PHM389H1 Research Project

July 20, 2020

DESCRIPTION

This elective course is designed to introduce pharmacy students to the philosophy, methodology and performance of research in scientific fields offered by faculty members who hold SGS appointments in the ***Graduate Department of Pharmaceutical Sciences***. Thus fields of study are wide ranging and may include as examples: bioethics, clinical pharmacy, drug delivery, drug metabolism, drug policy, drug safety, global health and corruption, health services research, medicinal chemistry, pharmaceutical diagnostics and imaging, neuroscience, pharmaceutics, pharmacoeconomics, pharmacoepidemiology, pharmacokinetics, pharmacology, pharmacy administration, radiopharmacy, receptor biology, therapeutics, toxicology.

Research methods across the fields of pharmaceutical sciences are broad ranging and may include, as examples: cohort studies, case-control studies, chart review, clinical studies, costing studies, cross-sectional studis, documentary data analysis, drug utilization studies, experimentation in the lab, focus groups, time series analysis, interviews, literature synthesis*, qualitative methods, self-controlled studies, survey methods.

**All types of systematic literature synthesis are eligible, e.g., scoping review, meta-analysis, network meta-analysis. However, a traditional narrative review that does not include replicable study methods (e.g., databases and search terms identified as well as study flow of results) are not eligible for this course. Regardless of the type of research, all students are required to review pertinent scientific literature to inform the background, rationale and discussion.*

Course Coordinator:

Suzanne Cadarette, PhD
s.cadarette@utoronto.ca*
416-978-2993
PB 602 (first office left off the main elevators on the 6th floor)

if sending email to the course coordinator, please include PHM389 in the subject heading

APPLICATION AND ENROLMENT PROCEDURES

If the professor agrees to supervise the student research project, the **Research Project - Supervisor Form** (see Appendix), must be completed and **submitted to the course coordinator by the end of the first week of the term**. The Course Coordinator for PHM389H1 must also sign this form. Submission of the **Research Project – Supervisor Form** does not in itself complete your registration in the course. You must also complete a course add form with Linda Chung (room 424, l.chung@utoronto.ca) by the end of the second week in the term.

RESPONSIBILITIES OF THE STUDENT

1. Identify a Supervisor

- Students may identify a supervisor from among the faculty members with an unrestricted School of Graduate Studies (SGS) appointment with the Graduate Department of Pharmaceutical Sciences, i.e., at a minimum level to serve as sole supervisor for MSc students.
  https://pharmacy.utoronto.ca/programs-and-admissions/gradprograms/graduate-faculty/
- Students are encouraged to meet with several professors to discuss potential research projects. The decision to enroll in the course is a joint decision of the student and faculty member.
- Faculty members can supervise a maximum of 2 students (primary or co-supervisor) per term.

NB: The sooner you reach out to potential faculty members, the better. Each faculty member is only permitted to supervise (or co-supervise) a maximum of two students per term. In fact, students typically reach out and secure a supervisor one or two terms before enrolment in the course.

2. Course Enrolment

- Once a supervisor is secured, students are required to complete the course enrolment form with their supervisor and submit to the course coordinator by the end of the first week of the term.
  NB: Ethics approval is required BEFORE course approval by the course coordinator
- Once course enrolment is approved, students are required to complete and submit a course add form to Linda Chung (room 424, l.chung@utoronto.ca) before the end of the second week of the term.

3. Course Orientation

All students are expected to attend the course orientation (typically 2nd week of the term). Please contact the course coordinator if there is an unavoidable conflict.

4. Write and Submit Proposal

Students will submit a preliminary report/protocol by the third week of the term that outlines the background and rationale, the type of question(s) or hypotheses asked, methods, significance and feasibility of the project.

- Max: 3 double-spaced, typed pages (Times New Roman, 12-point font), exclusive of references, tables and figures (tables and figures may be appended to support the protocol report). References are imperative.

5. Meet with Course Coordinator

Students will meet with the course coordinator (typically in the 4th week of the term) to discuss their research project, including feasibility.

6. Execution of Project

Depending on the project and supervisor, the research may be completed in a number of settings, e.g., laboratory or office at the Faculty, hospital, community pharmacy or pharmaceutical company.

Students are expected to spend a minimum of 78 hours on the course project. This typically includes:

- searching for, reading, and critically appraising pertinent literature;
- preparing a detailed proposal to guide the project;
- execution of a research project (e.g., data collection, analysis); and
- communication of research findings (oral presentation and paper).

The actual time distribution will be flexible and determined by the nature of the research conditions and any timetable conflicts.

7. Complete and submit mid-term report

Students will meet with their supervisor(s) to discuss progress for the mid-term assessment, and submit the **PHM389H1 Research Project Mid-term Review Form** through Quercus by the deadline.

- The purpose of this assessment is to identify any deficiencies or problems at the mid-point, determine if the project is progressing well, and identify changes as needed to support student success in the course.

8. Complete and submit final report

- Prepare a final, double-spaced, type-written (Times New Roman, 12-point font) report of maximum 3500 words, excluding abstract, references, tables and figures. The report must follow the format of a scientific journal with sections on Introduction, Materials and Methods, Results, Discussion, Acknowledgement, Citations or References, Tables and Figures.
- Please see Appendix for detail and Template in Quercus.

9. Presentation

- Present their research in a 10-minute "PowerPoint" presentation with an additional 5-minute question and answer period. This will be scheduled at the end of the fall or winter term.

SUPERVISOR(S)' RESPONSIBILITIES:

1. define the research project (*topic must be different from prior PHM389/399 projects*);
2. complete the course enrolment form with the student;
3. ensure progress of the student through guidance and encouragement;
4. provide resources and support for conduct of the project;
5. stimulate and evaluate the student in the laboratory (or other relevant setting) on their aptitude to think and learn;
6. oversee the progress of the student and meet with the student at mid-term to document progress;
7. ensure successful write-up of the project for submission of a grade; and
8. grade the final report.

COURSE COORDINATOR'S RESPONSIBILITIES:

1. oversee project students*;
2. approve enrolment in the course;
3. remind supervisors of course requirements and deadlines throughout the term;
4. meet with each student to discuss their proposal and assign a grade;
5. review mid-term reports and identify potential issues for remedy;
6. reach-out to students and supervisor(s) with any concerns (e.g., progress in the course)
7. coordinate presentations and assign a grade;
8. secure a secondary reviewer to evaluate the final report; and
9. assign the final grade.

**if the course coordinator also supervises the student, the Director or one of the Graduate Field Coordinators in the Graduate Department of Pharmaceutical Sciences will serve these roles.*

SUMMARY OF COURSE REQUIREMENTS

Course orientation	No grade, yet required
Proposal (write-up and meeting with course coordinator)	10%
Mid-term review	No grade, yet required
Presentation	10%
Research paper • Supervisor, 54% • Secondary reviewer, 26%	80%

Forms and rubrics are included in the Appendix and will be available through Quercus.

PHM389H1 Research Project – 2020/21 Deadlines

	2020 Fall Term	2021 Winter Term
Submit Supervisor Form to Course Coordinator	September 11 (1st week of term)	January 8 (1st week of term)
Safety course	September 11 on-line, *contact Graduate Department for detail*	January TBD*
Course Orientation**	September TBD* (2nd week of term)	January TBD* (2nd week of term)
Once approved, submit Course Add Form to Linda Chung (room 424)	September 18 (2nd week of term)	January 12 (2nd week of term)
Submit 3-page proposal in Quercus***	September 25 (3rd week of term)	January 22 (3rd week of term)
Meeting with Course Coordinator – sign-up in Quercus	Typically 4th week in term (see Quercus for options)	Typically 4th week in term (see Quercus for options)
Submit Mid-term Review Form *through Quercus*	October 23	February 19
Submit final report to • Supervisor, and • Quercus***	December 2	April 5
Presentation of work • 10 minute presentation • 5 minute questions and answer period	TBD*, likely week of December 7	TBD*, likely week of April 5

* TBD=to be determined, dates will be posted in Quercus once known

** ALL students that enrol in the course are expected to have attended the course orientation. Please contact the course coordinator if there is an unavoidable conflict.

*** LATE PENALTY: Students who fail to submit graded assignments by the specified due date and time will receive a deduction of 5% for each day beyond the due date (including weekends/holidays).

Appendix - Supplemental Material*

1. Forms
    - Supervisor Agreement Form
    - Mid-term Review Form
2. Evaluation
    - Proposal and Coordinator Meeting
    - Final Paper
    - Presentation
3. Guidance Material
    - Final Report Template

**Word version of forms and templates are available in Quercus*

PHM389H1 RESEARCH PROJECT – SUPERVISOR FORM

Submit to Course Coordinator (email – include PHM389 in subject heading) by deadline, *NB:*

- Max 2 students per supervisor (primary or co-supervisor) per term
- Ethics approval must be granted BEFORE course enrolment can be approved
- Only faculty members with an unrestricted School of Graduate Studies (SGS) appointment in the Graduate Department of Pharmaceutical Sciences can supervise students in this course.

TO BE COMPLETED BY THE STUDENT (all fields MUST be completed):

_____
Surname | Given Names (as on ACORN)

_____
Student Number | Telephone Number

_____
U of T E-mail Address

_____
Proposed Research Topic Title

_____
Date | Student's Signature

TO BE COMPLETED BY THE SUPERVISOR(S)

Please check to confirm you are eligible to serve as PHM389 supervisor:

❑ I have an SGS appointment in the Graduate Department of Pharmaceutical Sciences that permits at minimum sole supervision of MSc students*, **and:**

- ❑ I have supervised or co-supervised PHM389 students in the past; or
- ❑ course coordinator has approved sole supervision despite no prior experience with PHM389*

**course coordinator to confirm*

❑ I approve supervision of this student, **and:**

- ❑ ethics approval has been granted for the student project, detail:_____
- ❑ I select this student as one of my maximum two students per term as primary or co-supervisor

_____
Date | Supervisor Name (Please print) | Supervisor Signature

_____
Date | Co-supervisor Name (Please print) | Co-supervisor Signature

TO BE COMPLETED BY THE COURSE COORDINATOR:

❑ I approve this student's enrolment in PHM389H1 with above supervisor(s)

_____
Date | Course Coordinator's Signature

PHM389H1 RESEARCH PROJECT – MID-TERM REVIEW FORM

Students to upload in Quercus by the deadline

Student Name: _____

Supervisor Name(s): _____

Meeting Date: _____

1. **Brief summary of progress (describe accomplishments during the first half of the course):**

2. **Are there any problems or difficulties you foresee in completing the project?**

3. **Goals for the remainder of the project course:**

4. **Strengths:**

5. **Areas for improvement:**

Mid-point evaluation of student performance by supervisor (please circle ONE)

Excellent Very Good Good Adequate Marginal Inadequate

For feedback only, no marks

Signatures

Supervisor(s):_____Student:_____

Date:_____

PHM389 - Grading Structure for Proposal and Meeting with Course Coordinator
10% of final grade

Components	Grade Distribution
	Marks
Written	*10*
Background/Rationale (identification of problem) • *Supported by well-referenced peer-reviewed literature*	2
Objectives (what you will accomplish) • *Clear, logical (based on background/rationale), measurable* • *Hypotheses (if applicable)*	1
Methods – Design and rationale (how data collected) • *State the study design (e.g., RCT, cohort, cross-sectional, time series)* • *Identify data sources and/or data collection instruments/ methods* • *Clear, logical (rationale provided), measurable, replicable* • *Sample size or power considerations (if applicable)* • *Supported by well-referenced peer-reviewed literature, e.g., validity of data sources or rationale for variable coding/categorization – use tables if space is limited (include as appendix)*	3
Methods - Data analysis (how summarize/analyze data) • *Clear, specific, appropriate, replicable* • *Includes mock tables or figures*	2
Ethical considerations, feasibility and timeline • *Includes statement about ethical considerations (e.g., indicates ethics approval with project number)* • *Includes timeline demonstrating feasibility* • *Identifies possible feasibility issues and contingency plans*	2
Formatting, flow, style, grammar *Did student follow formatting guidelines, e.g., title page, max 3 pages in main text, Times New Roman 12 point font, 1 inch margins, includes peer-reviewed references,* max 10 pages supplemental including references* *+ readability, flow and grammar.*	Up to -5
Oral	*10*
Clearly summarizes background and rationale	2
Clearly articulates objectives/purpose + hypotheses (if applicable)	1
Clearly describes (and defends) methods for data collection and analysis with rationale	2
Clearly discusses ethical considerations, feasibility and timeline	1
Clearly articulates strengths and limitations	1
General ability to respond to questions	3
Total	20

**will lose 10% of grade (-2/20) if does not adhere to format requirements.*

PHM389 - Grading Structure for Final Paper

80% of final grade

Components	Grade Distribution	
	Supervisor	**Second Reader**
Industry (carefulness, time, punctual), **Originality and Creativity** • *Assess student initiative, industry, problem-solving skills, responsiveness to suggestions, attention to detail, comprehension, originality and creativity*	20	n/a
Background/Rationale (identification of problem) • *Assess thoroughness of literature review and rationale*	10	10
Methods / **Data Analysis** (quality and depth of work) • *Assess whether student has adequately described the methods with support from the literature (e.g. validity, rationale for sample size calculation)*	10	10
Results • *Assess whether student has presented and summarized the results in a suitable way*	10	10
Discussion (critical evaluation, interpretation) • *Assess student's critical evaluation, interpretation and how they fit results into the context of the existing literature* • *Assess discussion of study strengths, limitations and future directions*	10	10
Write-up • *Assess paper flow, style, grammar* *(NB: supervisors please consider how well student follows your guidance)*	10	10
Total	70 x 54%	50 x 26%

Students who fail to submit the final report by the specified due date will receive a deduction of 5% for each day beyond the due date (including weekends/holidays). If a student does not adhere to the formatting guidelines, they will be requested to revise and resubmit; facing any late penalty for the revision based on the final submission date of the paper that follows formatting guidelines.

PHM389 - Grading Structure for Presentations

10% of final grade

	Marks
Content, e.g., *Background, study rationale…* *Methods* *Results* *Discussion, significance, future…*	10
"written" - quality of slides	2.5
"oral" - clarity, enthusiasm…	2.5
Question and Answer	5
Total	20x10%

PHM389H1 RESEARCH PROJECT – FINAL PAPER TEMPLATE

Format Requirements:

- Times New Roman, 12 point font
- Double-spaced
- 1 inch margins
- Page numbers
- Acronyms
    - Use sparingly or not at all
    - Define acronym upon first use in the main text (and abstract if applicable)
- Structured abstract of maximum 300 words
- Maximum 3500 words in **main text** (excludes title page, abstract, references, tables/figures, appendices)
- Maximum 10 pages of supplemental material, including references, tables, figures.

The report must follow the format of a scientific journal – below includes some guidance.

Title Page

Title

Student Name: xxxxx xxxxxx

Supervisor Name(s): xxxxx xxxxxx, xxxxx xxxxxx

Manuscript word count: xxxx (Max 3500, excludes title page, abstract, references, tables/figures, appendices)
Number of figures: x
Number of tables: x
Number of references: xx

Funding Sources: *if none, indicate: unfunded research*

Suggested Secondary Reviewers*

1. xxxxxxxxxxxxxxxxxxx
2. xxxxxxxxxxxxxxxxxxx
3. xxxxxxxxxxxxxxxxxxx

**must have an unrestricted SGS Appointment in the Graduate Department of Pharmaceutical Sciences, i.e., minimum sole supervisor of MSc students*

Abstract (max 300 words)

The abstract is a summary of the story and snapshot of highlights; it is not possible to include all information. However, the abstract should be able to stand alone and be coherent independently of the manuscript.

Format:

Purpose or Background: *1-2 sentences to set the stage*
Methods: *include study design, data source, statistical analysis*
Results: *number of patients studied, main results (only highlights-not all results)*
Conclusions: *The conclusion in an abstract may only refer to what is mentioned in the results section in the abstract*

Abstract word count: xxx (300 max for course, yet typically 250 for peer-reviewed journals)

- *please include on a separate (its own) page(s)*

MAIN TEXT (typically 2500 words, maximum 3500 words in PHM389)

Introduction

- *Brief review of the literature that provides enough background / context to understand the rationale for your study. Even a literature synthesis requires background to justify the rationale for the paper.*
- *Include statements of*
  - *Problem / significance*
  - *Rationale / purpose*
  - *Research objectives, questions and/or hypotheses.*
- *References are imperative.*

Methods

- *Detailed description of study methods in sufficient detail to replicate, e.g.,*
  - *Study design*
  - *Inclusion / exclusion criteria*
  - *Measurements*
  - *Data collection (if applicable)*
  - *Data sources*
  - *Statistical analysis*
- *Include*
  - *Rationale for methods and analyses selected (include references to support)*
  - *Software when applicable (include reference if applicable)*
- *Make sure to only describe methods and NOT report results, e.g., total sample included after inclusion/exclusion criteria applied belongs in the results section. However, sample size estimate to base data collection are to be included in the methods section.*
- *Include an ethics statement – even if not applicable (e.g., completing literature synthesis), a statement re: ethics is still required.*
- *References to justify methods are imperative.*

Results: Present and summarize results efficiently using tables, figures and text

- *All tables, figures and appendices must be cited in the main text*
- *Mention the most interesting findings in tables and figures rather than repeating all the data summarized in tables/figures*
- *Tables and Figures appear AFTER the references section and NOT within the main text of the results section.*

Discussion

- *Interpret findings within the context of the literature*
- *Make sure NOT to present new results that were not mentioned in the results section text – here you discuss the findings (not report them)*
- *Include study strengths and limitations*
- *If applicable, discuss any unforeseen disruptions to the course project (e.g., Winter 2020 projects were impacted by COVID-19 disruptions)*
- *Include recommendations for future research (all) and for policy changes (if applicable)*
- *References are imperative*

Acknowledgements and Student Contributions: PHM389 projects are often completed with support from graduate students, post-doctoral fellows or other research staff (e.g., analyst, lab technician) in addition to supervisor(s).

- *Acknowledge and specify contributions from others*
- *Clearly indicate your specific contributions to the project/report submitted*

Maximum 10 pages of supplemental content, including references and result tables / figures

References

- *Cite references in order (numerical) of appearance in the main text*

Table(s) – single spaced is acceptable

- *Number tables in order of appearance in the manuscript*
- *Tables titles go above the table*
- *Tables should "stand alone" and include enough detail to be interpreted without the detailed methods or results sections, e.g., include sample size, define abbreviations used in table footnotes*
- *If table is too long to fit on a single page, repeat the heading row on subsequent pages*

Figure(s)

- *Number figures in order of appearance in the manuscript*
- *Captions go underneath the image – single spaced is acceptable*
- *Figures should "stand alone" – see above under Tables*
- *Have an adequate legend, e.g., use colour or other features (e.g., symbols, shading) that can be interpreted when printed in black and white*

Appendix (uncommon for PHM389), *e.g., supplemental Tables with statistical code, animations of results*