MEDICAL SCIENCES HONOURS HANDBOOK

SCIE 4901 + 4902

Information for Students and Supervisors

Medical Sciences
Faculty of Science

DALHOUSIE UNIVERSITY

CONTENTS

I. PURPOSE

The Medical Sciences Honours program will allow you to conduct independent research on a health-relevant topic under the supervision of a faculty member. The project will enable you to develop the skills required to perform scientific research without the controlled environment and experiments usually practiced in a class laboratory session. This experience will help you decide whether you enjoy research and want to pursue graduate studies or a future career as a researcher. Undertaking an Honours project will also allow you to read the literature in your field of interest and teach you how to report your data and information properly, aiming to produce a final thesis document. The research project (including literature review, data* collection, analysis, and thesis writing) is part of the requirements for SCIE 4901 + 4902, the mandatory Honours courses in your fourth year of studies. NOTE: SCIE 4901 & 4902 comprise part of your ten courses and are not in addition. (*Although often numeric, **data** can refer to any unit of information collected in your study.)

II. REQUIREMENTS FOR ACCEPTANCE TO PROGRAM

1. Entry into the Honours program is by permission only. Only students who achieve a minimum **average GPA of 3.0 calculated from the following core courses are eligible: BIOL 2020, BIOL2030, PHYL 2041, PHYL 2044, MICI 2100, BIOC 2300, SOSA 2503 or EPAH 2010, PHIL 2805 or 2810, CHEM 2401, CHEM 2402, PHAC 3030, MICI 3115, ANAT 3010, and PATH 3000.** If you have not completed all the listed core courses, your average GPA for the completed courses at the time of application must be equal to or greater than 3.0 (B average). You must also maintain an average GPA of at least 3.0 for all core courses at graduation.

2. Additionally, you must identify a faculty member who has agreed to be your Honours supervisor. Since Medical Sciences is not a department, you have the option of doing your Honours work at any Dalhousie research site. The only conditions are that your direct supervisor has a faculty appointment with Dalhousie University and that the work is health-related. Upon completion, you will have an Honours degree in Medical Sciences, not in the Dalhousie department where you complete your work. **If you do not identify a supervisor, you will not be permitted entry into the Medical Sciences Honours program, regardless of your GPA.**

To find a supervisor, start exploring the various faculty websites (Medicine, Science, Dentistry, Arts & Social Sciences, etc.) in your 2nd and 3rd year. Each site will have a *Department* tab and a *Research* tab in each department. Here, you can investigate who is doing what research. If you find something of interest, reach out to the researcher (usually via email to start); I recommend reaching out to more than one. Tell them who you are, your year of study, why you are interested in their research, your intentions, any relevant courses you've taken, and your GPA. Ask to meet with them to discuss your interests further. Consider providing them with a copy of this handbook, so the faculty member knows their role as a supervisor. As a starting place, **you may also refer to the list of faculty members who have supervised MedSci students in some capacity over the years**; you can request this list from the Honours coordinator.

3. You must complete the online **Dalhousie Honours Application Form** to register for Honours. The Medical Sciences Honours Coordinator will help you if needed. You can apply as early as

January of your third year and will have until **May 15** (or the Monday following the 15th if it falls on a weekend) of that same year to submit your application. Once completed, submit it as a PDF to the Honours Coordinator via email (no photos of the form, please). You must also submit a completed **Project Form** (Appendix A). Include a brief description of your proposed project (one paragraph, including background/rationale, hypothesis, proposed methodology and techniques, expected results, and whether ethics approval is needed. (See Appendix A for a well-written example.) Also include your supervisor's signature, indicating that you will complete all necessary, applicable training requirements (e.g., biosafety, animal & human ethics, etc.). Please also specify who wrote the project description (i.e., you, your supervisor, or both). Ensure you submit an electronic copy of your completed & signed Project Form and a copy of your project description in Microsoft® Word format to the Honours Coordinator.

4. Once your Dalhousie application is reviewed and considered satisfactory, the Honours Coordinator will sign it and send it to the Registrar's Office. The Medical Sciences Honours Committee will assess your project description and marks for your second and third-year core courses to verify your eligibility as an Honours student (June or July). The Honours Coordinator will contact you by your Dalhousie email address to invite you to register in SCIE 4901 & 4902 if you haven't already done so.

III. THE ROLE OF THE HONOURS STUDENT

SCIE 4901 & 4902 are the compulsory Honours courses, carrying the following expectations:

- You must identify your supervisor before obtaining permission to register for the course. Look for a project with a high probability of success in a short time. You may want to meet with a few potential supervisors before deciding. Also, remember that you want to work with a supervisor with whom you are compatible.
- Before your project begins, clarify with your supervisor what it involves and their expectations of you. During the year, try to meet with your supervisor **weekly** to discuss your completed work and plan for the next steps. Remember that you will be conducting the project while carrying a load of four other courses each term.
- Registering in SCIE 4901 & 4902 will reserve weekly class times in your schedule for the Fall term. Lectures will be provided by the Honours Coordinator and by other faculty members. You must attend the lectures and participate in class activities and discussions (class participation is worth **10%** of your final mark). In the lecture series, you will learn about others' projects, scientific writing, literature searches, essential aspects of research (integrity, ethics, data presentation), and platform and poster presentation preparation. You will also complete four different assignments based on four lectures (2 *Lecture Activities* and 2 *Discussion Boards)* as part of your class participation. (See Appendix B for discussion board guidelines.) Finally, you will have time to hone your presentation skills by giving a short presentation (up to 10 min). The grade will be Pass/Fail, but you will also receive a numbered evaluation and constructive feedback from the Honours coordinator, other faculty members, and your peers (see Appendix C for mini presentation rubric). The Honours coordinator may use the mini-presentation grade to determine your eligibility to give a platform presentation at the Medical

Sciences Annual Symposium. You should consider the quality, depth, and mechanics of your feedback. See Appendix D for guidelines on how to assess your peers.

- You will be randomly assigned to a group for the whole year. Groups are responsible for evaluating the presentations of students in one other group. **Each group will check in with the course coordinator twice during the Winter term.**
- After an appropriate training period, you will be responsible for your research project. You will be contributing your time, energy, AND intellectual input. You may also participate in your research group meetings. You will contribute a minimum of 84h and a maximum of 96h per term (that works out to about 7-8h per week and can include reading the literature and any writing required). You and your supervisor should agree on how you will use this time, as it may not be evenly distributed across the semester.
- **Budget your time effectively.** It is important to start your research as soon as possible (see Section V regarding preparatory work) and to work consistently throughout the academic year to finish on time. It would be best if you were coming to the end of your research by mid-late February so that you can start to compile your data and write your thesis. Resist the temptation to collect more data, even if you have not completed what you had initially planned. Otherwise, you will not leave yourself enough time to write the thesis (while finishing class reports and papers and studying for final exams). To make the most efficient use of your time, we advise you to **write your Methods section and Results section/figures while you gather data**.
- At the end of the Fall term, your **Interim Report** will be due (Section VI). The report is an opportunity to gather feedback on your writing. You will submit an **outline** of your paper to the Honours coordinator two weeks before it is due. The coordinator will grade the outline and provide feedback. You will submit the completed interim report to the Honours coordinator, who will send it to your supervisor for review and grading. This initial report is worth **15%** of your grade, with **5%** dedicated to the outline (see Appendix E for the guidelines & grading rubric).
- The **Medical Sciences Annual Symposium** (Section VII) allows you to present your Honours research to your peers, graduate students, supervisors, and faculty members. You may do so through a platform or a poster presentation. Practice your presentation well before your presentation date. Your feedback from your research mates and supervisor allows you to incorporate any changes on time. This presentation is worth **15%** of your grade (see Appendix F for the grading rubric). You will submit your abstract for the symposium in March (see Appendix I for the form and an example).
- The **Honours Research Thesis** (Section VIII) is a significant body of work; therefore, we encourage you to work on it as you progress through the academic year. For instance, you can develop your Methods and reference sections from the start. Your supervisor and at least one other reader not involved in your project will mark your thesis worth **40%** of your grade (see Appendix G for guidelines & grading rubric).

IV. THE ROLE OF THE HONOURS SUPERVISOR

As supervisor of a Medical Sciences Honours student, you will take on the following responsibilities:

- Sign and help your student complete the Project Form (Appendix A).
- Take care in choosing projects for your students. We want students to break new ground but ensure the project is doable and appropriate for a senior undergraduate student.
- Clearly explain to your student your expectations and make sure the student understands. Be reasonable in your expectations as this is typically one course out of a full course load.
- Guide your student with their research project, including meeting with them regularly. In larger research sites, you may hand over the supervision to a senior graduate student or post-doctoral fellow. However, as the Principal Investigator, you are ultimately responsible for oversight and grading. You may also choose to co-supervise with another faculty member, where both of you can participate in overseeing the student's work and provide grading.
- If possible, ensure your students participate in your research group activities, including group meetings.
- Attend and evaluate the mini-presentations of your Medical Sciences student(s) and act as a marker for the other presentations taking place in the class that day (see Appendix C for the evaluation form).
- Review a draft of the Interim report before their final submission (remember that the interim report – and thesis – will likely be the first significant research documents they prepare). You can ask for clarification, offer suggestions (including alternate wording), and give positive feedback, but do not edit their work. A copy of the final submission will come to you from the Honours Coordinator, after which you will have 10-14 days to provide a grade on the evaluation form. Provide detailed feedback directly on the Interim report and indicate a grade on the evaluation form (Appendix E; it is worth 15% of the final grade). When you submit the Interim report evaluation, please provide the names of two Faculty members that could act as additional thesis readers. Make sure they agree to act as readers.
- Ensure data collection is wrapping up by the end of February to allow time for the student to concentrate on writing the thesis.
- Guide your student in writing the Abstract for the Medical Sciences Symposium (see Appendix I for the form and an example); the abstract is due in March.
- Guide your student in preparing the platform or poster presentation at the Medical Sciences Annual Symposium. You should strongly encourage your student to do at least one trial run of the presentation in advance of the presentation date so that the student can make changes. If the student presents a poster, you are responsible for the cost of the poster. This presentation is worth 15% of the student's final grade. You will attend the symposium and evaluate at least two student presentations (but not your student's). See Appendix F for the grading rubric.
- Review a draft of the thesis before their final submission. You can ask for clarification, offer suggestions (including alternate wording), and give positive feedback, but do not edit their work. A copy of the final submission will be sent to you by the Honours Coordinator for detailed feedback and grading.

- You (and one other reader) will grade the final thesis. If there is a discrepancy of more than a full letter grade between you and the second reader, the Honours coordinator will act as a third reader, and the final grade will be the average of the three.
- In addition to grading your student's thesis, you will be responsible for reading and grading one other Medical Sciences Honours thesis. When grading these, keep in mind that you are evaluating them as an example of scientific communication. You will also assess productivity. When supervising more than one Honours student, you must grade the theses for all students where you are the supervisor, with the potential to grade the work of at least one additional student. You will have 10-14 days to complete the theses evaluations. Delegates must be identified by the supervisor and approved by the Medical Sciences Honours Committee. The thesis grade will be worth 40% of the student's final grade for SCIE 4901 + 4902 (see Appendix G for guidelines & grading rubric).
- You will also assess the student's research effort (Section IX), making up 20% of the student's mark. The assessment covers intellectual input, commitment to work, participation in group meetings, experimental skill, interpretive ability and originality, and productivity (see Appendix H for the evaluation form). You will complete an assessment at the end of the Fall term (worth 5%) and one at the end of the Winter term (worth 15%). Feedback from the first evaluation allows for improvement in the second term. This assessment is separate from the interim report and thesis mark.

Please alert the Honours coordinator, as soon as possible, to any problems or concerns with a student (work ethic, personality issues, etc.) or the way the project is progressing.

V. PREPARATORY RESEARCH CONDUCTED BEFORE THE FOURTH YEAR

You may choose to work at a research site before your fourth year. It is **not** mandatory, but it does provide a few advantages. Working before will allow you to become familiar with the literature in your research area. It may also allow you to obtain some of the technical skills needed for your project, making you more efficient in your fourth year, where you will significantly build upon that work. You will not collect data during this time unless it is for background purposes only. If you do preparatory work, indicate it in your thesis. Remember that you will complete most of your project during the Fall & Winter terms.
NOTE: If you have registered in an Experiential Learning course for credit or have been paid for the research work (see below), you cannot use data from either of these opportunities for your thesis.

Some research supervisors have funds from research grants that permit them to hire summer students. However, several agencies will support students if such funding is unavailable. Most of these agencies have deadlines in late Fall or early Winter before the summer of research. For more information, refer to the summer research award guidelines on the Faculty of Science Summer Research Awards web page.

VI. INTERIM REPORT

The Interim Report is due on the last day of classes in the Fall term (the outline is due two weeks before). The purpose of this report is to demonstrate that you understand the literature related to the Honours research. Rather than extensively discussing experimentation and data (since your results to this point are unlikely to make a complete story), the emphasis is placed on background material and providing a rationale for your project. As such, it serves as a mini literature review, upon which you will expand for the Introduction section of your final thesis. One page of references is sufficient at this stage.

The report should be written in a similar format to a peer-reviewed paper in your field of study. Make sure to number your pages. Your report will include the following, each beginning on a separate page:

- Title Page
- Table of Contents
- List of Figures & Tables (if applicable)
- List of Abbreviations
- Introduction (incl. your rationale and research question/hypothesis) – **3-5 pages**
- Methods – **3 pages**
- Preliminary Results (with at least one figure/table/schemata; with legend) highlighting your results so far - if no results are available, include a figure representing the background, workflow, or Methods section instead.
- Discussion – brief, describing what is to come; **not graded**
- References

The **Introduction**, **Methods**, **Results**, and **Discussion** should total around **10 (1.5-spaced) text** pages. Put each figure, table, or schemata on a separate page. Intersperse the figure in the body rather than at the end. For **References**, use the style of references most common in your

field of study (i.e., the reference style of the journal in which your research group most frequently publishes). See the attached **Guidelines for the Interim Report** in Appendix E.

You will be required to provide an **outline of the report** two weeks before it is due. The outline and **one** copy of your paper are to be submitted to the Honours coordinator by the deadline provided by uploading them to the appropriate Brightspace folders. The supervisor should review the report at least once before submission, so please ensure there is enough time for them to provide feedback before you submit it (recommend 10 days before the due date). The report will make up **15%** of your grade in the course, 5% of which will come from the outline.

Artificial Intelligence – REMEMBER: You are **not to use AI** to write your preliminary report.

VII. MEDICAL SCIENCES ANNUAL SYMPOSIUM

In March, please submit an abstract of your work to the Honours coordinator (example in Appendix I; your supervisor can help you with this). The abstract will summarize what you will present at the end-of-year symposium (indicate on your abstract form whether you want to give a platform or poster talk). The symposium includes Honours and Capstone presentations, limiting the number of platform talks. We will review the abstracts, as in a scientific conference, to determine who will give the platform presentations. If there are more eligible than available spots, we will use the in-class presentation mark provided by the honours coordinator's evaluation to determine who will give the platform talks.

Whether platform or poster, you will give a short talk summarizing your research project (10 min presentation with 3-5 min for follow-up questions concerning any topic related to your work). The presentation should be clear and concise, including background information that describes a rationale (the "Who cares?"), how you performed your investigation, relevant results, and your conclusions. We advise you to practice in front of your research mates and supervisor to receive feedback and to make sure you don't go over time. The constructive criticism and suggestions for improvement you receive from your research group and your in-class presentation evaluation will be invaluable.

If you are giving a platform presentation, please use **PowerPoint** as your presentation medium. We will provide a computer and projector; however, we ask that you submit your presentation, via email, **by noon the day before** the symposium, at the latest (ensure your slides project as you've intended). You can have your posters made at a location upon which you and your supervisor agree (e.g., Dalhousie MedIT, Killam Library, etc.) and can be hung by you the day of the symposium.

VIII. HONOURS RESEARCH THESIS

Your final thesis is written in the same format as your interim report, only longer. Your thesis will require a more detailed Methods section than typically seen in a peer-reviewed journal article. For example, you cannot use "as previously described" to explain how testing was done. We would advise you to look at past Honours theses from your research group to get a feel for how it is written.

The report should be written in technical language appropriate for your field of study, but that which is accessible to non-experts in the field (the supervisor and one other reader will evaluate the thesis, so the Introduction should provide enough background to familiarize any reader with the material). All abbreviations/symbols should be defined on first mention (including in the methods and figure legends). Avoid the use of jargon or slang and be concise.

The **body of the thesis** (which includes the Introduction, Methods, Results, and Discussion) should be about **15-20 pages (1.5-spaced),** excluding figures, tables, schemata, references (**1.0-spaced**), and appendices. Please use **12-point** font and **2.5cm margins** all around. Make sure to number your pages. Your thesis will include the following, each beginning on a separate page:

- **Title** - Include your name, B00#, course number and name, the name of your supervisor, date, and the title of your study. Ensure the title is informative but not extensive.
- **Table of Contents** - You can use the "References" tab in Word. TOC page numbers are typically Roman numerals, so you can use this link for guidelines on how to use different numbering in the same document: https://bit.ly/2LmXCQ9.
- **List of Figures, Tables, and Schemata** – Your report should list your figures/graphics, highlighting your results (i.e., not every result acquired needs to be included in the thesis). Just include the title and page number; a full description is not required, nor are the figures/tables/schemata themselves included in the list (those will appear in the body of your work).
- **List of Abbreviations** – Your list of abbreviations (with definitions) should be alphabetical and defined again when first used in the document (including in the abstract, methods, and figure legends).
- **Abstract** – This is a short, concise summary of the important points of the report (250-300 words). It will introduce the background, and the problem to be addressed, and provide results and conclusions. No reference should be made to any part of the report (Including abbreviations); the abstract is a stand-alone paragraph. Do not use citations in the abstract. Write this section last, as it is often the most difficult part of the report to write (see Appendix I for an example).
- **Acknowledgments** - It is appropriate to acknowledge, in addition to the supervisor, any intellectual and practical assistance, advice, encouragement, and sources of monetary support that contributed to the successful completion of the thesis.
- **Introduction** – This will not be an exhaustive literature review. This section introduces the reader to aspects of the scientific field pertinent to your project while familiarizing a non-expert scientist with concepts crucial to understanding your research. The reader should understand what work has been completed in the area and what needs to be done. Your introduction must also include a rationale for your work.
- **Methods** – Describe all methods used for the project, including those published methods requiring references. If new methods are created, these must be described in a way that allows others to repeat the testing. If more than one method is described, use subheadings – one for each method. The methods are not conversational accounts of what was done on the project. Be sure to write in the third person using past tense and passive voice.

Use clear and precise descriptions of how experimentation or data collection was done and the rationale for why specific procedures were chosen. The methods section should describe what was done to answer the research question, describe how it was done, justify the experimental design, and explain how the results were analyzed. This section should describe any materials used in the study and how they were prepared, describe the research protocol, explain how the analysis was performed, including measurements and calculations, and state which statistical tests were used (if applicable). Note where materials were purchased throughout the method, if applicable. Do so chronologically (i.e., the order in which they were used in the study) and use sub-sections, if necessary. References should be used where needed and listed at the end.

- Results – There should be a natural flow from one test or subject to the next. The use of subheadings is encouraged in this section. In each subsection, introduce the rationale for the testing, briefly describe what was done, and refer to the appropriate figure/table/schema that reveals the data. Figures, tables, and schemata should be interspersed with the results (i.e., not at the end of the report), but each should be on a separate page and include a figure/table/schemata legend.
- Discussion Discuss the significance of the data in the context of existing published literature and indicate the next steps forward. If there has been difficulty with data collection or the techniques used, try to identify the cause(s) and suggest ways to resolve these issues. Include citations of relevant literature in this section to support the discussion.
- References – References should be cited in a standard journal format; use the style of references most common in your field of study (i.e., the reference style of the journal in which the research group most frequently publishes). An electronic reference manager is recommended, and this would be an ideal opportunity to learn if you have not previously used such a reference tool. Programs such as Refworks (or Bookends, Papers, Endnote) allow you to acquire references from online sources and insert the reference into your Word file as you write. When your report is complete, these programs will then format your Word document so that each reference is formatted, and the accompanying reference list is automatically generated in whatever format you specify. Refworks is available for free to all university students via the library.
- Appendices (if any) - Reserved for supplemental information (buffer solutions, computer programming code, surveys, models, etc.). The supervisor can provide advice on appropriate content.

A draft of your thesis should be given to your supervisor promptly (recommend 10 days before) so that they can provide constructive criticism. You can use information from your Interim Report and feedback from the Interim Report to help write your thesis. Your supervisor's comments should help you achieve a better writing style and focus your report so that it reads clearly and concisely. It is not your supervisor's job to write your thesis, so make sure that the draft you submit is in good shape and not a version you expect your supervisor to change and polish dramatically. Your supervisor and one additional reader will mark the final product. See the Thesis Guidelines in Appendix G for additional information.

Artificial Intelligence – REMEMBER: You are **not to use AI** to write your thesis.

PLEASE SUBMIT AN ELECTRONIC COPY OF YOUR HONOURS THESIS TO THE HONOURS COORDINATOR VIA THE APPROPRIATE BRIGHTSPACE ASSIGNMENT FOLDER BY 5 PM ON THE LAST DAY OF CLASSES OF THE WINTER TERM

IX. EVALUATION

The Honours Coordinator solicits reviews of each thesis from the supervisor and faculty members acting as readers. The marking scheme is a guideline for the Honours Coordinator only and does not always reflect how your final mark is derived. The Honours Coordinator has the right to adjust your mark if there are markedly discrepant grades between the supervisor and readers.

- Mini Presentation (Pass/Fail) and Participation (10%) – Your peers and at least one faculty member will mark your mini-presentation. Participation in the class will come from attendance, class discussion boards, lecture activities, and peer evaluation (each component is worth 2.5%).
- Interim Report (15%) - You will have to provide one copy of your outline and one copy of your report to the Honours coordinator by the designated deadlines. The Honours coordinator will mark your outline and your supervisor will mark your report.
- Symposium Presentation (15%) – Your mark will be calculated as the average of the scores submitted by your judges.
- Thesis (40%) – Your mark will come from an average of the grades submitted by the supervisor (20%) and the additional reader (20%). Markers will assess your thesis on three main criteria: (i) rationale, hypotheses, and predictions; (ii) method and testing design; and (iii) analysis, interpretation, and writing skills. A good grade will be contingent upon a clear, thoughtful writing style that is relatively free of grammatical, spelling, and typographical errors. Non-expert readers should be able to follow your train of thought without significant difficulty. Productivity will be assessed case-by-case and considered in your final mark. If there is a discrepancy in the grade between the supervisor and the second reader (greater than a full letter grade), the Honours coordinator will act as a third reader, and the final grade will be the average of the three scores.
- Research Effort (20% = 5% Fall + 15% Winter) – The supervisor will provide this mark and base it on motivation, initiative, attitude, quality of work, ability to learn, application of knowledge, planning & time management, and dependability They will also comment on where you excelled and ways that you might improve.
- Final Requirement – Meet the minimum GPA requirement of 3.0 in the courses listed in Section II above, as well as an average GPA of at least 3.0 for all core courses at the time of graduation (excluding year 1); submit a satisfactory Interim Report and thesis; deliver an adequate symposium presentation. **You must also attend the weekly classes in the Fall to receive this credit.**

Summary table of course evaluation

Component	% Final Grade	Date
In-class Presentation	Pass/Fail	Fall term
In-class Participation	10	Fall term
Interim Report	15	Last day, Fall classes
Thesis	40	Last day, Winter classes
Symposium Presentation	15	Day after last day of classes, Winter term
Research Effort	20 (5 Fall/15 Winter)	End of each term

Grade Conversion

A+ 90-100 (4.3)	B+ 77-79 (3.3)	C+ 65-69 (2.3)	D 50-54 (1.0)
A 85-89 (4.0)	B 73-76 (3.0)	C 60-64 (2.0)	F <50
A- 80-84 (3.7)	B- 70-72 (2.7)	C- 55-59 (1.7)	

X. COURSE POLICIES

Lecture activities, the interim report outline, interim report, symposium abstract, and thesis must be submitted to the Honours coordinator via the appropriate assignment folder on Brightspace by **5 pm** on the designated due dates. Extensions are given only in extenuating circumstances; please see *Student Declaration of Absence* information below). If you do not complete the lecture activities, you will lose **one-quarter** of your class participation mark. If you do not participate in the discussion boards, you will lose **one-quarter** of your class participation mark. If you do not evaluate the mini-presentations of your peers, you will lose **one-quarter** of your class participation mark. The grade for reports (interim and thesis) submitted late will be reduced by an absolute value of **10%** for each 6h after the due date and time. If the interim report outline is not submitted, you will lose **5%** of your interim report mark.

Please attend every class in the Fall term. If you miss more than two class sessions, you will **lose one-quarter** of the class participation mark.

A student who misses the symposium presentation due to illness or extenuating circumstances must notify the Honours Coordinator within 48h (see *Student Declaration of Absence* information below). We will schedule a make-up presentation within 7 calendar days of the missed presentation.

XI. ACADEMIC INTEGRITY

Any form of plagiarism can earn you a failing grade for the entire course. At Dalhousie University, we are guided in all our work by the values of academic integrity: honesty, trust, fairness, responsibility, and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you must demonstrate these values in your work. The University provides policies and procedures that every member of the university community follows to ensure academic integrity.
Information: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Artificial Intelligence – Feel free to use AI-driven tools to assist your learning, but you may not use them to produce work to be submitted for either formative or summative evaluations, including any written assignments. Due to the nature of this course, it is impractical and difficult to assess students properly if AI tools are allowed. For this reason, despite these tools possibly being valuable in your career, their use in this course is restricted so that your learning may be assessed.

Student Declaration of Absence (SDA)

The SDA is for absences of three days or fewer. Use the SDA if you are going to miss or be late with an academic requirement. Let the Honours Coordinator know immediately (via email), so alternate arrangements can be made, if appropriate. More information about the SDA, including a link to the form, can be found here: https://bit.ly/2NJS8jw.

APPENDIX A – PROJECT FORM

This form should be completed and submitted with the Dalhousie Honours Application to the Honours Coordinator.

<u>Brief</u> Project Description (Include background/rationale, hypothesis, proposed methodology/techniques, and expected results. Please also include if need **ethics approval** and when that will be submitted. Headings are strongly encouraged (approx. 1-2 paragraphs). See an example on the next page.

Ethics: ☐ approved ☐ not approved yet, but expected by September.

The project will take place at the hospital ☐ NSHA ☐ IWK

☐Written by student ☐ Written by supervisor ☐ Written by the student, edited by the supervisor

I have read the Medical Sciences Honours Handbook and understand the responsibilities associated with being a Medical Sciences Honours Supervisor

_____ _____

Supervisor's Signature **Date**

The Medical Sciences Honours student will fulfill all the required training while engaging in their Honours project under my supervision

_____ _____

Supervisor's Signature **Date**

_____ _____

Supervisor's name (Pls. print) **Supervisor's Department (Pls. print)**

SAMPLE PROJECT DESCRIPTION

Background: Ovarian cancer is the fifth most common cancer in women and the most lethal gynecological malignancy. The hallmark treatments for cancer currently include surgery, radiation, and chemotherapy, however – chemotherapy eventually fails to treat late-stage cancers. Once chemotherapy is no longer contributing to tumor regression, there is minimal hope for the patient. Immunotherapies, on the other hand promise improved outcomes. Immunotherapy harnesses the patient's immune system to enhance its own cancer-fighting abilities and thus has superior clinical outcomes – including long-term remission in some cases where chemotherapy had failed.

Goal: The goal of this study is to use molecular resonance imaging (MRI) as well as positron emission tomography (PET) to evaluate how immune cell migration and tumor progression changes in response to the addition of a checkpoint inhibitor (anti-PD-1) to a treatment regime that includes low dose chemotherapy, and a peptide-based immunotherapy in a humanized ovarian cancer mouse model.

Methods: Mice will be implanted with syngeneic mouse ovarian surface epithelial (MOSE) cells and were allowed to recover for a short period. Mice are then treated with the combination therapy and injected with superparamagnetic iron oxide labelled $CD8^+$ T cells and B cells (CD19+). We will then use MRI to track immune cell infiltration into tumors for 6 weeks starting day 28 post-implant. We already have UCLA approval for this study, and it is part of our return to research plan.

Expected differences: We hypothesize that anti-PD-1 will increase recruitment of CD8+ T cells and reduce recruitment of B cells to the tumor. We are also hypothesizing that it will improve tumor control. This will be measured by MRI data analysis and flow cytometry of tumor infiltrates and each mouse endpoint. The student will be assisting with surgeries when possible and will assist with all biological procedures as mice are terminated due to tumors. They will also carry out data analysis.

APPENDIX B – DISCUSSION BOARD GUIDELINES

The discussion boards are integral to your learning experience in SCIE 4901 & 4902. They will serve as a forum for commenting on the discussion topic, engaging in conversation with your peers, and asking questions based on the topic. You will be required to engage in the discussions for two different modules.

Please be clear and organized in your thoughts, be respectful of everyone in the discussion, be professional in your contributions, and please check your grammar and spelling. Your comments should be constructive and, if you feel there is a problem, be sure to include a possible resolution. Before you post, ensure you are saying exactly what you want to say. Avoid the use of ALL CAPS as it can be interpreted as shouting. Please be careful when using sarcasm or humour, as both may be misinterpreted in an online setting.

Participation will be monitored and will make up one-quarter of your overall class participation grade. You are expected to view the discussion boards daily, engage in the discussion with **three or more posts per module** and **initiate at least one thread** during the discussion period.

APPENDIX C – MINI PRESENTATION RUBRIC

Presenter:_____ **Date:**_____

Evaluator (B00# if Honours student, name if not): _____

Thoughtful, constructive feedback is valuable to everyone. Please give thought to how you rate each question and be sure to include helpful comments at the end. Keep in mind that you are going to be assessed on the quality, depth, and mechanics of the feedback (e.g., grammar, spelling, use of jargon, clarity). Refer to the rubric on Brightspace for more details.

Presentation Components	Score	Weight	Total score
Content/Knowledge of Material 1. Demonstrates appropriate knowledge and understanding of material and draws on relevant literature	/10	x 1.0	
2. Gives accurate and complete explanations of key concepts	/10	x 1.0	
3. Answers questions well	/10	X1.0	
Organization 3. Appropriate amount and level of content for time given and intended audience	/10	x 0.5	
4. Appropriate pace and time spent on sections; presented clearly, with good flow, and in an organized manner	/10	x 0.5	
Presentation Style & Communication 5. Effective use of visual materials (slides, fonts, images) and eye contact to engage audience; demonstrates confidence; appropriate tone and body language	/10	x 0.5	
		Final score (/45)	

Comments:

APPENDIX D – GUIDELINES FOR PEER EVALUATION

As part of your class participation, you will be asked to evaluate your peers during their mini-presentation. This is an opportunity for you to provide effective feedback so that they can improve their presentation skills. And remember, they will be evaluating you, too!

When you are assessing the work of others, please consider the following:

Quality of feedback: Comments should be appropriate, thoughtful, reflective, & respectful. Do not offer a score without comments.

Depth of feedback: Specify areas of excellence in addition to those needing improvement and include suggestions to help improve. A comment like "Good job" or "I liked it" is not enough. Also, avoid giving everyone the same feedback.

Mechanics: Ensure your comments are error-free in grammar and spelling, are legible, do not use jargon, and provide clear feedback.

Questions: You are expected to ask at least one question of any presenter on the day you evaluate

APPENDIX E – MEDICAL SCIENCES INTERIM REPORT GUIDELINES & EVALUATION

Overview

The Interim Report is due on the last day of classes in the Fall term (the outline is due two weeks before). The purpose of this report is to demonstrate that you understand the literature related to the Honours research. Rather than extensively discussing experimentation and data (since your results to this point are unlikely to make a complete story), the emphasis is placed on **background** material and providing a **rationale** for your project. As such, it serves as a mini literature review, upon which you will expand for the Introduction section of your final thesis. One page of references is sufficient at this stage.

Outline

The interim report outline is one page only. I have provided you with an outline below, under the Format section, so you can use this as a template and just input information relevant to your project. Subsections within each of the listed sections below will be useful for you when it comes to putting your information together. This is especially true for the *Introduction* and the *Methods* sections.

Format

General:

The report should be written in a similar format to a peer-reviewed paper in your field of study. Font should be **12-point**, **1.5-spaced** (except for references, which will be 1.0-spaced), **2.5cm margins**. Please do not use jargon or slang; be concise. Total number of pages of **text** should be about 10 pages (excluding figures and references).

Sections:

Title page – Include your name, B00#, course number and name, the name of your supervisor, date, and the title of your study. Ensure the title is informative but not extensive.

Table of Contents (TOC) – You can use the "References" tab in Word. TOC page numbers are typically Roman numerals, so you can use this link for guidelines on how to use different numbering in the same document: https://bit.ly/2LmXCQ9.

List of Figures/Tables/Schemata – Your report should list at least **one** figure/graphic, highlighting your results so far. Just include the title and page number; a full description is not required, nor are the figures/tables/schemata themselves included in the list (those will appear in the body of your work). If no results are available, include a figure on proposed workflow or in the Methods section instead (more information is below in the preliminary results section).

List of Abbreviations – Your list of abbreviations (with definitions) should be **alphabetical** and defined again when first used in the document (including in the abstract, methods, and figure legends).

Introduction (3-5pages) – This section is probably the most important at this stage, as it will cover relevant **background** material and provide a **rationale** for your project; this section will include most of your references (your cited material); it will also include your **research question/hypothesis** (*For more information on "Research Question versus Hypothesis": see https://cirt.gcu.edu/research/developmentresources/research_ready/quantresearch/question_hypoth)*

Methods (approx. 3 pages) - This section details the specific techniques you used to generate the data* described within the report or methods that you may use in future data collection for this project. If you describe more than one method, use subheadings – one for each method. The methods are not conversational accounts of what you did on the project. Be sure to write in the third person using past tense and passive voice. (*Although often numeric, **data** can refer to any unit of information collected in your study.)

Use clear and precise descriptions of how experimentation or data collection was done, and the rationale for why specific procedures were chosen. The methods section should describe what was done to answer the research question, describe how it was done, justify the experimental design, and explain how the results were analyzed. This section should describe any materials used in the study and how they were prepared, describe the research protocol, explain how analysis was performed, including measurements and calculations, and state which statistical tests were used (if applicable). Note where materials were purchased throughout the method, if applicable. Do so chronologically and use sub-sections, if necessary. References should be used where needed and listed at the end.

The best example for your guidance will be a recent publication from your supervisor's research group, so do not be afraid to ask for an example. See also (posted on Brightspace):
Kallet, R. H. How to write the methods section of a research paper. Respir Care. 2004 Oct;49(10):1229-32.

Preliminary Results/Figure(s) (1-2 pages)- The purpose of this section is to practice making and formatting one figure, its title, and its legend. Create a figure from your original data. If no results are available, include a figure on the background section, on workflow, or in the Methods section instead. If you use information from someone else's work to create your figure, make sure you reference it, and say "Adapted from… ". Figures do not need to be high resolution or publication quality, but they cannot be pixelated, fuzzy, or difficult to read when you print them. Include a title, which represents the major conclusion of that figure. Write a figure legend that describes how you obtained the data in the figure in general terms. Leave specific details for the methods section. Make sure to define all abbreviations. Have each figure, table, or schemata (with its legend) on a separate page, but interspersed in the body, rather than all figures at the

end. Because this requirement is for practice purposes, it will not be graded for this report. See below an example of a well-crafted figure and legend.

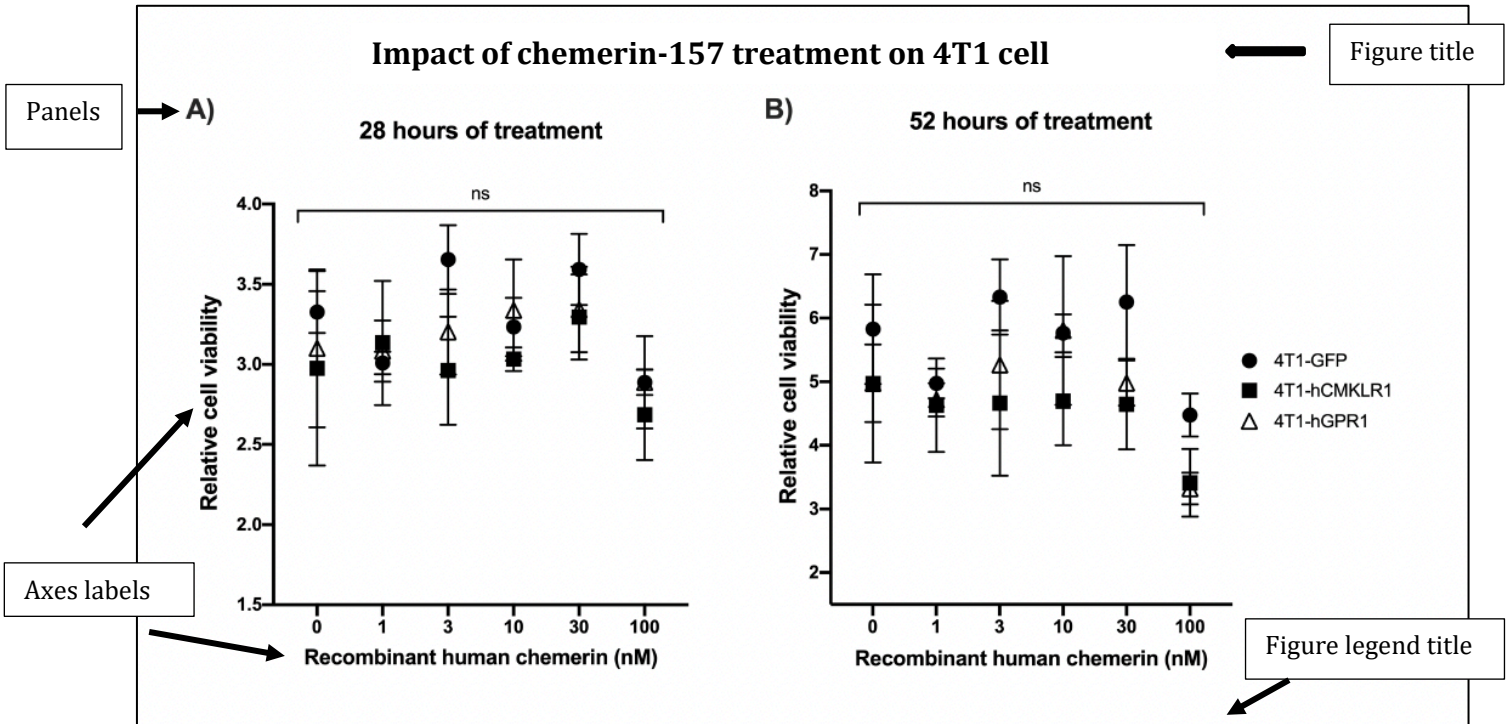

Figure 6. No change in proliferation of 4T1 cells after treatment with recombinant chemerin-157. 4T1-hCMKLR1 and 4T1-hGPR1 with 4T1-GFP included as a control, were plated in 96 well plates at 4,000 cells per well. After 20 hours, the corresponding treatment groups were treated with either 0, 1, 3, 10, 30 or 100 nM of recombinant human chemerin-157 diluted in Opti-MEM. An MTT assay was performed on the cells at 4 hours, A) 28 hours and B) 52 hours after treatment and the absorbance values were normalized to absorbance at the 4 hour time point. All values are represented as mean±SE, n=3, ns=no statistical significance.

Discussion – If you have acquired preliminary results, it is recommended that you discuss what the results mean and how they may direct your future study. If you have had difficulty with data collection or analysis to date, you can suggest causes and ways to resolve the issue. This is good practice for your thesis-writing, but you will not be graded on this section.

References - references should be cited in a standard journal format; use the style of references most common in your field of study (i.e., the reference style of the journal in which your research group most frequently publishes).

Submission

You will be required to provide **one** copy of your report to the Honours Coordinator by **5pm** on the deadline provided by uploading it to the appropriate Brightspace folder. The supervisor should review the report at least once before submission, so **please ensure there is enough time for your supervisor to provide feedback before the final copy is submitted**. The report will make up 15% of your grade in the course and will be graded by your supervisor.

INTERIM REPORT GRADING RUBRIC

	Grade
Introduction (3-5 pages): The Introduction need not be an exhaustive literature review. It should serve to introduce the aspects of the scientific field that are central to the research and to familiarize a non-expert scientist with concepts that are crucial to understanding your research. It identifies the gaps, problems, and issues unresolved by the literature (i.e., provides the reader with a sense of what work has already been done and what needs to be done going forward). It leads to the project's rationale (usually at the end of this section) and transitions to the next section of the proposal.	/15
Research Question/Hypothesis*: This should be explicit, testable, and non-trivial.	/5
Methods (3 pages, excl. figures): The methods section should clearly describe the specific design of the study and provide a clear and concise description of the procedures that were performed. The purpose of sufficient detail in the methods section is so that an appropriately trained person would be able to replicate the work. Methods are concise & complete, appropriately referenced, and demonstrate understanding of the content and tools of the field.	/10
References: Sources and citations should be used correctly. The style of references is the most common in the field of study (i.e., the reference style of the journal in which the research group most frequently publishes).	/6
Clarity of writing and writing technique: The document is clearly organized, and the writing is crisp, clear, and succinct. The writing is appropriate for the target audience. No spelling, grammar, or punctuation errors are made.	/5
Formatting: The page is set up correctly, with 2.5cm margins, page numbering, and 1.5 line spacing. All sections are included.	/4
TOTAL	/45

**For more information on "Research Question versus Hypothesis": see https://cirt.gcu.edu/research/developmentresources/research_ready/quantresearch/question_hypoth*

Comments (Evaluate the student's grasp of the literature. Provide feedback and make suggestions for change, but please do not make the changes yourself):

_____

Supervisor's Name (Please print)

_____ _____

Suggested Final Thesis Reader #1 Suggested Final Thesis Reader #2

(Please print name & include department for both and ensure they have agreed to participate)

APPENDIX F – SYMPOSIUM PRESENTATION EVALUATION FORM

Please complete the following form and return it to the Honours Coordinator immediately after the presentations. Please provide thoughtful comments that will benefit the student.

STUDENT: _____ PLATFORM or POSTER (circle)

MARKER: _____

Item	Comments	Grade
Content: • The material integrates and synthesizes different sources of literature to present a coherent background & rationale. • The content is clear and concise, highlighting the key elements of the project. • The student provides a summary of the project to conclude the presentation.		/20
Knowledge: • The student understands the purpose of the project. • The student critically & logically analyzes the results. • The questions are well-answered.		/20
Design & Organization: • The presentation is clearly and logically organized. • The presentation is visually appealing and uses appropriate headings, bullet points, and graphics to convey information effectively. • The presentation uses language that is appropriate for the intended audience. • The presentation is free of errors in grammar, punctuation, and spelling.		/15
Presentation Style: • The presenter delivers a clear and engaging presentation that effectively summarizes the project. • The presenter uses appropriate body language, eye contact, and tone of voice to engage the audience/judges.		/5
	TOTAL	/60

General Comments & Suggestions for Improvement:

APPENDIX G – MEDICAL SCIENCES HONOURS THESIS GUIDELINES & EVALUATION

Overview

The thesis is due on the last day of classes of the Winter term. This is the culmination of your hard work over the past year. Time and care should be taken to produce a polished, well-written report that demonstrates an understanding of the literature, the purpose of the project, the conclusions reached from your investigation, and how this may influence further research in this area of study.

Information and feedback from the Interim Report can be used to help write the thesis. The supervisor's comments should help you achieve a better scientific writing style, as well as focus the report so that it reads clearly and concisely.

Format

General:
Your final thesis is written in the same format as your interim report, only longer. Your thesis will require a more detailed Methods section than typically seen in a peer-reviewed journal article. For example, you cannot use "as previously described" to explain how testing was done. We would advise you to look at past Honours theses from your research group to get a feel for how it is written.

The report should be written in technical language appropriate for your field of study, but that which is accessible to non-experts in the field (the supervisor and one other reader will evaluate the thesis, so the Introduction should provide enough background to familiarize any reader with the material – see more information below in *Writing Tips*). All abbreviations/symbols should be defined on first mention (including in the methods and figure legends). Avoid the use of jargon or slang and be concise.

The body of the thesis (which includes the Introduction, Methods, Results, and Discussion) should be about 15-20 pages (1.5-spaced), excluding figures, tables, references (1.0-spaced), and appendices. Please use 12-point font and 2.5cm margins all around. Make sure to number the pages.

For guidance on writing style, you may refer to:
Northey, M, von Aderkas, P. Making Sense, Life Sciences: A Student's Guide to Research and Writing. Ontario. Oxford University Press; 2011.

Sections:
Title page – Include your name, B00#, course number and name, the name of your supervisor, date, and the title of your study. Ensure the title is informative but not extensive.

Table of Contents – You can use the "References" tab in Word. TOC page numbers are typically Roman numerals, so you can use this link for guidelines on how to use different numbering in the same document: https://bit.ly/2LmXCQ9.

List of Figures/Tables/Schemata – Your report should list your figures/graphics, highlighting your results (i.e., not every result acquired needs to be included in the thesis). Just include the title and page number; a full description is not required, nor are the figures/tables/schemata themselves included in the list (those will appear in the body of your work).

List of Abbreviations – Your list of abbreviations (with definitions) should be alphabetical and defined again when first used in the document (including in the abstract, methods, and figure legends).

Abstract – This is a short, concise summary of the important points of the report (250-300 words). It will introduce the background, and the problem to be addressed, and provide results and conclusions. No reference should be made to any part of the report (Including abbreviations); the abstract is a stand-alone paragraph. Do not use citations in the abstract. Write this section last, as it is often the most difficult part of the report to write.

Acknowledgments - It is appropriate to acknowledge, in addition to the supervisor, any intellectual and practical assistance, advice, encouragement, and sources of monetary support that contributed to the successful completion of the thesis.

Introduction - This will not be an exhaustive literature review; the point of this section is to introduce the reader to aspects of the scientific field pertinent to the project while familiarizing a non-expert scientist with concepts crucial to understanding the research. The reader should get a sense of what work has already been done and what needs to be done going forward. The introduction must also include a rationale for the work. Goals, objectives, and/or hypotheses should be explicit.

Methods - Describe all methods used for the project, including those published methods requiring references. If new methods are created, these must be described in a way that allows others to repeat the testing. If more than one method is described, use subheadings – one for each method. The methods are not conversational accounts of what was done on the project. Be sure to write in the third person using past tense and passive voice.

Use clear and precise descriptions of how experimentation or data collection was done and the rationale for why specific procedures were chosen. The methods section should describe what was done to answer the research question, describe how it was done, justify the experimental design, and explain how the results were analyzed. This section should describe any materials used in the study and how they were prepared, describe the research protocol, explain how the analysis was performed, including measurements

and calculations, and state which statistical tests were used (if applicable). Note where materials were purchased throughout the method, if applicable. Do so chronologically (i.e., the order in which they were used in the study) and use sub-sections, if necessary. References should be used where needed and listed at the end.

Results - There should be a natural flow from one test or subject to the next. The use of subheadings is encouraged in this section. In each subsection, introduce the rationale for the testing, briefly describe what was done, and refer to the appropriate figure/table/schema that reveals the data. Figures, tables, and schemata should be interspersed with the results (i.e., not at the end of the report), but each should be on a separate page and include a figure/table/schemata legend.

Discussion - Discuss the significance of the data in the context of existing published literature and indicate the next steps forward. If there has been difficulty with data collection or the techniques used, try to identify the cause(s) and suggest ways to resolve these issues. Include citations of relevant literature in this section to support the discussion.

References – References should be cited in a standard journal format; use the style of references most common in your field of study (i.e., the reference style of the journal in which the research group most frequently publishes). An electronic reference manager is recommended, and this would be an ideal opportunity to learn if you have not previously used such a reference tool. Programs such as Refworks (or Bookends, Papers, Endnote) allow you to acquire references from online sources and insert the reference into your Word file as you write. When your report is complete, these programs will then format your Word document so that each reference is formatted, and the accompanying reference list is automatically generated in whatever format you specify. Refworks is available for free to all university students via the library.

Appendices (if applicable)- reserved for supplemental information (buffer solutions, computer programming code, surveys, models, etc.). The supervisor can provide advice on appropriate content.

Artificial Intelligence – REMEMBER: You are not to use AI to write your preliminary report or thesis.

Submission

A draft of the thesis should be given to the supervisor in a timely manner (at least 10 days before the due date) so that constructive criticism for improvement can be provided. Remember, this is worth **40%** of your grade, so you do not want it to be rushed. It is not the supervisor's job to write the thesis so the draft submitted should be in good shape and not a version that needs to be polished dramatically. The supervisor should not edit the work, just provide feedback.

A PDF copy of the thesis is to be submitted to the Honours Coordinator via the appropriate Brightspace assignment folder by **5pm** on the designated due date. The final product will be marked by the supervisor and by one additional reader. The thesis grading rubric is found on the next page.

HONOURS THESIS GRADING RUBRIC

STUDENT: _____
SUPERVISOR: _____
GRADED BY: _____

Item	Comments	Grade
Formatting: margins 2.5cm around, 1.5-spacing, numbered pages, spelling, grammar, punctuation		/4
Sections Present: Title Page, Table of Contents, List of Figures, List of Abbreviations, Abstract, Acknowledgements, Introduction, Methods, Results (incl. figs on separate pages), Discussion, References		/2
Abstract: 250-300 words; background, problem to be addressed, highlighted results, conclusions		/4
Introduction: appropriate material; logical; refs cited; accessible to non-experts; quality writing; unique question identified, with rationale; goals/objectives/hypotheses		/20
Methods: concise & complete; demonstrated understanding of content and tools in field		/5
Results: well-organized; good flow; original figures, labeled clearly, neatly, & with legible font; figures referenced in text; correct info in figure legends (not repetitive); quantitative or qualitative tools used appropriately		/30
Discussion: appropriate material included; logical; refs cited; quality writing; significance of work incl.; independent and critical thought		/30
References: sources and citations used and formatted correctly		/5
	TOTAL	/100

Writing Tips

1. Know your audience

For the purposes of the final thesis, it should be assumed that the audience is technically competent in the general field but is a newcomer to the specific areas of application discussed in the report. Therefore, any special terms, abbreviations or symbols should be clearly defined. Also, be sure to include sufficient background material to allow the reader to orient themselves with respect to the topics and issues being discussed. Remember, you are writing for the reader.

2. Avoid the last-minute rush

Invariably, a last-minute effort shows in the report and will affect the evaluation. Begin preparing the thesis as early as the Fall term, where you can be writing your methods as you go, as well as creating figures for your results as you collect them. This is where the Interim Report will come in handy. And remember that references always take longer than you think, which is why a reference program is very beneficial (see above in "References" section). Finally, allow plenty of time for your supervisor to review and provide feedback (Remember: they have very busy schedules as well).

3. Review and revise

Take time to reread what has been written, correct spelling errors, improve the grammar and punctuation, substitute better words when appropriate, and rewrite portions of the thesis prior to submitting the draft to your supervisor. Repeat this revision process after receiving comments from your supervisor in preparation for the final deadline. Employing the "reverse outlining" method is recommended (http://dal.ca.libguides.com/c.php?g=257176&p=1718021).

4. Obtain constructive criticism from your supervisor and others

Having your thesis read and understood by another person is the real test of your effective communication. Have a friend read it and comment on what the thesis says or does not say. Since the report deals with some aspects of your supervisor's operation, they must be asked to read it and comment upon all the technical aspects of it. This allows the supervisor to verify confidentiality, accuracy, and technical content, and should also provide additional useful feedback (but they must not directly edit your report). Remember that your supervisor will have other deadlines, so please have them consult their schedule well in advance. Also, Dal's Writing Centre provides free writing services to help you become proficient in writing. Use their services early in the year.

5. The style and presentation of the report are important

The report itself must be written to inform and not to impress. The language should be simple and direct. Being concise and to the point is important. The reader's time should be saved by cutting out unnecessary words and sentences, but care must be taken not to sacrifice clarity and precision.

6. Sentences must be clear and clearly connected

Each paragraph must be a unit and the break between paragraphs should not separate points that ought to be together. Write directly, without excessive words. Avoid jargon. Avoid padding and trivialities because they can cloud the main points of arguments. Be

careful of misusing words and do not rely on your word processor program for punctuation and spelling. Use of personal pronouns and possessive tense should be avoided.

For example: “I ran a series of tests on the temperature of the water and found...” should be replaced by “Measurement of the water temperature indicated...”. “The cells’ fluorescence was monitored…” should be replaced by “Fluorescence of the cells…”

7. The copying of previously produced material without reference is PLAGIARISM: this is unethical and unacceptable

Quotes must be so indicated by giving all the information about the source, i.e., author's name, title and date of publication, chapter, and pages as a reference. A reference must also be provided for any figure included in the thesis that was not created by the author, and also if the figure has been based on that created by someone else even though the author may have made their own version of it. In the latter case, the citation should indicate that the Figure was “adapted from” and then the reference provided. When in doubt, ask

APPENDIX H – MEDICAL SCIENCES SUPERVISOR'S EVALUATION OF STUDENT

STUDENT: _____

SUPERVISOR: _____

Part I. Please answer questions 1-8 using the following rating scale:

1 – Poor 2 – Satisfactory 3 – Good 4 – Very Good 5 – Excellent

This form will be completed twice: once at the end of the Fall term (worth 5%) and once at the end of the Winter term (15%). Remember that these ratings will be converted into 20% of the student's final grade. Therefore, if you give the student 3/5 on each question, they will receive 24/40 or 60% on their performance. Please rate accordingly. Partial marks are acceptable. Feel free to include comments, as necessary. This form will be handed back to the student, so constructive feedback is encouraged.

Item	Comments	Score
Motivation: Was the student interested in the research work? Enthusiastic? Did the student take pride in completing tasks well?		
Initiative: Does the student initiate work independently when capable? Does the student ask questions or seek help when appropriate? Does the student ask for additional work?		
Attitude: Does the student have a positive attitude about the work at the research site? Does the student work well with other members of your research group?		
Quality of Research Work: Are research techniques successfully performed by the student?		
Ability to Learn: Did the student's quality of work improve over the course of the term? Does the student learn from their mistakes?		
Application of Knowledge: Does the student bring an understanding of some of the relevant background material from their classes? Can the student apply this knowledge to research-related activities		
Planning and Time Management: Does the student allocate enough time to complete technical procedures?		
Dependability. Does the student show up on time? Does the student stay until the task is complete? Does the student adapt to the direct supervisor's schedule if necessary?		
	TOTAL SCORE	

Part II. Please answer the following questions with comments only. These comments will help me interpret the ratings from questions 1-8.

1. What do you feel this student did well at your research site? At what did they excel?

2. How could this student improve?

_____ _____

Supervisor Signature Date

APPENDIX I – HONOURS ABSTRACT FORM

Annual Medical Sciences Symposium

STUDENT'S NAME: _____

SUPERVISOR'S NAME: _____

Supervisor's Availability on Apr. 8 _____

Preferred presentation type: ☐ Platform presentation ☐ Poster presentation

Template for abstract (250-300 words):

Acute Effects of Mechanical Stimulation on the Stiffness of Cardiac Cells

Background: The heart's mechanical properties are altered by mechanical stimuli, and thus susceptible to changes in the mechanical environment. Chronically, environmental changes are known to alter physical properties of cardiac tissue, which affects its mechanical performance. For instance, a chronic increase in intracardiac pressure generally results in myocardial stiffening, which can lead to heart failure. Acute changes in cardiac mechanics, on the other hand, are known to feedback on the heart's electrical activity, which can lead to deadly arrhythmias. Yet, whether these changes occur with acute mechanical stimulation is unknown. The aim of this study was to investigate the effects of acute mechanical stimulation on cardiac cell stiffness. It was hypothesized that repetitive mechanical stimulation would result in an acute increase.

Methods: A method was developed for measuring the stiffness of single myocytes isolated from the left ventricle of New Zealand white rabbits. This involved the use of specialized carbon-fibres that adhere to the cell surface, coupled to a custom piezo-electric micrometer position system, for controlled stretch of single cells. By stepwise stretch and calculation of applied force, this technique allowed for measurement of the force-length relationship in contracting cells, which is representative of cell stiffness.

Results: To validate the ability of our system to measure acute changes in cell stiffness, force-length relationships of control cells and those exposed to 10µm paclitaxel (causing microtubule hyperpolarization) were measured, which showed an increase in stiffness in paclitaxel treated cells. When cells were instead subjected to 1min of repetitive mechanical stimulation by cyclic stretch, however, no change in stiffness was observed.

Conclusions: Our carbon-fibre based system allows for the measurement of stiffness in single isolated cardiac cells, however it appears that repetitive mechanical stimulation has no acute effect on cell stiffness.