Department of
Chemical and Biological Engineering

Graduate Student Handbook

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DEPARTMENT OF CHEMICAL and BIOLOGICAL ENGINEERING

GRADUATE STUDENT HANDBOOK

1. INTRODUCTION

The purpose of this manual is to inform new and continuing graduate students of the policies and regulations which are unique to the Department of Chemical and Biological Engineering as well as those of the College of Graduate Studies and Research which are most important to this Department. It is hoped that this manual will be an easy reference for graduate students to use as they pass through their graduate program from registration to graduation.

2. OTHER SOURCES OF INFORMATION

The University's online Calendar describes all Colleges and Departments. The Graduate Studies and Research section provides information on significant dates, requirements for admission, health benefits, registration and fees, scholarships, as well as all the graduate courses that are given in our Department as well as other relevant Departments and Colleges.

Safety is an important aspect within the Department and all students are required to register for laboratory safety courses before beginning any work in faculty research labs.

The graduate student should also be aware of the following resources on campus: The Graduate Student Association; the International Student Advisor; Student Counseling Service (4920); Student Health Centre (5768) and the Student Help Centre (6982). These organizations render assistance in health insurance plans, summer vacations, camps, youth festivals, health care, counseling, etc.

3. REGISTRATION & OTHER PROCEDURES FOR NEW STUDENTS UPON ARRIVAL

3.1 Departmental Registration: Students registering for the first time should report to the Graduate Assistant (2B60 Engineering). Departmental staff will assist with arrangements to order keys for graduate desks and payroll information. Alll students are required to register for the online course GSR 960 during their first term. The student should consult with the supervisor as to the courses that should be taken during the first year. Otherwise, the student should consult with the Department Head and/or the Chair of the Department Graduate Studies and Research Committee.

3.2 College Registration: If not already provided, the College will require official transcripts and certificates(s) from previous university programs as well as an official TOEFL score of 20 in each category (80 overall) for students coming from countries where English is not the regular language of instruction (see Requirements for Admission, Graduate Studies and Research, University Calendar).

3.3 Registration with SESD: Students will then go to the Treasury Office for the payment of fees. Registration is prior to the start of classes and a penalty is charged for late registration. The fee structure is given in the University Calendar. Students can pay the full amount upon or by deductions from payments to them by the University for scholarships, research and teaching assistantships, etc. Arrangements for the latter options must be made through the Business Office.

4. SUPERVISORY COMMITTEES

Each graduate student will have a supervisory committee which will oversee the student's program. Supervisory Committee meetings will be held at least once a year. The student is to supply a written progress report to the committee members one week in advance of each meeting. This report should include the following: the research objectives; a summary of work prior to the last meeting; methodology and future plans for the next twelve months. In each meeting, the course work and other requirements of the student will be reviewed by the committee, the student will orally present a 20 minute summary of the research progress to date and future plans, and a question period will follow. At the end of the meeting, the student will be dismissed and the committee will discuss the merits of the presentation and the student's progress. The Graduate Chair will inform the student of any decisions made by the committee. The last meeting of the committee will be to approve the writing of the thesis; hence, the student should provide a Table of Contents of the thesis for this meeting.

4.1 Master's Committee: The committee for a Master's student will consist of the Head of the department or the departmental Graduate Chair, the Supervisor and at least one other member of the departmental Graduate Faculty. A faculty member from a related department may be added.

4.2 PhD Committee: The committee for a PhD student will consist of the Head of the department or the departmental Graduate Chair, the Supervisor and at least three other members of Graduate Faculty, one of whom must be from outside the department.

5. COURSE WORK

Students are required to complete a minimum of thirty credit units for the M.Eng. Degree, twelve credit units for the Master's Degree with thesis and up to eighteen credit units for the PhD program. Students may choose relevant courses from either within the Department or from other Departments and Colleges after consultation with the supervisor. Under some circumstances, these requirements may include up to three credit units at the undergraduate level, usually when the student is working in an interdisciplinary area outside the normal field of chemical engineering. The student must consult with the supervisor and Department Head before enrolling in undergraduate classes. The student may audit undergraduate classes but not graduate classes. Each student must register in the ChE 990 Seminar course as well as the ChE 992 (m.Eng.), ChE 994 (Masters) or 996 (PhD) Research course for each term, regardless of how long the student had been registered. Students are expected to attend all of the seminars in ChE 990.

After the first committee meeting for a student, a program including a class list will be approved and submitted to the College of Graduate Studies and Research. If a student wishes, at a later date, to take a class other than those on the approved list, the student should consult with the supervisor and a change of program will be submitted by the Departmental Secretary).

6. DEPARTMENTAL POLICIES

6.1 990 Seminars: All graduate students are required to enroll in ChE 990 or BLE 990 regardless of how long they have been in the program. There is no extra registration fee for this class.

6.2 Use of Departmental Copying Machine/FAX: To use the Departmental copying or FAX machine, a student must either have an account or pay cash. An account may be authorized for the student by their supervisor. Such an account for the copying machine will have a limit on the number of copies made, and may be used only for the purposes authorized by the supervisor. To use the copying and FAX machines for cash, a student must consult with the office staff.

6.3 Use of Secretarial Time: The Department does not provide secretarial support (typing, copying, etc.) for graduate students. However, staff will assist graduate students in administrative questions such as: visas for foreign students, teaching assistants employment in the Department, keys, student desk placements, and organization of student advisory committee meetings.

6.4 Use of Office Supplies: The Department does not provide graduate students with office supplies. Students' needs should be discussed with their supervisors.

6.5 Ordering Equipment and Supplies: Any items that are not available in the Stores Department of Chemical and Biological Engineering may be ordered through office staff. You should use the standard requisition form for this purpose (available from staff). Be sure to fill out the form in detail, giving the account number to be charged, a description of the item to be ordered, the name, address and phone number of the supplier, and your supervisor's signature You should always have an up-to-date quotation from the supplier and supply this with the order form. It is usually beneficial and quick to use the 1-800 phone number, if available, to get the required information from the supplier without incurring any charge. **Do not phone orders directly from the supplier. They must go through office staff and the Purchasing Department of the University.** Departmental personnel are there to assist you and answer any questions you may have.

6.6 Use of Research Equipment and Supplies: The equipment and supplies in the research and undergraduate laboratories belong to the supervisor of that facility or the Department of Chemical and Biological Engineering. Before using or borrowing these materials, graduate students **MUST** obtain permission directly from the supervisor or Dale Claude (for Undergraduate labs). No other personnel are authorized to give permission to use such materials.

6.7 Use of Computers and Printers: Graduate students are encouraged to use the computers and printers provided in Engineering computer labs. The department does not provide computers or printers to graduate students.

6.8 Research Data Record Book: All graduate students should record their experimental data in a record book approved by their supervisor. This book should be dated and signed each day that data is recorded and stored in a manner which will prevent loss or damage. It would be wise to maintain a duplicate (backup) record book in a different location than the lab or office and updated on a regular basis.

6.9 Thesis Production and Reproduction: All graduate students should consult the various guides available before beginning to write a thesis: They should also consult with their supervisor and look over completed theses which have been accepted in the past.

It is the student's responsibility to prepare and assemble all materials for the thesis. Although departments and supervisors may be prepared to assist graduate students in this matter, they are not obliged to do so. A department is under no obligation to provide financial, technical, or secretarial assistance to graduate students for the preparation of their thesis.

Master's and Doctoral candidates are required to provide a bound copy of the thesis to the department. The student may be asked to provide a second copy for the student's supervisor. An electronic copy of the thesis must be submitted to the College of Graduate Studies and Research.

6.10 Department Requirements to Graduate: Before a graduate student can obtain a degree, his/her supervisor must submit a signed form to the Department Head indicating that the supervisor has received the following items:

1. a completed, bound thesis.

2. all copies of reference papers which have been paid for out of the supervisor's research or other account.

3. a copy of the experimental data record book. The student should arrange to have their own copy.

4. the source codes of all computer programs and experimental data files in both printed and electronic form. Students should discuss these requirements with their supervisor to determine what should be included.

6.11 Teaching and Supervision Evaluations: Each year, the Department will solicit evaluations from the graduate students of the teaching and supervision by the faculty. The results will be tabulated and submitted to each faculty member anonymously.

7. GRADUATE SCHOLARSHIPS

Graduate Scholarships are awarded to graduate students on an annual basis. In most cases, new scholarships are awarded to new students. In some cases, continuing students may receive a scholarship. In both cases, the Scholarship Committee of the college pays particular attention to the marks that the student has received in the past two years of full-time study. Students who have been engaged in research work associated with their graduate programs (continuing students) are more difficult to evaluate. If a case for a graduate scholarship is based primarily on research accomplishments, the onus is on the Department to make that case clear to the Scholarship Committee. This is particularly important if the student is about to embark on a Ph.D. program of study. Students receiving U of S Scholarships (Chemical Engineering) are required to provide four hours per week of service to the Department (e.g. demonstration, marking).

7.1 Value of Graduate Scholarships: The value of these scholarships varies from year to year. The values for the academic year are as follows:

Master's Thesis	$8,100 per calendar year
Ph.D.	$9,000 per calendar year

7.2 Assistantships: A limited number of Student Assistantships are available within the Department and include marking of undergraduate assignments and demonstrating in undergraduate laboratories. The rate of renumeration is $18.51/hr (2013/14). The student should consult with the Departmental secretary prior to each term to determine what is available. Students holding scholarships are limited to a maximum of 12 h/week work load.

7.3 All awards are made on the condition that the students will have met at the time of registration all admission requirements of the College of Graduate Studies and Research.

8. PhD QUALIFYING EXAMINATIONS (Chemical Engineering)

8.1 Purpose: To be used for diagnostic purposes for students wishing to be transferred from a Masters program to the PhD program or for those admitted to the PhD program as conditionally qualified and/or probationary students. It should determine: (a) whether or not the student is a suitable (a fully qualified) PhD candidate and (b) to detect if remedial action is required (in the form of satisfactory performance in certain undergraduate classes or other special classes) prior to the student achieving the status of a fully qualified PhD student.

Comment: The spirit of the qualifying exams should be mainly diagnostic rather than punitive although the latter is necessary to ensure that only quality students be advanced. In order to complete the exam, the student should have shown promise of his/her ability to pursue satisfactory advanced study and research at the PhD level, as judged by his previous scholastic records (transcripts, letters of recommendation, etc.), except where academic qualifications are difficult to assess or whose qualifications are marginal for admission to the PhD program.

8.2 Who Must Write Exam: All graduate students who wish to be transferred to the PhD program, e.g., any student: (a) in a Masters program in the College of Graduate Studies and Research who wishes to waive a Masters thesis degree and go directly to a PhD; (b) has completed or is planning to complete a Masters degree in the College; and (c) has a Masters degree from another institution and has enrolled as a Masters student in the College. As well, any student who has been admitted as probationary or conditionally qualified must take the exam.

8.3 Examining Committee: The committee consists of all members of the student's Graduate Advisory Committee (including the cognate member), and a designated member from the Graduate Studies Committee. The designated faculty member will chair the Examining Committee.

8.4 Time of Exam: The PhD Committee will meet within the first month of tht student's program to determine subject materials and the contents of the student's report. The report will include a literature review, knowledge gap and research objectives, research plan and experimental system(s) including safety measures, milestones and timeline, and references. The first attempt will take place up to six months after admission. If the student does not pass, and meets the criteria for a second attempt, it will take place within the next three months. An M.Sc. student will only be allowed one attempt to pass the qualifying exam.

8.5 Format of the Exam: The examination includes both written and oral components. Before the examination, the Examining Committee will meet and discuss the subject materials to be examined and the content of the student's research proposal. Once decided the student will be informmed about the subjects to be examined and the general requirement of the research proposal (including at least an up-to-date literature review and an applicable research plan). A preparation peiod up to six minths will be given to the student. During the examination, the provided research proposal will be regarded as the written part of the examination and questions relating to Chemical Engineering principles pertinent to student's research proposal will be asked. After the examination, the Examining Committee will submit an evaluation report to the Department Head or the Graduate Chair if the Department Head is a member of the Examining Committee, and vice versa. A pass-fail decision will be made at the next department meeting, If failed, a second attempt will be granted to the student, who already holds a recognized MSc degree, and the preparation period will be reduced to three months; however, a transferring student (i.e., without a MSc degree) has only one opportunity.

8.6 Research Proposal and Presentation: The research proposal should be distributed to all members in the Examining Committee two weeks before the examination. The proposal should not exceed 20 pages (maximum). Use 12-pt font size, double-spacing and set margins at one inch all around. The maximum allowable time for the presentation is 15 – 20 minutes.

9. PhD COMPREHENSIVE EXAM

9.1 Purpose: The PhD Comprehensive Examination "is used as a means of judging whether or not the candidate has a mature and substantive grasp of the" research "discipline as a whole". "A comprehensive knowledge of the subject will not only help to validate the PhD student as an expert in the general field of his or her choice, but will also complement research activity in the specific area under investigation". It will also allow the student to organize his/her ideas into a

comprehensive written document and give him/her experience in presenting his/her ideas orally and to be prepared to answer questions on his/her feet.

9.2 Who: All fully qualified PhD candidates.

9.3 When: The Comprehensive Exam should be scheduled after the student has completed all the requirements except the doctoral thesis, e.g., after the course work, literature review, theoretical and experimental work has been completed and the student is about to write up. (This is the direction given by the College of Graduate Studies and Research in the Calendar).

Comment: This examination should occur just after the research program has been completed. It should be up to the supervisor to decide when the candidate is ready for the exam. The exam should be designed to ensure that the student has (a) completed his/her research to a standard expected of a PhD student, (b) has a broad understanding of his/her research field, and (c) is ready to prepare a thesis. The exam would be good preparation for the final oral defense of his/her thesis.

9.4 Format: The exam should consist of three parts: (a) a written research report; (b) an oral presentation of his or her research results, and (c) an oral examination related specifically to the research proposal as well as to topics of a more general nature but cognate to the candidate's field of research.

The written part should be a thorough report of the research activities of the student and include all important results, conclusions and recommendations. It should show the thrust of the work and the student's original contribution to the current research area. This is to be a 20 to 35 page typed report, double-spaced and presented to the examining committee two weeks prior to the date of the examination. A copy of the report should be placed in the main office for the benefit of other faculty members. The oral should consist of a 20 minute presentation followed by a question period. The committee should examine the student's knowledge of the research field and question any aspect of the research report that is appropriate.

9.5 Experience: The examining committee in each case consists of members of the Supervisory Committee. Other faculty members of the Department of Chemical Engineering are encouraged to attend and ask questions. (The oral should be chaired by the Department Head, or his designate). The committee should recommend to the Department that the student pass or fail. As with the Qualifying Exams, the spirit of this examination should be mainly diagnostic rather than punitive but in this case, the emphasis should be placed on the student's field of research so that remedial action can be taken to: (a) improve the scope or direction of the project, or (b) require further experimental/theoretical work to be done.

9.6 Advertising: The requirements of the Comprehensive Examination are to be clearly spelled out to new and continuing students. This is done in our Departmental Graduate Student Manual.

10. SAFETY

Safety is a high priority within the Department of Chemical Engineering. Each student must ensure that they carry out their research work with the utmost care to ensure the safety of them self and others.

10.1 WHMIS Training: The University requires that all employees and graduate students take WHMIS training, levels I and II. These courses are given on a regular basis by the Occupational Health and Safety Department and the Departmental Safety Committee posts schedules of these courses when they are received. It is the responsibility of each student to ensure that they have taken these courses.

10.2 Safety Committees: The Department of Chemical and Biological Engineering has a Safety Committee and the Engineering Building has a statutory Occupational Health and Safety Committee which has two members representing the Department (one faculty, one staff). Any safety concerns should be directed to either of these two committees. Check with the Departmental staff to obtain the names of the committee members.

At the University level, there is the Department of Occupational Health and Safety which has a Director, a Biological/Chemical Safety Officer, a Safety and Loss Prevention Manager, an Occupational Hygienist, a Radiation Safety Officer, and a Waste Management Facility Manager. A University Chemical Safety Committee made up of faculty and staff also exists to set university policy and advise the OH&S Department.

10.3 Some Important Departmental Policies: A safety manual is available which outlines the safety policies of the department. All students are required to read this booklet and be familiar with it. Some of the important policies follow:

10.3.1 Working at Night: All students working in the lab during off hours (evening, night) must **NOT** work alone. They must ensure that they have another person available nearby who can be reached in an emergency.

10.3.2 WHMIS Labeling and MSDSs: All chemicals used in the lab must be in containers with proper WHMIS labels. As well, an MSDSs for each chemical must be available in the lab or in the MSDS library in Chemistry Stores. Each lab containing controlled substances must have a warning label on the outside of the door warning of controlled substances in the lab as well as information about who the contact person is and emergency phone number. WHMIS level I and II training will familiarize you with these labels. If you have any questions, contact the Departmental Safety Chairperson or the University OH & S Department (Richard White, 966-8496).

10.3.3 Chemical Inventory: All labs which contain controlled chemicals as defined by WHMIS legislation must have a chemical inventory available in a prominent position in the lab (e.g., posted on one of the walls).

10.3.4 Condenser (Water) Hoses: All hoses connected to the water supply where the water will be left on continuously and unattended must be kept in good condition and secured with proper those clamps. Every effort must be taken to ensure that no leaks occur which can cause floods and damage equipment, books, etc. on floors below.

10.3.5 Compressed Gas Cylinders: All compressed gas cylinders must be secured properly to benches or walls while in use or when stored. As well, proper regulators for each type of gas must be used. Whenever inflammable or poisonous gases (hydrogen, carbon monoxide, etc.) are used, care must be taken to prevent any leaks and these gases must be vented to fume hoods.

10.3.6 Fire Alarms: The labs have smoke or heat detectors in the ceiling and will set off the fire alarm when activated. Care must be taken not to position furnaces or ovens near these detectors where heat from an open oven door might activate them. When an emergency occurs and a detector has not started an alarm, be sure to pull the fire alarm in the hall way as close as possible to the lab where the emergency is. This will activate an indicator to the firemen where the fire or emergency is.

10.3.7 Chemical Waste Disposal: Any hazardous chemical wastes must be disposed of properly. These include the any lube oils (used in pumps, drive motors, gears), toxic experimental residues, etc. Some innocuous chemicals may be disposed of down the drain but most must be disposed of through the University Waste Management Facility via Chemistry Stores. Consult with Chemistry Stores the Chair of the Departmental Safety Committee, or the Waste Management Facility (8498) to obtain the proper disposal procedures.