

### LAND ACKNOWLEDGEMENT

UBC's Point Grey Campus is located on the traditional, ancestral, and unceded territory of the xwməθkwəy̓əm (Musqueam) people. The land it is situated on has always been a place of learning for the Musqueam people, who for millennia have passed on their culture, history, and traditions from one generation to the next on this site.

### COURSE INFORMATION

| Course Title                     | Course Code Number | Credit Value |
|----------------------------------|--------------------|--------------|
| Directed Studies in Biochemistry | BIOC448            | 3-6          |

### PREREQUISITES

BIOC301 and BIOC303

### COREQUISITES

None

### COURSE CHAIR

| Course Chair                | Contact Details  |
|-----------------------------|--|
| Dr Lindsay Rogers (she/her) | <a href="mailto:lindsay.rogers@ubc.ca">lindsay.rogers@ubc.ca</a> |

### COURSE DESCRIPTION

Within 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 methods
- Improve and develop skills in the critical analysis of primary data

- Develop skills in designing experiments

## ELIGIBILITY

BIOC448 is available to students in the Biochemistry Majors program who have fourth year standing in the program and have met grade requirements. To take BIOC448, students must have obtained  $\geq 70\%$  in BIOC 301, 303 and the overall average of the winter session of their 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. 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.

## REGISTRATION

There are two 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 published by the faculty member on projects which are of interest to you. Then 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, so start the process early.*

### 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 BIOC448 Application and Project Registration Form from the course chair. Complete the student section and then have the supervisor complete the form and email it to the course chair. Note this form is **emailed by the faculty supervisor in place of a signature**.

If the application and project are approved, the student will be registered into BIOC448 by the course chair. **Ensure you have sufficient space to add these credits to your timetable.**

The course is available as a 1 or 2 term option. However, 2 term projects are highly advised so that



students have sufficient time to learn the research approach, produce quality data and prepare an in-depth thesis. One-term projects must be approved for feasibility by the course chair.

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

Students who fail to arrange a supervisor by the deadline must drop Biochemistry 448 and immediately discuss alternatives with the BIOC448 course chair and the 4th year academic advisor in the department.

### IMPORTANT COURSE DATES AND DEADLINES

- **Submission and approval of a project:** September 16, 2022
- **3 Minute Thesis Due:** October 11, 2022
- **Poster presentation:** March (exact date TBD)
- **Thesis submission:** April 13, 2023

### COURSE EVALUATION

| Component         | Grade Weight | Evaluated By       |
|-------------------|--------------|--------------------|
| Lab Performance   | 40%          | Supervisor         |
| Formal Thesis     | 40%          | 2 external faculty |
| Oral Thesis (3MT) | 10%          | Course chair       |
| Poster            | 10%          | Course Chair       |

#### 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. Please consult that document for the assignment details and evaluation criteria.

#### Poster Presentation

In March you will prepare a poster outlining the results of your research project and present this poster during an in-person poster session. Details regarding poster requirements and assessment will be provided within a separate document on the course website. Information regarding the time and location of the poster session will be finalized early during term 2W.



### 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. Theses are to be submitted through Canvas. The thesis will be graded by two Biochemistry and Molecular Biology faculty members.

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.

### LATE SUBMISSION POLICY

The deadlines for the 3MT and thesis submission 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.

Students with disabilities and ongoing medical conditions have the option to request an accommodation for course assessments after registering with the Centre for Accessibility. If you are eligible for course accommodations, please contact the course chair.

### 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 supervisor's 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, poster and written thesis
- Provide a grade for “lab performance” using the provided grading rubric to the course coordinator by the last day of classes for the term

## ACADEMIC MISCONDUCT

UBC and the Department of Biochemistry and Molecular Biology take the issue of academic misconduct very seriously; the honest assessment of student learning is key to both the success of the university and success for individual students. Cheating, in any form, undermines the value of a degree and can have serious consequences for your continued academic success. As such it is important to know what your responsibilities are, what constitutes academic misconduct and how you can avoid it. With some effort and forethought no student should ever have to find themselves facing discipline for academic misconduct; inform yourself as to the expectations placed on you and what your responsibilities are.

### **What consequences can arise from academic misconduct?**

The severity of the discipline can range from a letter of reprimand or a zero on the assignment in question all the way to expulsion from the University. Perhaps the most common outcome in these cases are grades of zero in the course in which the misconduct occurred.

**Information regarding academic integrity, expectations of students, and potential disciplinary measures resulting from academic misconduct at UBC is provided within the links below.**

<https://learningcommons.ubc.ca/resource-guides/understand-academic-integrity/>

<https://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,54,111,959>

<https://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,54,111,960>

## EQUITY DIVERSITY AND INCLUSION (EDI) POLICIES

Our goal is that students from all diverse backgrounds and perspectives are well-served by this course, that students' learning needs are addressed both in and out of class, and that the diversity students bring to this class is viewed as a resource, strength and benefit. We make a commitment to present materials and activities that are respectful of diversity: gender identity, sexuality, disability, age, socioeconomic status, ethnicity, race, nationality, religion, and culture. We will foster a climate within the classroom where students of diverse backgrounds and identities feel comfortable sharing their opinions and experience with varied topics throughout the class. We (like many people) are learning about diverse perspectives and identities. If something was said in class (by anyone) that made you feel uncomfortable or if you observe a situation where someone else is made to feel uncomfortable, please talk to us about it. This includes concerns about any class-related interactions that lead to feelings of exclusion or marginalization. We welcome and encourage your feedback on how we can better cultivate a sense of inclusion in our course. This can be done through meetings, email or anonymous feedback through Canvas. We aim to do our best to address each situation as it arises and effect meaningful changes moving forward. For more information follow the link below to our departmental EDI website.

<https://biochem.ubc.ca/equity-diversity-inclusion/>



## STUDENT RESOURCES

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions. Details of the policies and how to access support are available on the UBC Senate Website.

<https://senate.ubc.ca/policies-resources-support-student-success/>

### Mental Health Resources

In case you are struggling with mental health, or are feeling stressed or anxious, UBC Counselling Services provides information about a number of resources available to students. Additionally, UBC students receive mental health coverage of up to \$1500 under the AMS Health & Dental Plan. Here2Talk is available for BC post-secondary students to talk with trained counsellors 24/7 (via voice call or text messages). If you are a student living in UBC residence, Counsellors in Residence can also be a valuable resource to provide mental health support. If you have a UBC email address, Therapy Assistance Online (TAO) is a free online resource that provides tools to manage stress, relationship problems, substance use, etc.

<https://students.ubc.ca/health/counselling-services>

<https://vancouver.housing.ubc.ca/counsellor-in-residence/>

## COVID RELATED POLICIES

For UBC's latest response to COVID-19, please visit [covid19.ubc.ca](https://covid19.ubc.ca). During in-person meetings for this course, it is important that everyone feels as comfortable as possible engaging in class activities while sharing an indoor space. Non-medical masks that cover our noses and mouths are a primary tool to make it harder for COVID-19 to find a new host. The higher the rate of vaccination in our community overall, the lower the chance of spreading this virus. You are an important part of the UBC community. Please arrange to get vaccinated if you have not already done so. **If you are sick, it is important that you stay home – no matter what you think you may be sick with (i.e. cold, flu, other).**

## COPYRIGHT

All materials of this course (course handouts, lecture slides, assessments, course readings, etc.) are the intellectual property of the course Instructor(s) or licensed to be used in this course by the copyright owner. Redistribution of these materials by any means without permission of the copyright holder(s) constitutes a breach of copyright and may lead to academic discipline.



**APPENDIX**

**Evaluation Rubrics**

**3MT**

| <b>Grade the 3 Minute Thesis with respect to the following criteria</b>  |                  |
|--|------------------|
| 4 – Completely agree   | 3 – Mainly agree |
| 2 – Sometimes agree  | 1 – Rarely agree |
| <b>Comprehension</b>   |                  |
| 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?  |                  |
| <b>Engagement</b>  |                  |
| 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?   |                  |
| <b>Communication</b>   |                  |
| 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?                         |                  |
| <b>Rules</b>   |                  |
| Did the presentation adhere to all rules (yes/no)?   |                  |

Evaluation criteria are adapted from UBC 3MT Guidelines



Poster Presentation

|   |                             |                   |                          |                        |
|---|-----------------------------|-------------------|--------------------------|------------------------|
| <b>Student name:</b>  |                             |                   |                          |                        |
| <b>Student number:</b>  |                             |                   |                          |                        |
| X to indicate the extent to which you agree                                     | Strongly Agree<br>(85-100%) | Agree<br>(70-84%) | Weakly Agree<br>(55-69%) | Do Not Agree<br>(<55%) |
| <b>Comprehension</b>  |                             |                   |                          |                        |
| The poster effectively conveys the central outcomes of the research project.    |                             |                   |                          |                        |
| The poster contains all required components.                                    |                             |                   |                          |                        |
| All visuals are clearly annotated.  |                             |                   |                          |                        |
| <b>Visual Appeal</b>  |                             |                   |                          |                        |
| The poster has an attractive layout and design.                                 |                             |                   |                          |                        |
| All text is large enough to read from a distance of 6-8 feet.                   |                             |                   |                          |                        |
| <b>Presentation</b>   |                             |                   |                          |                        |
| The presenter is welcoming and available during the assigned presentation time. |                             |                   |                          |                        |
| The presenter displays a deep knowledge of the subject matter.                  |                             |                   |                          |                        |
| The poster presentation is smooth, concise and professional.                    |                             |                   |                          |                        |
| <b>Grade:</b>   |                             |                   |                          |                        |
| <b>Comments:</b>  |                             |                   |                          |                        |



## Written Thesis

| Student Name:  |                             |                   |                          |                             |
|--|-----------------------------|-------------------|--------------------------|-----------------------------|
| X to indicate the extent to which you agree  | Strongly Agree<br>(95-100%) | Agree<br>(85-94%) | Weakly Agree<br>(75-84%) | Do Not Agree<br>(Below 75%) |
| <b>Thesis - Introduction</b> 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                              |                             |                   |                          |                             |
| <b>Thesis - Methods</b> Limit of 10 pages. Worth 10% of total thesis grade.                                    |                             |                   |                          |                             |
| Methods are sufficiently detailed to be repeated   |                             |                   |                          |                             |
| <b>Thesis - Results</b> 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   |                             |                   |                          |                             |
| <b>Thesis - Discussion</b> 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  |                             |                   |                          |                             |
| <b>Thesis - Overall Impression</b> 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   |                             |                   |                          |                             |
| Original, flow, interesting to read, insightful  |                             |                   |                          |                             |
| <b>Overall Thesis Grade</b>  |                             |                   |                          |                             |
| <b>Grade (%)</b>   |                             |                   |                          |                             |
| <b>Comments if required:</b>   |                             |                   |                          |                             |



Lab Performance

| X to indicate the extent to which you agree                                   | Strongly Agree<br>(95-100%) | Agree<br>(85-94%) | Weakly Agree<br>(75-84%) | Do Not Agree<br>(Below 74%) |
|---|-----------------------------|-------------------|--------------------------|-----------------------------|
| <b>Lab Performance</b>  |                             |                   |                          |                             |
| 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                                    |                             |                   |                          |                             |
| <b>Lab Performance Grade</b>  |                             |                   |                          |                             |
| Grade (%)   |                             |                   |                          |                             |
| Comments if required:   |                             |                   |                          |                             |