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**
Advanced topics in biochemistry – proteomics	BIOC 557	1.5

PREREQUISITES

Background in biochemistry, molecular biology, or a related discipline

COREQUISITES

None

COURSE LOCATION AND TIME

Time (Day(s), Hour)	**Room**
Tue/Thurs, 10:00-11:20	MSL 237

COURSE CHAIR

Course Chair	**Contact Details**
Leonard Foster (he/him/his)	foster@msl.ubc.ca

COURSE INSTRUCTOR(S)

Course Instructor(s)	**Contact Details**	**Office Location**	**Office Hours**
Leonard Foster (he/him/his)	**foster@msl.ubc.ca**	NCE 416	By appointment

Thibault Mayor (he/him/his)	**mayor@msl.ubc.ca**	NCE 306	By appointment

LEARNING OUTCOMES

- How mass spectrometry-based proteomics works, including its limitations and future possibilities.
- Proteomic data analysis, including using modern software packages
- Reading primary proteomics literature
- Presentation skills
- Participation to scientific discussion

COURSE OUTLINE

This 12-lecture module will teach the basics of protein-based mass spectrometry and introduce a variety of related topics such as deep proteomics, quantitative mass spectrometry (e.g., SILAC), methods to study protein-protein interaction (e.g. AP-MS, BioID, protein correlation profiling), identification of post translation modifications, and single-cell proteomics. This course will consist of introductory lectures, student presentations of selected articles and student presentations of data analysis.

Each student will have to present one listed article to the rest of the class. The student is expected to have carefully read the article, including supplementary information and methods, as well as additional articles if required. Presentations should consist of about 20 slides, taking about 20 to 25 min if uninterrupted. The presentation should include an introduction to provide some background information (typically 2-5 slides) and a conclusion (1-2 slides). In most cases, the student will have to select a subset of the results to present. Particularly, the student should emphasize the mass spectrometry methods used in the presented article. Discussion during the presentation will be encouraged. If required the student will have to adapt their presentation to respect the time limit for their half of the class (40 min total, including questions).

COURSE SCHEDULE

The first three weeks will be taught by Dr. Mayor, while the second half will be taught by Dr. Foster. In general, each section will begin with a lecture about techniques, theory, and background. This will be followed by student presentations of current papers from the primary proteomics literature. The last part of Dr. Foster's section will include an assignment where students will be required to analyze a dataset and present their findings from it.

Lecture 1 – Introduction to Protein Mass Spectrometry - Thursday September 8

Lecture 2 – Paper presentations 1-2 (DDA vs DIA) - Tuesday September 13

Lecture 3 – Paper presentations 3-4 (Protein half-life) - Thursday September 15

Lecture 4 – Paper presentations 5-6 (PPI: AP-MS vs BioID) - Tuesday September 20

Sept 22 – no class

Lecture 5 – Proteomics in System Biology - Thursday September 27

Lecture 6 – Paper presentations (interactomes) 7-8 - Tuesday September 29

Lecture 7 – Paper presentations 9-10 (multiomics) - Thursday October 4

Lecture 8 – Paper presentations 11-12 (single-cell proteomics) - Tuesday October 6

Lecture 9 – Paper presentations 13-14 (single-cell proteomics) - Thursday October 11

Lecture 10 – Introduction to Data analysis & Tutorial part I - Tuesday October 13

Lecture 11– Tutorial Part II and Q&A - Thursday October 18

Lecture 12 – Student presentations (teams of 2or 3) - Tuesday October 20

GRADING SCHEME

Students will be graded based on their presentations (50%), project assignment (25%) and participation (25%). The participation grade will depend on student's contributions to discussion during lectures and student presentations.

GRADING AND COURSE POLICY

Students with disabilities and ongoing medical conditions have the option to request an accommodation for the course assessments after registering with the Centre for Accessibility.

If you are ill, please do not attend class. If you do miss class/assessments because of illness please contact the instructor. If you are presenting, we will find a different time for you to do your presentation. If you were just to be a participant then we will ask you to read the paper ahead of time and submit a question to be asked of the presenter.

If the instructor is sick: We will all do our best to stay well, but if one of the instructors falls ill then they will not come to class. If that happens, all efforts will be made to communicate that to students in a timely manner prior to class time, usually via an announcement in Canvas. Depending on the situation a substitute lecturer will take over, the lecture may take place over zoom, or the class may be cancelled.

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 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. UBC definition of academic misconduct can be found in the UBC Calendar and additional information is available in this UBC resource link.

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.

EQUITY DIVERSITY AND INCLUSION (EDI) POLICIES

It is our goal that students from all diverse backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and diversity that the students bring to this class be 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 visit our departmental EDI webpage.

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.

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 for students to use. Additionally, UBC students receive mental health coverage of up to $1500 under the AMS Health & Dental Plan (more information about coverage here).

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.

COVID RELATED POLICIES

For UBC's latest response to COVID-19, please visit covid19.ubc.ca. For our in-person meetings in this class, it is important that all of us feel 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 is 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're sick, it's important that you stay home – no matter what you think you may be sick with (e.g., cold, flu, other).**

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