Bioc 9555: Advanced Laboratory Research

Course Outline

1. Course information

3 credits
Classes in the FALL TERM are on Wednesdays, 3:00-4:30 pm, in MSB346 (unless specifically stated).

Sept 13: Session 1: Course introduction (Boffa/Schild-Poulter) - Start at 3:30
Sept 20: Session 2: Presentations by faculty members - MSB 384
Sept 21: Session 3: Hypothesis development, project and experimental design (Ball) 4pm, MSB 384 – please note this is not the usual day.

Oct 4: Session 4: Proposal/grant writing. (Weir)
Oct 11: Session 5: Oral communication (McLachlin)
Oct 18: Session 6: Research techniques I (Genomics – David Carter)
Nov 1: Session 7: Research techniques II (Crystallography – NMR – Shilton)
Nov 8: Session 8: Research techniques III (Model systems (Brandl/Meakin/Schild-Poulter)

Mid-November: deadline to indicate choices of laboratory/supervisor
First week of December: projects start. Project Phase 1
Last week of January: poster presentations of Phase 1, Project Phase 2 starts
Mid-March: Phase 2 written report due, Project Phase 3 starts.
End of April Phase 3 ends. Research presentations scheduled for end of April

2. Instructor information
Course coordinator: Dr Michael Boffa, Director of the non-thesis MSc program.
Instructors: All Faculty supervising a student for the specific year of the program.
There are no set office hours for this course. Appointments can be made with any of the instructors as needed.

3. Course description

The course will consist of two components. In the first component (12 hours, equivalent to a 0.25 credit graduate level course that is standard in our program), students will participate in interactive seminars on topics such as hypothesis development, project and experimental design, grant writing and integrity in research. Other sessions will develop communication skills in poster and oral presentations. Students will be evaluated with assignments that will test these skills. This component of the course will be worth 10% of their final grade. This component will conclude with sessions on state-of-the-art research techniques in research areas core to the Biochemistry discipline.

The second component of the course will involve research project(s) to provide practical laboratory training (wet lab and/or computational). Students will have the option of identifying a single project and supervisor for the course, or participating in a rotation system (outlined below). The project(s) will be hypothesis driven, on a research topic mutually agreed upon by the faculty member and student, and suitable for the timeframe of the rotation.

Options for research project component of the Advanced Laboratory Research Course:

1. The “one research project” option: students identify a faculty member and conduct their project in one laboratory. The scope of the project will be aligned with an 18 week timeframe. Students will be expected to present a research report, poster and/or oral presentation every 6 weeks that will be evaluated by the supervisor and an advisor (see below).

2. The “rotation” option: Each rotation will be 6 weeks in duration (Dec-Jan, Feb-mid-March and Mid-March-April), with the scope of the projects adapted for the 6-week time frames. This model allows students to rotate through 3 research laboratories. However, students can modify the rotation schedule to fit their research and career development goals. For instance, two rotations can be performed in one lab followed by the third in another. Every 6 weeks, students will be required to present their research to be evaluated by the supervisor and their advisor (see below).

Faculty advisor for students.

In addition to selecting a supervisor(s) for the laboratory project, each student should select one faculty advisor at the beginning of the research component of the course that will be available for consultation and to monitor and evaluate the project(s). Selection of the advisor may be done in consultation with the laboratory supervisor and with the Director of the Non-thesis MSc program. Students choosing the rotation option will keep the same advisor throughout their rotations.
Learning outcomes:
Students will be able to:

- Formulate defined questions and develop a rationale and hypothesis based on current scientific literature
- Develop an experimental plan based on a hypothesis
- Acquire knowledge about a broad range of methodologies in biochemistry and molecular biology.
- Develop a research proposal and compose a written research proposal
- Conduct scientific research to address an experimental plan
- Analyze and critically evaluate data and research methodologies
- Present and defend a research proposal
- Work individually and in a team
- Communicate scientific concepts to diverse audiences in different formats in a way that conveys their importance.
- Demonstrate creativity and independence in the application of biochemical knowledge

4. Course Materials
Scientific literature provided by instructors for respective classroom sessions and by supervisor for researched by the students for their experimental project.

5. Methods of evaluation

- Course assessments (assignments relevant to the material presented in the classroom) 10%
- Poster presentation (in the form that would be presented at a research conference): 20%
  Assessment of: introduction/hypothesis/ data presentation/oral presentation/response to questions
- Written report (in the form typical of a research journal such as the Journal of Biological Chemistry) 20%
  Assessment of: scientific background/formulation of research question-hypothesis/experimental plan/evaluation of data/presentation/creativity
- Oral presentation (to be presented to the Department) 20%
  Assessment of: scientific background/organization/presentation skills
- Supervisor(s) laboratory work evaluation 15%
  Mark will be averaged from 3 evaluations provided by supervisor(s) at the end of each Project Phase.
Students seeking academic accommodation on medical grounds for any missed tests, exams, participation components and/or assignments worth 10% or more of their final grade must apply to the Graduate Administrator, Barb Green, as soon as possible and provide documentation.

The statement: “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/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf

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).

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).

As part of a successful graduate student experience at Western, we encourage students to make their health and wellness a priority. Western provides several on campus health-related services to help you achieve optimum health and engage in healthy living while pursuing your graduate degree. For example, to support physical activity, all students, as part of their registration, receive membership in Western’s Campus Recreation Centre. Numerous cultural events are offered throughout the year. Please check out the Faculty of Music web page http://www.music.uwo.ca/, and our own McIntosh Gallery http://www.mcintoshgallery.ca/. Information regarding health- and wellness-related services available to students may be found at http://www.health.uwo.ca/

Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as their faculty supervisor, their program director (graduate chair), or other relevant administrators in their unit. Campus mental health resources may be found at http://www.health.uwo.ca/mental_health/resources.html

To help you learn more about mental health, Western has developed an interactive mental health learning module, found here: http://www.health.uwo.ca/mental_health/module.html. This module is 30 minutes in length and provides participants with a basic understanding of mental health issues and of available campus and community resources. Topics include stress, anxiety, depression, suicide and eating disorders. After successful completion of the module, participants receive a certificate confirming their participation.

Helpful Resources @ Western for Graduate Students

Writing Support Centre http://www.sdc.uwo.ca/writing/  SDC’s Learning Skills Services, Rm 4100
WSS, www.sdc.uwo.ca/learning
LS counsellors are ready to help you improve your learning skills. We offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

The Student Success Centre: http://success.uwo.ca/