan 17</td>
<td>Jan 18</td>
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<tr>
<td>Assignment #3: TR and Lab 4</td>
<td>Mar 21</td>
<td>Mar 22</td>
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Submit assignments #1 and #3 via the Assignments tab on OWL by **1:30 pm** on the date specified. Assignment #1 should also be submitted to ComPAIR (see section on ComPAIR below). Submit Assignment #2 via email to Kelly Hatch (khatch@uwo.ca) by 4:00 pm on the day of the Library Workshop; you will have some time to complete this assignment in the
workshop. Late assignments will be penalized as for written submissions (see below). These assignments will not be submitted to Turnitin.

Written Submissions
Students will submit the following pieces of writing:

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<tr>
<th>Submission</th>
<th>Due date</th>
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<tr>
<td></td>
<td>Section 1</td>
<td>Section 2</td>
</tr>
<tr>
<td>Abstract</td>
<td>Jan 24</td>
<td>Jan 25</td>
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<tr>
<td>EGFP mutagenesis proposal</td>
<td>Jan 24</td>
<td>Jan 25</td>
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<tr>
<td>Lab 2 (hemoglobin) Results &amp; Discussion*</td>
<td>Jan 31</td>
<td>Feb 1</td>
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<tr>
<td>Lab 2 (hemoglobin) full report</td>
<td>Feb 14</td>
<td>Feb 15</td>
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<tr>
<td>Lab 3 (enzyme kinetics) full report</td>
<td>Mar 7</td>
<td>Mar 8</td>
</tr>
<tr>
<td>EGFP mutagenesis full report</td>
<td>Apr 8</td>
<td>Apr 8</td>
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a Students must submit the Abstract (the one due Jan 24 or 25) and only the Results section of their Lab 2 full report to ComPAIR via the ComPAIR tab on OWL (see ComPAIR section below), in addition to the regular submissions via the Assignments tab on OWL.

b Students must submit at least the Results and Discussion sections (along with a Title, References, and Supplemental Information), but have the option of submitting a full report (including Abstract, Introduction, and Materials and Methods sections). All work submitted will be graded using the appropriate posted rubric, and TAs will give feedback. Students may use this feedback to prepare the full report, which will be worth 8%.

Marks for the reports will be distributed as follows:
- Title and abstract: 10%
- Introduction: 8%
- Methods: 4%
- Results: 25%
- Discussion: 25%
- References: 8%
- Organization, grammar, style, etc.: 20%

The written assignments will be marked according to a rubric, available to students via the OWL site. In addition to the rubric, the report-writing modules and Appendix A in the lab manual provide guidance on how to prepare the reports. Students may also find it helpful to consult Mimi Zeiger’s book “Essentials of Writing Biomedical Research Papers,” 2nd edition, which is available at Taylor Library.

Written submissions are due at **exactly 1:30 pm** on the date specified. Submit an electronic copy in PDF format via the appropriate link on the OWL site. After successful submission you should be emailed a confirmation number; record this number in case it is needed to verify your submission. *A printed or hard copy of the submission is not required.* The electronic document will be analyzed by Turnitin; information about this program may be found at turnitin.uwo.ca.

The official time of submission will be as shown on OWL. Reports will be considered late if they are submitted after 1:30:00. Please do not wait until the last moment to submit your file, because the OWL site may be sluggish. Late submissions will be penalized 10% (*e.g.*, a mark of 80% will count as 70%) if submitted within 24 hours of the deadline, 20% if submitted 24 to 48 hours after
the deadline, and 30% if submitted 48 to 72 hours after the deadline. Reports submitted more than 72 hours after the deadline will receive a mark of 0%.

**ComPAIR**
ComPAIR is peer assessment software developed at the University of British Columbia (see [http://ubc.github.io/compair/site/index.html](http://ubc.github.io/compair/site/index.html)). After you submit your work to ComPAIR via OWL, you will be presented with three anonymous pairs of work submitted by your peers. For each pair, you will be asked to assess which submission is better based on criteria provided through the software. You will provide anonymous feedback for each answer, and will be able to view feedback provided by your peers. Detailed instructions are posted in a separate document on OWL.

The software is based on the idea that people can accurately make judgements about the relative quality of two things when comparing them to each other. It is harder to evaluate a single piece of work in isolation than it is to notice and prioritize differences between two comparable pieces of work. During the comparison process, you should think critically about what makes one piece of work better than the other. Therefore, this activity should help you evaluate your own work more appropriately and understand areas in which you can improve. After you compare three pairs of student work, you will be expected to write at least one sentence reflecting on your own submission and how you think it could be improved.

You will use ComPAIR for three submissions: 1) Assignment #1; 2) the Abstract due January 24 or 25; and 3) the Results section (only) of the Lab 2 resubmission. Completing the ComPAIR tasks for each of these submissions will be worth 1% (for a total of 3% of your final mark). For each submission, you will earn 0.2 marks for submitting, 0.6 for completing three comparisons (including comments for your peers), and 0.2 for writing a reflective statement.

When writing feedback for your peers, please be respectful. Criticism should be constructive and not insulting or mean-spirited. Feedback deemed inappropriate may affect your professionalism mark.

**Professionalism and performance**
This mark includes, but is not necessarily limited to, attendance, being on time, preparedness, proper keeping of a lab notebook, integrity, respect for others, attention to and participation in what is going on in the lab, participation in clean-up, proper attire, and general lab technique.

**Exam**
The 3-hour final exam is based on all aspects of the course. Questions will be multiple choice, calculations, and short answer. Bring a non-programmable calculator and a ruler. No other electronic devices will be allowed. Sample questions will be available before the exam.

**Statement on Academic Offences**
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 Web site: [http://www.uwo.ca/univsec/handbook/appeals/scholoff.pdf](http://www.uwo.ca/univsec/handbook/appeals/scholoff.pdf).
Even though you are working in pairs, lab reports must be prepared independently and must be original. Plagiarism is a scholastic offence and is defined as “The act or an instance of copying or stealing another’s words or ideas and attributing them as one’s own.” (Excerpted from Black’s Law Dictionary, West Group, 1999, 7th ed., p.1170.) This applies to all lab reports and all components of the reports (e.g., graphs or diagrams). Even though partners share photographs of gels, each student must label them individually. Plagiarism will result in a mark of zero for that report, and will also affect your professionalism mark. In addition, information related to the academic offence will be kept on record in the Office of the Associate Dean for Basic Medical Sciences Undergraduate Education.

The web pages listed below should help you understand what constitutes plagiarism, and how to avoid inadvertent plagiarism. Note, however, that in scientific writing, direct quotations from another’s work are used very rarely, and only if there is a compelling reason. If it is possible to state the same idea in different words, you should not use a direct quotation.


**Rounding of marks**

Final grades in this course, irrespective of the number of decimal places used in marking individual assignments and tests, will be rounded to the nearest integer (e.g., 74.4 becomes 74, and 74.5 becomes 75). Marks WILL NOT be bumped to the next grade or GPA level (e.g., 84 will NOT be bumped up to 85). The mark attained is the mark you achieved and the mark assigned; requests for mark “bumping” will be denied, in accordance with Bachelor of Medical Science Undergraduate Education policy.

**OWL**

Pre-lab talks and other information will be posted periodically to the OWL site: owl.uwo.ca/portal. Submission and grading of written work will also be done through OWL.

Students with OWL issues should contact the Computer Support Centre (519-661-3800) or fill out the OWL webform: https://servlet.uwo.ca:8081/vistahelpdesk/controller.jsp.

**This course is supported by the Science Student Donation Fund.**

If you are a BSc or BMSc student registered in the Faculty of Science or Schulich School of Medicine and Dentistry, you pay the Science Student Donation Fee. This fee contributes to the Science Student Donation Fund, which is administered by the Science Students’ Council (SSC). One or more grants from the Fund have allowed for the purchase of equipment integral to teaching this course. You may opt out of the Fee by the end of September of each academic year by completing paperwork in the Faculty of Science Dean’s Office. For further information on the process of awarding grants from the Fund or how these grants have benefitted undergraduate education in this course, consult the chair of your department or email the Science Students’ Council: ssc@uwo.ca.
The Fine Print

Prerequisites: Biochemistry 3381A and 3382A
Priorities: Priority will be given to students who are registered in modules offered by the Department of Biochemistry, other Basic Medical Science departments, or the Department of Biology.

Senate regulation regarding the student’s responsibility regarding requisites:
Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Support Services:
Registrarial Services: http://www.registrar.uwo.ca
Academic Counselling (Science and Basic Medical Sciences): http://www.uwo.ca/sci/counselling/index.html
USC Student Support Services: http://westernusc.ca/service
Student Development Services: http://www.sdc.uwo.ca
Student Health Services: http://www.shs.uwo.ca/

Students that are in emotional/mental distress should refer to Mental Health@Western http://www.uwo.ca/uwocom/mentalhealth/ for a complete list of options about how to obtain help.

Accessibility Statement
Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

Turnitin
All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the 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).

Absence for medical illness
Students must familiarize themselves with the Policy on Accommodation for Medical Illness: https://studentservices.uwo.ca/secure/index.cfm

Statement from the Dean’s Office
If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the (Science) Dean's office as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Dean's Office immediately. For further information please see: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf

A student requiring academic accommodation due to illness should use the Student Medical Certificate when visiting an off-campus medical facility or request a Record's Release Form (located in the Dean's Office) for visits to Student Health Services. The form can be found at: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf
In Biochemistry 3380G, accommodation for medical illness for the reports for Labs 2 and 3, and the EGFP mutagenesis proposal, will require documentation to be submitted to the Dean’s Office as stated above, even though these reports are worth less than 10% of the final grade. Accommodation for assignments should be discussed directly with Dr. McLachlin.

**Absence for non-medical reasons**
If you are unable to meet a course requirement due to non-medical reasons, documentation must be provided to the Office of the Dean of Science as described above for medical accommodations.

**Special Examinations**
A Special Examination is any examination other than the regular examination, and it may be offered only with the permission of the Dean of the Faculty in which the student is registered, in consultation with the instructor and Department Chair. Permission to write a Special Examination may be given on the basis of compassionate or medical grounds with appropriate supporting documents.

A Special Examination must be written at the University or an Affiliated University College no later than 30 days after the end of the examination period involved. To accommodate unusual circumstances, a date later than this may be arranged at the time permission is first given by the Dean of the Faculty. The Dean will consult with the instructor and Department Chair and, if a later date is arranged, will communicate this to Registrarial Services. If a student fails to write a scheduled Special Examination, permission to write another Special Examination will be granted only with the permission of the Dean in exceptional circumstances and with appropriate supporting documents. In such a case, the date of this Special Examination normally will be the scheduled date for the final exam the next time the course is offered.