Chemistry 4000 8.0 Research Project
Fall/Winter 2019/20

Course Director: Prof. Sylvie Morin, PSE 346
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Course description:
This course is a hands-on original research project (laboratory-based) that includes a practical and written component as well as an oral presentation and exam. This course provides 4th year undergraduate students with invaluable research experience in the Chemical Sciences and provides an opportunity to enhance critical thinking, analytical and communication skills. The research project involves a significant investment of time and effort in the laboratory. Typically students spend a minimum of 10-12 hours/week (although this is likely to depend on the nature and stage of the work) over the Fall and Winter terms. You need to complete all components of the course to receive a passing grade, which includes the Oral Presentation and Oral Exam.

Course Evaluation:	Supervisor's Assessment	40%
	Written Thesis	25%
	Oral Presentation & Exam	30%
	Course Director (participation mark)	5%
	Total	100%

NOTE: You will only receive an overall letter grade, the above breakdown is to give you a general idea of where your grade comes from.

First In-Class Meeting: September 10th, 17:30h -19:30h

Deadlines and Subsequent In-Class meetings, 17:30h (room to be determined)*:
*Please note that dates will confirmed closer to the start of the Fall 2019 term

Sept. Xth, 2019	In-class WHIMIS II training (for those who need it)
Oct. 1st, 2019	Lab book keeping (ca. 1.5 hour)
Sept. Xth, 2019	Why should you care about Intellectual Property? (ca. 1.5 hour)
Oct. 22th, 2019	Thesis Project Summary Due (submitted by email to the CD)
Jan. 28th, 2019	Meeting with the Graduate Program Directors in Chemistry and Research Progress (round table discussion)
Jan. 28th, 2019	Draft of Thesis Introduction Due (submitted by email to the CD)

Jan. 21st, 28th and/or Feb. 4th, 2020	CHEM 4000 Progress Presentations (2 hours)
March 10th, 2020	Identify your two (2) Examiners (let CD know by email)
March Xth, 2020	Southern Ontario Undergraduate Student Chemistry Conference, (SOUSCC 2020) at Ryerson University (optional)
March 31st, 2020	Meeting to go over the elements of a good presentation, oral exam, as well as talk practice for those who are ready. (1-2h, as required)
April 1st to 5th, 2020	Latest Date to Submit Draft Thesis to your Supervisor for feedback.
April 13th to 17th, 2020	Final Thesis is due to your committee and CD as a PDF (submitted by email). Note that the Thesis should be submitted a week before your scheduled exam.
April 20th to 24th, 2020	CHEM 4000 Presentations and Oral Exams

Notes Regarding Evaluations:

Supervisor's Assessment:	This covers your work throughout the terms (40% of your final grade). It includes such things as your interaction with the research group, your efforts in the lab (not necessarily results), laboratory note keeping (lab book), critical thinking, etc. It also includes your thesis first draft, presentation and oral examination practice.
The Written Thesis:	Your two examiners provide an assessment of your written thesis itself, which are averaged to make up this component of your evaluation (25%). Important considerations in the thesis can include (among others): How it fames the research project and your objectives, outlining of your methods, presentation of the data/results and its discussion, indication of future directions, figures/tables, references etc.
Presentation & Exam:	This grade given by your examiners (15% for the presentation and 15% for the oral examination), which provide a common mark on how well you present your data, answer questions, think critically etc. TO PASS THE COURSE THIS COMPONENT NEEDS TO BE COMPLETED.

The Course Director: This component (5%) takes into account your participation in in-class activities and organizational matters in the course. Marks are deducted for the late submission of required components in the course (Summary, Introduction, Final thesis etc.). Submission of all items to the CD, your examiners etc. are dead-lined at 5 pm on the due date.

In-Class Meetings: There will be ca. 5-6 in-class meetings held this term, a schedule is provided above. These meetings will cover some materials to support your research project and your professional development. These meetings will also cover organizational matters, and allow for discussion regarding the composition/organization of the Thesis report, the research presentation, etc.

Email Policy: Please include "CHEM 4000" in the subject line of all emails. The CD will also from time to time send out emails in regards to organizational matters pertaining to the course or post announcement on the Course Moodle page.

The Project Summary

- The summary should be ~1 page in length. It should include a brief statement of what your planned research will be (or is).
- It *should* contain a statement of how your research fits into the bigger picture, its importance and relevance to the field of research, a brief summary of the current literature, your research plan. Make sure to submit a draft of the summary to your supervisor for feedback prior to submitting it to the CD.

Progress Presentations

- A 5-10 minute presentation of your research progress. I do not necessarily expect final results at this point. You can introduce your topic, list objectives, outline successes, difficulties, data you have acquired, results, etc.

Identifying Your Examination Committee

- Your examination committee will consist of your supervisor, the course director and two (2) faculty examiners
- It is up to you, the student, to ask faculty members if they are willing to be on your examination committee. Talk it over with your supervisor, but you must do the asking.
- Your examiners are to be Faculty members (not post-docs or research associates) who can effectively evaluate your research area. While you may like to have a favorite professor from a certain Department, they may not be appropriate for your research topic.

The Final Thesis

- Your final thesis is a short, 25-40 page (double paced, page 1 starting with the introduction) written report of your research. It should include a cover page, an abstract, table of contents, list of symbols (if appropriate), list of acronyms (if appropriate) list of figures, introduction, objectives, experimental methods, results, discussion, conclusion and future work.
- Your thesis should be submitted as a high-quality PDF to me and the examiners with the option for them to request a printed copy if needed.
- Samples of previous theses can often be found with current lab members to be used as examples of how to put the thesis together.

Oral Presentations and Exams

- You will be required to give a 15-18 minute (leave 2-5 minutes for questions for a total of 20 minutes) public presentation of your research. You should prepare your presentation in Power Point or other appropriate computer software (i.e. Open Office). Computer projection will be supplied. Some notes on organization of your presentation are below.
- The oral examinations will be 30 minutes in length, at which time your examiners will ask you questions about your research and written thesis. The schedule for presentations and exams will be announced one week before the oral date.

Organizing Your Research Presentation

Research presentations are to be 20 minutes in length, with 15-18 minutes for your presentation and 2-5 minutes for questions. At 1 – 1.5 minutes per slide, **you are looking at ~12 slides in 12-18 minutes**.

Practice is the key to deliver a good presentation!

A sample format of your organization could look like:

a) Title Slide (Title, authors, institution) - This is very important!
b) Introduction (2-3 slides) – use these slides to provide a background for your work
c) Research Goals – What are the specific goals of *your* research project
d) Experimental (1-2 slides) – Give an overview of the methods you employed in your research
e) Results (1-5 slides) – Use appropriate titles on the slides to highlight your research results. Note here that you can in some cases meld these slides with the experimental slides
f) Conclusions and Future Work – What did your research show, and where do *you* think it should go next
g) Acknowledgements – Also a very important slide...you did not do your research in isolation, so you should thank the people that helped