Biochemistry 3383F/G - Introduction to Biochemical Research    January 2018

Course Description:
Students carry out a research project under the direction of a faculty member, gaining practical experience in a biochemistry research laboratory. Experimental design, critical thinking, and scientific communication will be emphasized.

The objective of the course is to have students gain practical experience in a research laboratory with evaluations that emphasize writing and critical thinking skills. **The major component of the course will involve 5 hours per week of independent research.** The laboratory project should be a well-defined sub-project of a larger effort in the lab, feasible within a 12-week time frame. The course will involve reading selected manuscripts relevant to the project. This will provide an opportunity for the student to critically assess experimental approaches and outcomes, develop his or her writing ability, and recognize how specific research projects contribute to a larger body of understanding.

Completion of all required safety training is a mandatory component of this course. WHIMS training must be completed before beginning any lab work. Inform the course co-ordinator and your supervisor when you have completed all of your safety training.

Course outcomes:
After completing this course you should be able to:
1. Perform biochemical, molecular or bioinformatics experiments independently and following safety guidelines.
2. Research a topic in biochemistry using the scientific literature.
3. Prepare a scientific manuscript.
4. Prepare and present a scientific talk.

Pre-or Corequisite(s): Biochemistry 3381A and 3382A
Extra Information: 5 laboratory hours per week, 0.5 course.
Enrolment in this course is limited and requires special permission by the department.

Course Coordinators:  Dr. Chris Brandl (MBL C210)     Dr. Eric Ball
Telephone                519-850-2395         519 661-2111 x83068
E-mail:      cbrandl@uwo.ca     ehball@uwo.ca

Evaluation
- Supervisor assessment (knowledge, effort, engagement, and assessment of lab notebook) 30%
- 250 word summary introducing your research topic (1) 5%
- Description of a research method (2) 5%
- Presentation of a research figure (3) 5%
- Detailed Outline for your scientific report (4) 10%
- Oral Presentation (Graded by supervisor) 10%
- Final Report (2000 words) (5) 35%
Course Schedule

**Monday January 8th 4pm (MBL C214)**
Students meet with the course coordinator to go through the general course information.

**Week of January 8th**
Students should meet with their supervisor and receive the topic for their project and 2-3 articles for reading that introduce the key aspects of the project, which will be summarized in the final report. Complete WHIMS training, Lab Safety training, Biosafety training etc. (contact Kyle Pollard kyle.pollard@schulich.uwo.ca regarding questions on safety training)
Begin written assignment (1).

**Week of January 15th**
Laboratory project starts. Students must complete safety training before being any lab work. **Students are allowed in the lab only when supervised.**

**Monday January 22nd**
Submit your writing/summary assignment (1) to Chris Brandl as a Word document (before 4:00 pm).

**Monday February 5th**
Submit writing/method assignment (2) to Chris Brandl as a Word document (before 4:00 pm).

**Friday February 16th**
Submit writing/presentation assignment (3) to Chris Brandl as a Word document (before 4:00 pm).

**Monday March 19th**
Submit writing/outline assignment (4) to Chris Brandl as a Word document (before 4:00 pm).

**Monday March 26th**
Schedule time for an oral presentation in a group meeting. The presentation should be on or before the last day of classes. The presentation should provide the background for your project and identify your accomplishments. It should be approximately 20 minutes in length.

**Final Day of classes (April 11)**
Submit an electronic copy of the final report to cbrandl@uwo.ca (before midnight). Oral presentations should be completed before this date.

**April 15th**
Supervisors submit evaluation forms to the course coordinator.
Writing assignment/summary (1) (250 words) See due date above

Provide a title for your project. Provide a 250 word summary introducing your area of research, defining your goal and any relevant hypothesis, and stating the significance of your project. Be concise and specific. You are encouraged to share this and other assignments with your colleagues for editing purposes. Citations do not count towards your word total.

Assignments 1-4 will be evaluated on:
1. format and style
2. organization of materials
3. clarity of writing
4. accuracy of the material presented

Note that any late assignment will be penalized at 10% its value per day.

Writing assignment/method (2) See due date above

Provide a written description of one of the principal methods you are using in your project. The method should be written out in full as it would appear in a published scientific manuscript. If it is adapted from an existing source, that source should be clearly indicated. (limit 300 words)

Writing assignment/presentation of a figure (3) See due date above

Provide one figure from your work that is likely to appear in your final report. In certain projects this may be a model or schematic rather than derived from data, though the later is preferred. Provide a title for the figure. A detailed figure legend should also be included that identifies all of the components necessary to understand the figure. Follow the format of a scientific journal.

Writing assignment/outline (4) See due date above

Provide a detailed outline that you will use to write your final report. Divide into the major headings: Introduction, Materials and Methods, Results and Discussion. The outline may be in point form. Do not include figures or references. The outline should not exceed 2 pages in length.

Final Report (2000 words) Due date: The final day of classes
The final report should be written as a manuscript format for a scientific paper. Following sections should be included:
1. Abstract (250 words or less; the abstract does not count towards your total word count)
   • The abstract serves as a summary of your report. You should describe here the research problem that you are tackling, and the main results and conclusion of your work.
2. Introduction
   • Provide background information sufficient for your audience to understand the project. This should be tiered from the general big picture problem through to the specific problem you are addressing.
   • Define the research question
   • Describe in brief the experimental approaches used in your work and summarize the key results obtained.
3. Materials and Methods (experimental procedures)
   - You should describe the experimental procedures in sufficient detail that your labmates (or other researchers) can repeat your experiments.

4. Results
   - Results of your experiments should be presented in a logical order, and in a clear and objective manner. Use tables and figures to better organize your data in addition to text. In fact, it is recommended to frame your results section around the figures. Figures included in your report should be of high quality. Make sure the figure legends convey enough information for the reader to understand the data without referring to the main text.

5. Discussion
   - This section should include your interpretation of the results. Discuss whether the results obtained answer the research question you are trying to address. If not, suggest possible ways to improve the current experiments. Discuss your work in the context of other literature.

6. References
   - The references listed should follow the format of one of the journals in the Biochemistry field (e.g., Journal of Biological Chemistry, Biochemistry, Journal of Molecular Biology, etc.). These do not count towards your final word count.

7. Figures/tables
   - Provide figures (with legends)/tables as required. These do not count towards your word total.

You are encouraged to have one or more classmates/colleagues proof-read your thesis.

**Evaluation:**
The final report will be graded by two faculty members based upon the following items:
1. Writing quality including spelling, grammar, and organization
2. Background: sufficient and appropriate to understand the research aims, appropriate reference to the literature
3. Clear exposition of hypothesis and aims
4. Methods: sufficient detail for a knowledgeable worker to repeat the experiments
5. Results: clear and logical explanation of results obtained
6. Proper interpretation and discussion of results
STATEMENT ON ACADEMIC OFFENSES
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.

UNIVERSITY POLICY FOR PLAGIARISM
Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence, see Scholastic Offence Policy in the Western Academic Calendar (link above).

ABSENCE FROM COURSE COMMITMENTS
A. Absence for medical illness:
Students must familiarize themselves with the Policy on Accommodation for Medical Illness:
https://studentservices.uwo.ca/secure/medical_accommodations_link_for_OOR.pdf

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 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/handbook/appeals/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:
https://studentservices.uwo.ca/secure/medical_document.pdf

B. Absence for non-medical reasons:
Absences from midterms, final exams, or late essays or assignments, must be documented in the Dean's office. Documentation must be submitted by the student directly to the Dean’s Office and not to the instructor. It will subsequently be the Dean’s Office that will determine if accommodation is warranted.

C. 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.