

BIOC 448 Course Guidelines

Course Description

In this course students undertake an independent research project under the supervision of a Biochemistry and Molecular Biology faculty member. The project concept and approach will be provided by the faculty supervisor. Students are then expected to proceed with the project with ongoing guidance from the faculty member and lab personnel. At the conclusion of the project students will produce a written thesis on the research.

Learning Objectives

- Gain direct experience in performing independent research
- Improve scientific communication skills in the written and oral forms
- Build expertise in an area of modern Biochemistry/Molecular Biology research
- Build technical expertise in several biochemical techniques
- Improve and develop skills in the critical analysis of primary data
- Develop skills in designing experiments

Course Options

The course is available as a 1 or 2 term option. However that 2 term projects are highly advised so that students have sufficient time to learn the research, produce quality data and prepare an in-depth thesis. One term projects must be approved for feasibility by the course chair.

- 48A - section 101 (term 1) – 3 credits
- 448A - section 201 (term 2) – 3 credits
- **449B - section 001 (term 1+2) - 6 credits**

Eligibility

BIOC 448 is available to students in the Biochemistry Majors program which have 4th year standing in the program and have met grade requirements. To take BIOC 448 students must have obtained $\geq 70\%$ in BIOC 301, 303 and the overall average of the winter session of the third year. Note that students may substitute any 400 level BIOC course for the grade requirement in BIOC 301 and 303, as well as their previous winter session academic average.

All Biochemistry and Molecular Biology Faculty members (full or associate) are eligible supervisors. For a complete list of Faculty and research themes see the departmental website. Note that in certain cases supervisors can be faculty members outside of the Biochemistry and Molecular Biology department (see section below on external supervisors). In certain situations BIOC 448 can be taken by students in other related programs subject to course chair approval which is assessed on a case by case basis. Eligibility in such cases will be dependent on sufficient prior (and concurrent) Biochemistry course work.

Contact

While most issues pertaining to BIOC 448 are best addressed by your faculty supervisor, you are always welcome, and highly encouraged to discuss any issues with the course chair Dr Scott Covey
scott.covey@ubc.ca

Important Course Dates and Deadlines

- **Submission and Approval of a Project:** TBA
- **3 Minute Thesis Due:** TBA
- **Thesis submission:** TBA

Late Submission Policy

The deadlines for the 3MT are fixed. Extensions for medical reasons and personal hardship are to be directed to the course chair as soon as possible. Extensions for thesis preparation and data collection will **not** be considered barring exceptional circumstances. In such cases this must be brought to the attention of the course chair as soon as possible (which in most cases will be several weeks prior to submission). For a late submission without an approved extension there will be a penalty of 10% per day.

Registration

There are 2 steps to the registration process as outlined below. Note that all steps of the process (including approval) must be cleared prior to the date specified in the course dates section.

Step 1. Faculty Supervisor

Students are responsible for arranging their own supervisors. All full or associate faculty members of the Biochemistry and Molecular Biology department are eligible as supervisors. Supervisors should be arranged prior to the start of the term of the project. Students often make such arrangements in the spring prior to the start of the winter session.

Tips for identifying/arranging a supervisor. From the departmental website review faculty members and their areas of research. Identify several research themes/projects that are interesting to you. It is a good idea to look up a few recent papers from the faculty member on the projects which are of interest to you. The contact the potential supervisors to discuss the possibility of doing a project under their direction. Email is typically the best way to initiate this conversation. Including your transcripts with this email may be helpful. Note that it can take time and several attempts to identify and secure a supervisor, start the process early.

External supervisors. In certain cases it is possible to have a supervisor outside of the Biochemistry and Molecular Biology department, however this requires approval from the course chair and co-chair. Moreover students should note that we advise against having an external supervisor and should only do so with proper consideration and at their own risk. For approval projects must be deemed to have sufficient Biochemistry and/or Molecular Biology to produce a thesis in line with departmental

expectations. To gain approval for a project, **supervisors** are to provide a general description of the project (approximately one page). The description is to outline the basic experimental approach and the role of the student in the project. Note this is not to justify the science but rather to provide a basis to determine if the scope of the project and the content are appropriate for a BIOC 448. This outline is then to be emailed to the course chair and co-chair (see the contact information section).

Step 2. Application and Project Registration

The project concept and approach will typically be provided by the faculty supervisor, although students can propose their own research question and discuss this with the supervisor. Note you may proceed with a project on which you have previously worked (co-op, volunteer, work study or similar). However in such cases data used in the results section of the thesis cannot be generated prior to the start of the term of the project. This data may be included in the introduction.

Obtain the BIOC 448 application and project registration form from the course coordinator. Complete the student section and then have the supervisor complete and email back the project registration form. Note this is to be **emailed by the faculty supervisor in place of a signature.**

If the application and project are approved the student will be registered into BIOC 448 by the course chair. **Ensure you have sufficient space to add these credits to your schedule.**

Students who fail to arrange a supervisor by the deadline must drop Biochemistry 448 and immediately discuss alternatives with the BIOC 448 course coordinator and the 4th year academic advisor in the Department.

Expectations of Students and Supervisors

The following are meant to provide a basis for student and supervisor expectations and best practises.

Students

- Time spent in the laboratory will vary and should be discussed with the faculty supervisor. As a general guideline students are expected to spend on average a minimum of 8 hours per week in the laboratory
- Bring issues relating to the experiments and project progress to the supervisors attention
- Read relevant literature in the field. The supervisor will often provide initial papers but students are expected to direct their own literature review
- By December (for 2 term projects) students should have obtained some results which will be included in the written thesis. If there has been limited data by this point it is imperative that you discuss the progress of the project with your supervisor and develop a plan.
- Begin thesis writing within the last 4-6 weeks of the course to allow sufficient time for preparation and editing

Supervisors

- Meet regularly (several times per term) with the student to discuss progress
- Assist students in the preparation and editing of the 3MT and written thesis
- Provide a grade for “lab performance” as outlined in the Rubric Section to the course coordinator by the last day of classes for the term
- Provide students with the completed rubric for lab performance

Course Evaluation

Component	Evaluated by	Weight Towards Final Grade
Lab Performance	Supervisor	40%
Formal Thesis	Course co-chair	50%
Oral Thesis (3MT)	Course chair	10%

3 Minute Thesis

Early in the project you will submit a 3 minute thesis (3MT) which outlines the rationale, hypothesis and aims of your project. This is a single static powerpoint (or similar file) slide with a 3 minute audio track embedded in the file. Details for the 3MT thesis will be posted on the course website, consult that document for the assignment details and evaluation criteria.

Thesis Outline and Evaluation

The format for the submitted thesis is fixed and is not open to alternate formats. The exact details of the thesis are in a separate document which can be found on the course website. The thesis is to be submitted by midnight on the last day of classes for the term. Thesis are to be submitted onto the course website. The thesis will be graded by the course co-chair. The evaluation and corresponding marking rubric will be provided to students within 4 weeks of submitting the thesis.

Keep in mind this is a large document that will require several weeks to prepare, plan your time accordingly to allow sufficient time for preparation, review and editing. While students are to write their own thesis, supervisors are encouraged to assist the students in revising and editing the document. It is a useful idea to establish with your supervisor at the onset of the project when the writing process will begin and when certain drafts will be ready for their review.

Each year the best thesis will be selected (based on the evaluation criteria) and nominated for the Violet and Blythe Eagles Undergraduate Prize in Biochemistry which is an official UBC graduating award.

Evaluation Rubrics

3MT

Grade the 3 Minute Thesis with respect to the following criteria			
4 – Completely agree	3 – Mainly agree	2 – Sometimes agree	1 – Rarely agree
Comprehension			

Did the presentation provide an understanding of the background to the research question and its significance?	
Did the presentation follow a clear and logical sequence?	
Engagement	
Did the oration make the audience want to know more?	
Was the presenter careful not to trivialise or generalise their research?	
Did the presenter capture and maintain their audience's attention?	
Communication	
Did the presenter communicate in language appropriate to a non-specialist audience?	
Did the presenter spend adequate time on each element without the presentation feeling rushed?	
Did the PowerPoint slide enhance the presentation – was it clear, legible and concise?	
Rules	
Did the presentation adhere to all rules (yes/no)?	

Evaluation criteria are adapted from UBC 3MT Guidelines

Written Thesis

X to indicate the extent to which you agree	Strongly Agree (95-100%)	Agree (85-94%)	Weakly Agree (75-84%)	Do Not Agree (Below 75%)
Thesis - Introduction Limit of 10 pages. Worth 20% of total thesis grade.				
Includes a balanced and comprehensive literature review				
Identifies key gaps of knowledge in the field and relates this to the thesis				
The aims and hypothesis are explicitly stated, and rationally/logically justified				
Thesis - Methods Limit of 10 pages. Worth 10% of total thesis grade.				
Methods are sufficiently detailed to be repeated				
Thesis - Results Limit of 15 pages (not including figures and tables). Worth 40% of total thesis grade.				
For each experiment the rationale, approach and findings are fully presented				
Data analysis is accurate, sufficiently deep and is unbiased				
Important trends and outcomes of experiments are clearly identified				
Data are clearly and accurately presented in figures				
Figure captions provide an appropriate level of detail and information				
Thesis - Discussion Limit of 10 pages. Worth 20% of total thesis grade.				
Key aspects of the data are accurately and precisely highlighted				
The major outcomes are discussed in relation to current literature and data				
Key future experiments or potential further directions are explored				
Thesis - Overall Impression Worth 10% of total thesis grade.				
The thesis conforms to proper guidelines				
The document has minimal spelling, grammatical and structural errors				
References were used where appropriate, and the proper work was cited				
The thesis is written and presented with clarity				
Overall Thesis Grade				
Grade (%)				
Comments if required:				

Lab Performance

X to indicate the extent to which you agree	Strongly Agree (95-100%)	Agree (85-94%)	Weakly Agree (75-84%)	Do Not Agree (Below 74%)
Lab Performance				
On average worked the expected amount of time (min is 8 hours per week)				
Made efficient use of time, feedback and resources				
Was technically competent in performing experiments				
By the end of the project was able to design, execute and analyze experiments				
Demonstrated/contributed independent ideas				
Lab Performance Grade				
Grade (%)				
Comments if required:				