Manual for Data Science Research in Microbiology and Immunology / MICB 475

THE UNIVERSITY OF BRITISH COLUMBIA

Microbiology and Immunology
Faculty of Science

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Acknowledgements

This course was first developed in 2020 by Drs. David Oliver, Evelyn Sun, Stephan Koenig, and Steven Hallam with critical contributions from Mihai Cirstea, Emily Adamczyk, Ilan Rubin, Reynold Farrera, Zakhar Krekhno, Patrick Ho, and Eric Lee.

Department of Microbiology and Immunology
University of British Columbia

Course Overview

Since 2001, the Department of Microbiology and Immunology at the University of British Columbia has been delivering capstone research courses in microbiology (MICB 421 and MICB 421). Both of these courses have now been renewed to be MICB 471 and MICB 475 respectively. Unlike traditional teaching laboratory courses in which students typically follow recipe-driven protocols to learn techniques, MICB 471 and MICB 475 provide students with an opportunity to do authentic scientific research. The types of courses have been coined "Course-based undergraduate research experiences" or CUREs and have grown in popularity and diversity. There are now many versions of CUREs offered at universities around the world that vary in how they are structured and the types of projects students can do.

The CURE that you are about to do uses a course-based undergraduate research journal titled the Undergraduate Journal of Experimental Microbiology and Immunology (UJEMI). The goal of the course is to develop and execute a research project and ultimately publish your findings in UJEMI alongside hundreds of students who have gone before you. You can visit UJEMI here: https://ujemi.microbiology.ubc.ca/.

CUREs are exciting because they immerse you in the process of doing science. You will survey the literature, synthesize new ideas and hypotheses, learn new techniques, develop protocols, troubleshoot experiments, analyze raw data, present your findings, and authorize and publish a manuscript.

Historically, MICB 471 and MICB 475 have involved projects conducted at the lab bench. However, restrictions on lab work due to the COVID-19 pandemic have prompted us to develop a new version of our course in which students conduct team-based *in silico* (computer-based) bioinformatics projects. This course represents a new CURE model for our program, and we are very excited to deliver it to you.

Briefly, the plan is to use bioinformatics tools to interrogate very large microbiome sequencing data sets (previously published in most cases) to evaluate bacterial diversity.

The CURE will be divided into three main parts with two major projects. The first part of the course involves using a tutorial to introduce you to the analysis pipeline. Project 1 will test your ability to reproduce the pipeline and describe it through a written methods paper or technical report. Project 2 will be your team-based major research project which will ultimately be published in UJEMI. Project 2 builds off the skills acquired in Project 1. The general structure of the course is depicted in Figure 1, and each project is described in more detail below.

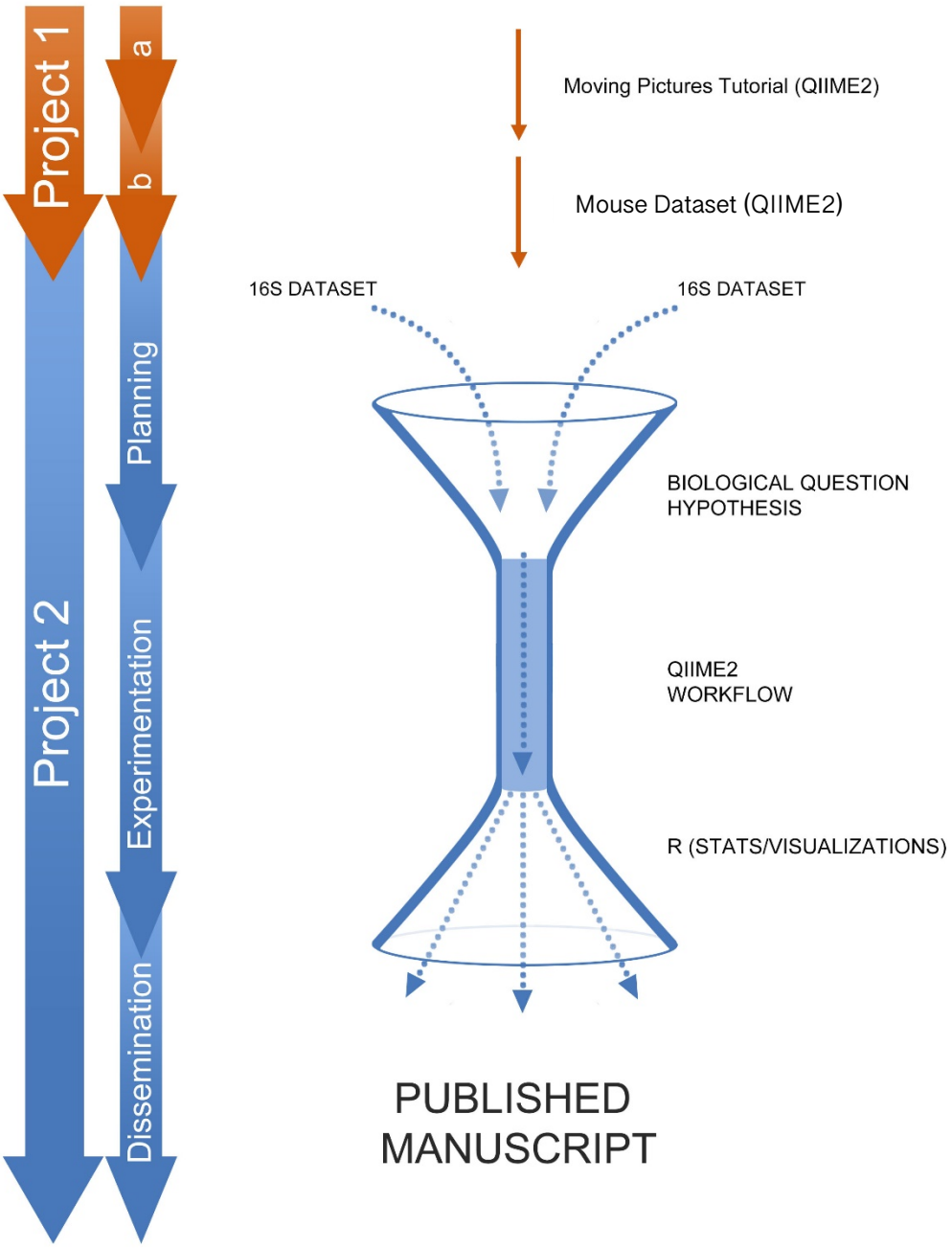

Figure 1. Schematic of the MICB 475 course structure. Project 1 consists of Project 1a (Moving Pictures tutorial) and Project 1b (Parkinson's Mouse Dataset). During the first part of the course, students will learn to use command line and R/R Studio. Project 2 is the major term project that culminates with the submission of a UJEMI manuscript.

Course Learning Objectives

Learning outcomes adapted from the BioSkills Guide (Clemmons et al., 2020):

By the end of this course, students will be able to:
Overarching objective**:** Apply science process skills to address a research question in a course-based or independent research experience.

General Scientific Development:

1. Explain how science generates knowledge of the natural world.
2. Locate, interpret, and evaluate scientific information.
3. Pose testable questions and hypotheses to address gaps in knowledge.
4. Plan, evaluate, and implement scientific investigations.
5. Interpret, evaluate, and draw conclusions from data in order to make evidence-based arguments about the natural world.
6. Work productively in teams with people who have diverse backgrounds, skill sets, and perspectives.

Technical Development:

1. Connect to and work in a server environment using command line.
2. Maintain an annotated record of programming scripts.
3. Describe the different steps of the QIIME2 pipeline.
4. Adapt the QIIME2 pipeline to different datasets.
5. Interpret and analyze microbiome data.
6. Perform microbiome analyses using R and RStudio.

Course Operations

Learning Centres

The course will have 4 learning centres:

(i) online modules (for the first 6 weeks)
(ii) a weekly 45-minute team meeting with your TA and/or instructor starting in week 4
(iii) an *in silico* lab (a computational server for processing data)
(iv) the MICB 447 Canvas webpage

(i) As a course that was originally developed to be entirely online, we now strive to enhance the learning experience by creating a hybrid model where lectures will be replaced with online modules which run for the first 6 weeks of classes. There will only be one in person lecture during the first class and in person lectures for team presentations. You can find all the modules which are a combination of written tutorials and videos on the course Canvas page. Each week following the completion of the modules, students will be expected to hand in an assignment on Canvas.

(ii) Each team will meet once per week with their TA and/or instructor starting in week 4 (location to be determined) to discuss project development and technical challenges. We expect team members to be punctual and participate in discussions, and we will assess individual attendance and participation each week. A table showing each team's meeting time and their assigned TA will be posted to the MICB 475 Canvas web page. **All team meetings will be in person.**

(iii) Lab work in the course will take place on your personal computer by linking to a remote computational server hosted by the Department of Microbiology and Immunology. The large lecture and team meetings will present details about connecting to the server, using the command line, organizing files, and working with data.

(iv) The MICB 475 Canvas web page will be the central hub for the course. Check the course web page regularly for course updates and resources. All modules and tutorials will be posted on Canvas.

Course Timeline

The following table shows a week-to-week breakdown of course activities:

Week	Date (M-F)	Lecture (Tues/Thurs)	*In Silico* Lab Phase	Assessment	Due Date	Team Meeting
1	Jan 9 – 13	1 (in person) / 2 (online)	Project 1	Weekly assignment 1	Jan 15	no
2	Jan 16 – 20	3 / 4 (online)		Weekly assignment 2	Jan 22	no
3	Jan 23 – 27	5 / 6 (online)		Weekly assignment 3	Jan 29	no
4	Jan 30 – Feb 3	7 / 8 (online)		Weekly assignment 4 QIIME2 Quiz (open Jan27)	Feb 5 Feb 5	yes
5	Feb 6 – 10	9 / 10 (online)		Weekly assignment 5	Feb 12	yes
6	Feb 13 – 17	11 / 12 (online)		Weekly assignment 6	Feb19	yes
7	Feb 20 – 24	Reading Week	Project 2	R Quiz (opens Feb 17) P2 Team Proposal	Feb 26 Feb 26	By request
8	Feb 27 – Mar 3	No lectures				yes
9	Mar 6 – 10	No lectures				yes
10	Mar 13 – 17	No lectures				yes
11	Mar 20 – 24	No lectures				yes
12	Mar 27 – 31	No lectures				yes
13	Apr 3 – 7	13 / 14		P2 Oral Presentations		By request
14	Apr 10 – 14	15 / 16		P2 Oral Presentations		By request
Exam Period Begins (Apr 17)						By request
UBC Exam Period *(note: there is no exam for MICB 475)*			Project 2	P2 Draft Paper	Apr 17	
				P2 Final Paper, Lab Notebook	Apr 24	

*Note: Schedule is not finalized and may be subject to change

Teams

This CURE will operate as teams of three or (preferably) four students. Students can either self-assemble their own teams or be assigned to a team by the course instructor.

Communication

Course updates will be posted regularly on the MICB 475 Canvas Announcements section. Any new resources or documents will be linked to these posts. Please visit the MICB 475 Canvas page daily to stay up to date as the course unfolds.

Course coordinator Dr. Evelyn Sun (evelyn.sun@ubc.ca) and course instructor Dr. Melissa Chen (melissa.chen@ubc.ca) are available by email if you have questions at any time. You are also welcome to contact your assigned TA for help.

Technical Requirements

Students will require either a PC or Mac computer. Since the majority of the computational work will be done on a remote server, individual student computers do not have to be high power. We will provide more information about computational requirements during the introductory lectures.

Documentation / Lab Notebook

Each team is expected to maintain 1 common electronic lab notebook (ELN) of their work in the course. Microsoft teams facilitates sharing of files in several formats. Although Microsoft Teams files is the preferred method of maintaining your ELN, other formats are acceptable as well (eg. Share Google docs)/ A copy of the ELN documenting the team's weekly activity must be submitted electronically at the end of the course. A course grade will not be assigned until the lab notebook has been received. Guidelines for ELN documentation will be provided in the course.

Assignments, Assessments, Grading Schemes

Assignments associated with the course are described in detail in this manual. Grading rubrics will be provided for each assignment. The course has 4 grading schemes depending on your team performance and/or whether or not you choose to do the optional reflective journal exercise (see below). Note: there is no final exam for this course.

Project	Assignment / Assessment	Course Grade
1	Weekly Assignments (6 total) (Individual)	18
	2 Quizzes (score above 80%) (Individual)	2
2	Written Proposal (Team)	15
	Research Oral Presentation (Team)	15
	Draft Manuscript (Team)	30
	Final Manuscript (Team)	10
	Agenda and Lab Notebook (Team)	5
	Team Meeting Attendance and Participation (Individual)	5
	Total	100

Note: Final mark (ie. Total Mark) displayed on Canvas does not represent your actual performance as the above grading schemes are not implemented into Canvas.

Participation

1. On average over the term, each member in the team is expected to participate in the planning, computational lab work, analysis and writing phases of all the projects.

2. The average weekly amount of work for each team member over the term is expected to be 5 or 6 hours per week. Some weeks might be shorter than the average if other weeks are longer as long as the overall participation balances out every two or three weeks.

3. Individual students can meet with the instructors if they feel that there is a problem in the way the workload or effort is distributed. If a member of the team is consistently not participating in the assignments or blocking participation of others, then the other members of the team should discuss the problem with the instructors.

Project Proposals and Papers

The requirements for the reports will be discussed in lecture and provided as a handout. Data will not be specifically graded in the reports. About 40% of the points will be determined by the quality of presentation details such as the suitability of units, adequate labeling of graphs, correct arithmetic processing, suitable rounding of values and general readability. Another 40% will depend on how you analyze, correlate and explain your actual observations and the potential meaning of your results rather than whether you discover the actual expected answers for the experiments. The last 20% will be determined by the quality and appropriateness of the concluding statement, the follow-up experiment and the referencing.

Each report must be submitted by the due date and time. Reports submitted late will be penalized by 10% per day overtime. Reports will not be accepted once the material is covered in class or any submitted reports are returned to the class. Missing reports will be marked as zero when the final grade is calculated. Each marked report will be returned with written comments and suggestions on how to improve future reports. If you feel that the mark is less than you expected and you do not understand the comments in the report, please discuss your concerns about the mark with the instructor.

Oral Presentation and Questions

The goal of the project oral presentations is to give each team an opportunity to share their research with their peers. We recognize that projects will be underway and that data will represent a work-in-progress. Teams should follow the presentation guidelines described in the lecture. Conclusions should be derived from the presented evidence only (i.e. avoid speculation or extrapolation).

Agenda, Minutes, and Lab Notebook

Each team will be required to keep a digital lab notebook. Guidelines on how to organize the lab notebook will be posted on Canvas. The notebook should document day-to-day activities and capture any troubleshooting events that occur. Prior to each meeting, an agenda should be included as part of the lab notebook followed by a "minutes" which are essentially notes from the meeting. It is recommended that team members alternate who is responsible for minutes. Your team can select whichever format of a digital lab notebook you would like to have. A link should be shared with you leading TA so they can monitor progress in your lab notebook throughout the term.

Theory Assessment

Weekly assignments and quizzes will test you on the following:

- any concepts presented or encountered in the online modules.
- principles for establishing or designing computational workflows.

Course Support Team

Role	Contact	How can they help?
Course Coordinator and Instructor	Dr. Evelyn Sun: evelyn.sun@ubc.ca	Enrollment inquiries Course structure and content Project advice and mentorship
Instructor	Dr. Melissa Chen: melissa.chen@ubc.ca	Course content support Project advice and mentorship Technical support
Teaching Assistants	Avril Metcalfe-Roach (avril.metcalfe-roach@msl.ubc.ca) Chris Lee (christopherwjlee@msl.ubc.ca) Bretta McCall (mccallbr@student.ubc.ca) Chad Poloni (Chad.Poloni@bcchr.ca)	Project mentorship and direction Technical support
IT Support	Patrick Ho: patrick.ho@ubc.ca	Server access and troubleshooting

Project 1: QIIME2 and R Training

Project 1 is broken up into two parts. The first part involves the use of a tutorial to help you learn how to perform amplicon sequence analysis on QIIME2 and the second half involves the use of small sample data to learn how to analyze and wrangle the data using R/R Studio. The intent of the Moving Pictures Tutorial is to begin learning how to work with QIIME2 (https://qiime2.org/). QIIME2 is a computational pipeline containing a set of bioinformatics tools used to analyze microbiome data consisting of amplicon DNA sequencing reads (for example 16S rRNA). Following the use of QIIME2, students will learn to apply more sophisticated downstream analyses using R. Skills learned in this tutorial will apply to the Project 1: quizzes and weekly assignments.

During these QIIME2 tutorials, students will:

(i) connect to the course server,
(ii) learn fundamental command line,
(iii) understand and use some of the QIIME2 tools, and
(iv) create some visual plots to analyze microbial diversity.

During the R tutorials, students will:

(i) learn the fundamentals of R and R studios
(ii) wrangle data into "tidy" dataframes
(iii) re-create visuals from QIIME2 into publication ready figures
(iv) perform differential and relative abundance analysis

Weekly assignments will involve applying what is learned through the use of the tutorial dataset into a new, larger dataset. A quiz will be implemented at the end of completing the QIIME2 and R components of the course to test your conceptual understanding of the analysis process. In order to complete each module, students must score above 80% on the quiz. Students who fail to do so must attend a 2-hour long bootcamp that reviews either QIIME2 or R mechanics.

Project 2: UJEMI Project

In Project 2, students will work in teams of 3 or 4 to conduct a research project. Teams will have server access to several 16S amplicon data sets extracted from published research articles. The teams will read the published scientific articles and assess the metadata collected with the study. Teams will derive a new research question and/or propose a novel QIIME2 workflow to process the data. The output will be visualized using QIIME2 as well as R. The study will be documented as an original research article and submitted for publication in UJEMI at the end of term.

Several research articles have been selected by a consulting TA as targets for investigation. Teams will be asked to rank their preferred study topic. A draw will be conducted to assign topics to teams based on the ranked order. More information about the research papers associated with these studies, available metadata, and raw sequencing files will be provided early in the term so that teams can assess the opportunities and potential pitfalls associated with each data set.

Grading Rubrics

Rubrics for each assignment are provided here and will be posted to MICB 475 Canvas during the term. The points in the rubrics reflect the relative weighting of each consideration in the grade for that report rather than the final calculated grade.

- Written Project Proposal – Project 2
- P2 Research: Oral Presentation – Project 2
- Draft Manuscript – Project 2
- Final Manuscript – Project 2

***Note** that rubrics provided here are not final and may be subject to change.*

Project 2 Written Team Proposal Rubric (Total of 52 Points)

	Clearly meets expectations. Few, if any problems	Acceptable but definite weaknesses	Does not meet expectations. Significant weaknesses or failed to include	Criteria
Proposed Title	2	1	0	Suitable and relevant to proposal. Sufficient detail to be unique and complete with regard to the objectives.
Introduction and Background	6	3	0	Clearly written. Addresses details needed to understand the explanation, approach and outcomes for your proposal. Describes the premise for collection of the dataset and provides a relevant review of already published findings on the dataset. Do not include figures or tables in your introduction.
Research Objectives	4	2	0	Clearly articulated explanation for the proposed research including research question(s) and corresponding hypothes(es). Hypotheses are <u>not</u> written as predictions. Explain motivation behind study proposal/research question(s).
Experimental Aims	4	2	0	Clearly written list of research aims that relate to the research objectives (ie. answering your research question(s).
Proposed Approach/ Methods	8	4	0	Provides a Table that describes the "purpose" and "analysis" that will be conducted to achieve each experimental aim. Be specific how the analysis will be conducted (eg. On qiime2 or R, do you need to filter the data first?)
Overview Flow Chart	4	2	0	Brief overview that shows a diagrammatic relationship of the aims within the context of the research question(s) and how each aim will be approached (eg. method/analysis used). Top to bottom: Research question→ Aims → Approach
Weekly Time Frame for Completing the Work(Gantt Chart)	4	2	0	Week by week staging of the work. Allow time to test/work with unfamiliar software. Also, allow for time to draft the manuscript.
Feasibility	4	2	0	Description of the main obstacles or difficulty that might be encountered in the approach. If you plan to do any analyses not covered in lectures, make references to methods published elsewhere or how you plan to acquire training on those analyses.
References	4	2	0	At least 6 background references supporting the proposed explanation and protocol. Proper ASM style.
Participation Report	2	1	0	Includes a meaningful section describing how each team member contributed to the work and the report.
Overall Impression	10	5	0	Demonstrates care and critical understanding throughout the proposal. Has been checked to eliminate most spelling, grammar and syntax problems. Clearly and concisely presented. Complete. Readily understood.

Project 2 Oral Presentation (Total of 35 Points)

	Clearly meets expectations. Few, if any problems	Acceptable but definite weaknesses	Does not meet expectations. Significant weaknesses or failed to include	Criteria
Title	2	1	0	Effective title. Title is supported by data presented and/or research direction
Introduction and background	2	1	0	Provides sufficient context. Effectively explain: research objectives (or research questions) and experimental aims
Data presentation and interpretation	6	3	0	Effectively explain experimental findings with appropriate interpretations.
Conclusions and Future Direction	4	2	0	Conclusions are supported by presented data. Future directions are logical, feasible extensions of conclusions.
Acknowledgements	1	NA	0	Recognize team members, collaborators, contributors, funding.
Visual aids	4	2	0	Appropriate use of presentation technology (e.g. Powerpoint). Slides are well designed and easily interpreted.
Formatting	6	3	0	All Figures and Tables are formatted as per ASM style guidelines. All figures show markers and are labeled clearly.
Delivery	2	1	0	Speaker(s) sets a reasonable pace, displays enthusiasm and confidence (e.g. makes eye contact), and modulates tone for emphasis.
Timing	2	1	0	Presentation meets time constraint of maximum ___ minutes. (Time will depend on number of teams in class)
Overall	6	3	0	Overall quality of presentation. Logical flow. Attention to details such as figure formatting, font size, and references.

Project 2 Draft Manuscript Rubric (Total of 100 Points)

	Consideration	Clearly meets expectations	Mostly meets expectations but with a few weaknesses	Acceptable but with definite weaknesses	Poorly meets expectations, significant weaknesses	Failed to include or does not meet expectations	Criteria
Title	Clear, accurate, and relevant	2	NA	1	NA	0	Concisely conveys the outcome of project, and is supported by data presented
Abstract	Clear and accurate. Appropriate format	2	1.5	1	0.5	0	Easy to read. Consistent with article. Includes purpose, main observations and conclusion(s). No abbreviations or references
	Relevant details	2	1.5	1	0.5	0	
Introduction	Clear and accurate	2	NA	1	NA	0	Easy to follow. Focused on the purpose of project. Proper coverage of background for the analysis and discussion. Does not include parts that should be in other sections
	Relevant details. Appropriate content.	4	3	2	1	0	
	Appropriate depth	4	3	2	1	0	
Materials and Methods	Complete and accurate	2	NA	1	NA	0	Mentions relevant details. Uses paragraph format. Uses citations where appropriate. Provides enough detail to follow approach.
	Appropriate format and content. Suitable abbreviations	2	1.5	1	0.5	0	
Results	Consistent and accurate processing	6	4	2	1	0	Consistent interpretation of data. No processing errors
	Appropriate format. Details	10	8	6	4	2-0	Tables and figures

	are clear and accurate						formatted with expected details. Figure legend provides necessary information (eg. Statistical analysis performed).
	Appropriate interpretation of the results	6	4	2	1	0	Interpretation of trends and observations is reasonable
	Appropriate observations	4	3	2	1	0	Has recognized the major relevant observations
Discussion	Clear and accurate	4	3	2	1	0	Statements are consistent with the results, help to understand the results and relate the results to the purpose. Statements show insight. Makes use of supporting knowledge. Covers all major observations
	Relevant	4	3	2	1	0	
	Reasonable depth of analysis	4	3	2	1	0	
	Study limitations	6	4	2	1	0	Cover major limitations in the study. Study limitations mentioned are relevant and useful to audience.
Conclusion	Accurate deductive statement	4	3	2	1	0	Deductive statement "proved" by the results rather than explanations
	Addresses the experimental question	4	3	2	1	0	Conclusion addresses the experimental question
	Relevant and feasible	6	4	2	1	0	Addresses a significant

Future Directions	Outcomes	4	3	2	1	0	problem or explanation raised in the discussion. Relevant to original purpose.
References	ASM format, accurate and appropriate citation	4	3	2	1	0	Cited by number in the manuscript. Correct ASM style in listing.
Supplemental Material	Supplemental figures and tables	2	NA	1	NA	0	Properly formatted and logical to the manuscript.
Participation Report	Explain how each author contributed to the project and the report.	2	NA	1	NA	0	Includes a meaningful section describing how each team member contributed to the work and the report.
Overall	Overall impression	10	8	6	4	2-0	Demonstrates care and critical understanding throughout the report. Correct language, tenses, and terms. Good insight into results.

Project 2 Final Manuscript Rubric (Total of 100 Points)

	Consideration	Clearly meets expectations	Mostly meets expectations but with a few weaknesses	Acceptable but with definite weaknesses	Poorly meets expectations, significant weaknesses	Failed to include or does not meet expectations	Criteria
Title	Clear, accurate, and relevant	2	NA	1	NA	0	Concisely conveys the outcome of project, and is supported by data presented
Abstract	Clear and accurate. Appropriate format	2	1.5	1	0.5	0	Easy to read. Consistent with article. Includes purpose, main observations and conclusion(s). No abbreviations or references
	Relevant details	2	1.5	1	0.5	0	
Introduction	Clear and accurate	2	NA	1	NA	0	Easy to follow. Focused on the purpose of project. Proper coverage of background for the analysis and discussion. Does not include parts that should be in other sections
	Relevant details. Appropriate content.	4	3	2	1	0	
	Appropriate depth	4	3	2	1	0	
Materials and Methods	Complete and accurate	2	NA	1	NA	0	Mentions relevant details. Uses paragraph format. Uses citations where appropriate. Provides enough detail to follow approach.
	Appropriate format and content. Suitable abbreviations	2	1.5	1	0.5	0	
Results	Consistent and accurate processing	6	4	2	1	0	Consistent interpretation of data. No processing errors
	Appropriate format. Details	10	8	6	4	2-0	Tables and figures

	are clear and accurate						formatted with expected details. Figure legend provides necessary information (eg. Statistical analysis performed).
	Appropriate interpretation of the results	6	4	2	1	0	Interpretation of trends and observations is reasonable
	Appropriate observations	4	3	2	1	0	Has recognized the major relevant observations
Discussion	Clear and accurate	4	3	2	1	0	Statements are consistent with the results, help to understand the results and relate the results to the purpose. Statements show insight. Makes use of supporting knowledge. Covers all major observations
	Relevant	4	3	2	1	0	
	Reasonable depth of analysis	4	3	2	1	0	
	Study limitations	4	3	2	1	0	Cover major limitations in the study. Study limitations mentioned are relevant and useful to audience.
Conclusion	Accurate deductive statement	4	3	2	1	0	Deductive statement "proved" by the results rather than explanations
	Addresses the experimental question	4	3	2	1	0	Conclusion addresses the experimental question
	Relevant and feasible	6	4	2	1	0	Addresses a significant

Future Directions	Outcomes	2	1.5	1	0.5	0	problem or explanation raised in the discussion. Relevant to original purpose.
References	ASM format, accurate and appropriate citation	4	3	2	1	0	Cited by number in the manuscript. Correct ASM style in listing.
Response to Feedback	Summary of feedback	2	NA	1	NA	0	Clear understanding of the feedback provided including highlighting major areas for improvement.
	Implementation of feedback	4	3	2	1	0	Description of how major feedback was implemented into this version
Script	Formatting	2	NA	1	NA	0	Properly formatted and includes comments.
Overall	Overall impression and improvement	10	8	6	4	2-0	Showed clear improvement from the draft. Addressed feedback in a sufficient manner. Manuscript is ready to be submitted for publication in UJEMI

Course Policies

A. CENTRE FOR ACCESSIBILITY

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 and cultural 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 here (https://senate.ubc.ca/policies-resources-support-student-success)

Students who are registered with UBC's Centre for Accessibility should contact the Centre as soon as possible to discuss how your accommodations can be met.

B. ACADEMIC MISCONDUCT

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.

A more detailed description of academic integrity, including the University's policies and procedures, may be found in the Academic Calendar at
http://calendar.ubc.ca/vancouver/index.cfm?tree=3,54,111,0