BMEG 490 A/B: Introduction to Academic Research

2024WT1/WT2 Syllabus

COURSE INFORMATION

Instructor:	Robyn Newell
Email:	robyn.newell@ubc.ca
Office Hours & Location:	TBD upon student availability
Teaching Assistant Info:	Iryna Liubchak: iryna.liubchak@ubc.ca

Pre-Requisites:	Fourth-year standing and at least 80% average in third-year courses.

COURSE DESCRIPTION

This course is a research project that is guided by a faculty member in Biomedical Engineering. There are two versions of the course, BMEG 490A (4-month, 3-credit course from January 2025 to April 2025) and BMEG 490B (8-month, 6-credit course from September 2024 to April 2025).

LEARNING OBJECTIVES

The learning objectives of this course will be:

- To gain experience with academic research
- To gain a deeper knowledge of a specialization in your area of interest
- To provide personal insights into research for evaluating your future career and/or study choices
- To gain an understanding of the different approach needed for research compared to other coursework. This involves creating new knowledge instead of the acquisition of existing knowledge

COURSE ORGANIZATION / STRUCTURE

The course is based on conducting a research project over one term (BMEG 490A) or two terms (BMEG 490B). You will work with a supervising faculty member in their lab to propose a research question and perform the research. There will be several deliverables, including reports and presentations.

Research Project
A suitable research project will allow you to gain experience in research methods and skills. You should gain experience reviewing the relevant literature, planning, and conducting research work, reflecting, and analyzing results, formulating conclusions, and producing a concise written report. The research experience should be intellectually challenging where you need to use your judgement and critical thinking skills (i.e., not mundane tasks).

Research Proposal
You will prepare a research proposal with the guidance of your project faculty supervisor. The **initial research proposal outline** is intended to help initiate this process and should include ~1-2 pages outlining your understanding of your research task. The outline should have the following:

- A few references to the relevant background literature
- The research questions/hypothesis
- Small summary of the methods
- Expected deliverables

The **final proposal** should be no more than 10 pages. It should have the following headings (or similar):

- Introduction
- Background
- Research Objective
- Description of Proposed Research
- List of References
- Budget and resources required (if applicable)

Final Research Report
The final research report should have the following sections (or similar) in about 20 pages (for BMEG 490A) or 30 pages (for BMEG 490B) and include the following:

- Introduction
- Literature Review
- Methodology
- Results
- Discussion
- Conclusions and Future Work

Presentations
You will be required to present your work to your research faculty and the course instructor once (BMEG 490A) or twice (BMEG 490B) in the course. One presentation will be your **mid-term research progress update** (15 mins + questions). The mid-term research progress update will be graded for BMEG 490B students only. Students in BMEG 490A are strongly encouraged to do a mid-term update presentation to get valuable feedback; however, this will not be graded for BMEG 490A. For both courses, there will be a **final presentation** of your project at the end of the term (15 mins + 15 mins for questions). These presentations need to be scheduled by the due dates at a time that works for your supervising faculty member and the course instructor.

Web Summary
You will be required to provide a web summary of your research project. This will be 100-200 words plus an image.

Bi-weekly Progress Report
You are expected to provide a bi-weekly progress report throughout the course. This is not meant to be onerous but a good way to motivate your progress and to keep your faculty member up to date with what you are working on. Consult with your faculty member on what format and content they prefer. This should be succinct and easy to follow (you might even use bullet points). Things to address might include: what you have been working on, what you have accomplished in the last two weeks, what your

plans are for the next two weeks, any problems that are affecting your progress, questions you have for your supervisor, etc.

STUDENT EVALUATION AND COURSE SCHEDULE

You are expected to spend approximately 20% of your time, or **8-10 hours/week**, on your research project as this course is **3-credits per term**. The following deliverable schedule and grading scheme will apply (depending on the course).

Deliverable	Deadlines		Grading Weight	
	490A	**490B**	**490A**	**490B**
Research Proposal Outline (~1 page)	2nd week, Term 2 (Jan 17th)	3rd week, Term 1 (Sept 20th)	0%	0%
Research Proposal (5-10 pages)	4th week, Term 2 (Jan 31st)	6th week, Term 1 (Oct 11th)	25%	25%
Presentation of Research Progress (~15 mins)	8th week, Term 2 (by Feb 28th)	During Dec exam period	0%	10%
Research Final Report (~20-30 pages)	Start of April exam period	Start of April exam period	40%	40%
Research Presentation (~15 mins and 15 mins Q&A)	During April exam period	During April exam period	30%	20%
Web Summary (100-200 words + picture)	With Final Report	With Final Report	3%	3%
Bi-weekly progress report	Due bi-weekly	Due bi-weekly	2%	2%

Your course grade is reflected in the quality of the deliverables you present. Your bi-weekly progress report is a completion grade (you will not be graded on quality of these reports). However, this is your opportunity to demonstrate your progress in the course. If there is clear evidence that your progress in the course is not sufficient, your course grades will be adjusted accordingly (up to and including failing).

LATE SUBMISSIONS AND GRADING POLICIES

10% will be deducted from the mark of any work submitted late for each day after the submission deadline (up to a maximum of 3 days late) unless an exemption has been granted.

If you want to requests an assignment or presentation to be re-graded, this falls into two categories:
(1) A belief that there is some minor oversight in the work - please direct requests to your faculty supervisor, who marked your deliverable, to correct.
(2) A substantive request for an assignment/presentation to be reassessed - please generate a short (<1pg) memo detailing the specific areas of concern, citing the rubric wherever possible and submit it to both your faculty supervisor and the course coordinator.

POLICY ON AI TOOLS

At the School of Biomedical Engineering, we believe that academic integrity is core to our educational mission, and are committed to upholding these values and skills. This is in line with UBC's stance on academic integrity, which you can learn more about here. As part of our educational mission, SBME is also committed to equipping our students with the competencies and tools needed to address complex and evolving challenges.

As Generative Artificial Intelligence (GenAI) technologies become more developed, it is crucial that you understand both the capabilities and limitations of these tools, so that – like any tool or technology – you may use them in a responsible and ethical manner. You are encouraged to review UBC's principles for the use of GenAI tools. The following was adapted from draft principles and guidelines prepared by UBC's Generative AI in Teaching and Learning Advisory Committee.

Key ethical considerations that you should be aware of as a learner:

- GenAI can be used in a way to support inclusion and accessibility
- GenAI outputs reflect social and cultural biases, which can reproduce systemic inequities, causing harm to individuals and communities
- GenAI outputs may be false, and therefore require critical evaluation by the user. This is also important to be aware of when GenAI tools are used for studying purposes.
- Different individuals have different levels of access to GenAI tools

As a student in UBC's SBME, you should always be submitting your own academic work, and using GenAI only when the course instructor provides you with clear permission to do so. Note that you should never submit resources created by TAs and instructors into GenAI tools without their express permission; this may constitute copyright infringement.

For **BMEG 490**, AI tools will be permitted **only if approved by your faculty supervisor and for specific activities.**

You are not required to use AI tools for any assignment in BMEG 490. However, AI tools may have valuable applications in your research, and their appropriate use should be decided upon in consultation with your faculty supervisor. If you choose to use AI-generated content, you are responsible for critically evaluating the output. You should also be mindful of any sensitive information or intellectual property involved in your research. Additionally, please be aware that using AI tools carries a risk of unintentional plagiarism. Many AI chatbots and image generators produce content based on existing works without proper citation. The academic integrity policy applies to all assignment submissions, and claiming "AI did it!" will not be an acceptable excuse for plagiarism. To avoid this, consider using AI tools that responsibly cite their sources, such as Perplexity AI.[1]

All AI-generated content (text, code, data analysis, etc.) must be properly cited within your work. This might include keeping a record of prompts and outputs. You may refer to the UBC Library's Guide on Generative AI for more information.

You **must** consult with your faculty supervisor early in the course to discuss the appropriate use of AI tools in your research and course deliverables. Together, you will develop an **AI Usage Agreement** that clearly outlines the scope of AI involvement in your work.

The agreement might include:

- What tasks AI will assist with (e.g., literature review, coding, data analysis)
- How AI outputs will be verified for accuracy and ethical standards
- Any limitations on the use of AI for specific aspects of the research
- Proper methods of citation and acknowledgment
- Any concerns regarding sensitive information or intellectual property

This agreement should be brief (it can be summarized in bullet points) and agreed upon by both you and your faculty supervisor. A copy of the agreement must be submitted to the course coordinator no later than the end of **Week 2**.

If you do not intend to use AI tools throughout the course, you should still submit a summary indicating that you do not intend to use AI tools. However, if this changes during the course, you must submit a revised agreement. ***It is your responsibility to ask your supervising faculty or the course coordinator if you are unsure what use is permitted!***

[1] Some notes above are modified from https://ctlt.ubc.ca/resources/assessment-design-in-an-era-of-generative-ai/communicating-with-students-about-generative-ai/

UBC POLICY ACADEMIC INTEGRITY

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the President's Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences.

For more information, see: https://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,286,0,0

ACADEMIC CONCESSION

The University is committed to supporting students in their academic pursuits. Students may request academic concession in circumstances that may adversely affect their attendance or performance in a course or program. Students who intend to, or who as a result of circumstance must, request academic concession must notify their instructor, dean, or director as specified in the link below. https://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,329,0,0

Students seeking academic concession due to absence from the final exam for any reason must apply to Engineering Academic Services (EAS) within 72 hours of the missed exam. This is a standard practice for all final examinations at UBC.

For more information, see: https://academicservices.engineering.ubc.ca/exams-grades/academic-concession/

SAFETY AND TRAINING

You are required to follow the rules, safety guidelines, and training requirements for the laboratory you are working in. Please ensure to get any training early so you are not delayed in your work.

For on-campus activities, we expect you to abide by any current UBC and Provincial Health policies. You should be aware that some laboratory sites, such as those that are part of a hospital complex, might have different health and safety or training policies that you will be required to follow to gain access to these facilities.

STATEMENT ON UNIVERSITY'S VALUES AND POLICIES

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.

LAND ACKNOWLEDGMENT

This course is held on the UBC Point Grey (Vancouver) campus, which sits on the traditional, ancestral, unceded territory of the xʷməθkʷəy̓əm (Musqueam) First Nation.