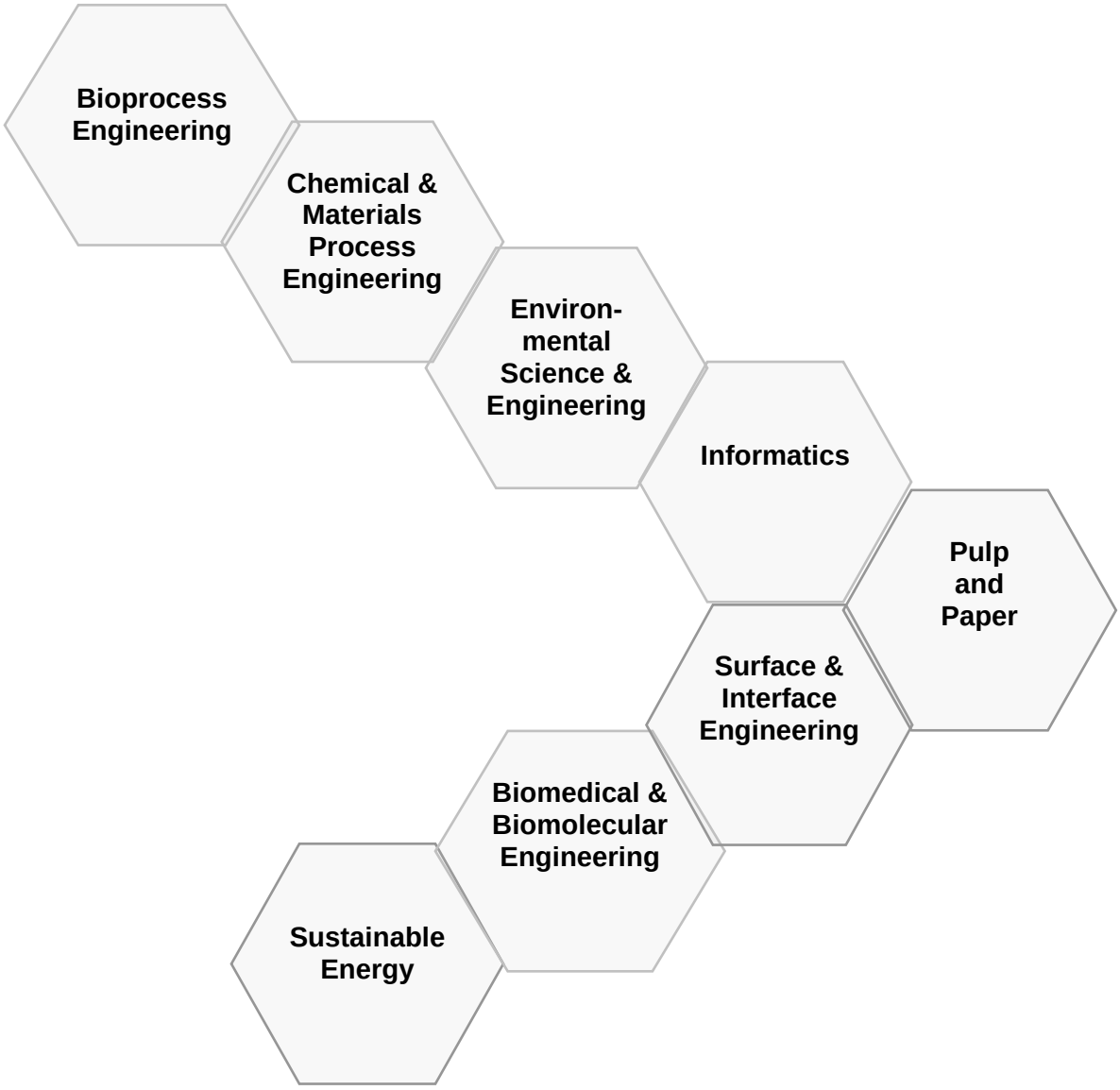
# Chemical Engineering & Applied Chemistry

# Graduate Student Handbook

# 2009-2010



# Contents


General Information ..... 3
- Departmental Contacts ..... 3
- 2009-2010 Dates & Deadlines ..... 4
- Registration and Official Student Status ..... 8
- Fees ..... 8
- Repository of Student Information (ROSI) ..... 9
- Student Card (TCard) and Accessing University Services ..... 9
- Official Communications ..... 9
- The University Portal ..... 9
- Courses ..... 10
- Transcripts ..... 14
- University Policies ..... 14

Services and Programs Available to Students ..... 15
- Departmental Services ..... 15
- University Services ..... 17

Funding ..... 18
- M.A.Sc. ..... 18
- M.Eng. ..... 18
- Ph.D. ..... 18
- Major Scholarship Holders ..... 18
- Sources of Funding ..... 19
- Social Insurance Number ..... 21

Degree Programs ..... 22
- Collaborative Programs ..... 22
- M.A.Sc. Program Information ..... 23
- M.Eng. Program Information ..... 31
- Ph.D. Program Information ..... 36

Appendix A: Thesis Preparation Costs ..... 47

# General Information

## *Departmental Contacts*

http://www.chem-eng.utoronto.ca

Department of Chemical Engineering & Applied Chemistry
University of Toronto
200 College Street,
Toronto, ON M5S 3E5
Fax: 416-978-8605

Incoming faxes and messages will be kept in Room 217 for one day then will be placed in the graduate student's mailbox in the Grad Lounge (room 247).

| What | Who | Where | Email |
|---|---|---|---|
| Desk space | Ask your supervisor | | |
| Building Keys/ Photocopy Cards/ Fax Messages | Ms. Gorette Silva | WB 217 | gorette.silva@utoronto.ca |
| Student Mailboxes | | WB 247 (Grad Common Room) | |
| Stipend Payments/ TA Assignments | Ms. Julie Mendonça | WB 201C | julie.mendonca@utoronto.ca |
| Safety Training | Ms. Leticia Gutierrez | WB 217 | leticia.gutierrez@utoronto.ca |
| Shipping & Receiving/Purchasing | Mr. Phil Milczarek | WB 16 | phil.milczarek@utoronto.ca |
| Activate TCard for access to the Graduate Common Room | Mr. Dan Tomchyshyn<br>Mr. Matt Tobin | WB 260 | must be done in person; remember to take your Tcard |
| Expense Reimbursement | Ms. Arlene Smith | WB 217 | arlene.smith@utoronto.ca |
| Chair | Professor D.W. Reeve | WB 220 | chair.chemeng@utoronto.ca |
| Graduate Coordinator – graduate academic matters | Professor V.G. Papangelakis | WB 213 | vladimiros.papangelakis@utoronto.ca |
| Graduate Office – graduate student and administrative matters | Ms. Pauline Martini/<br>Ms. Joan Chen/ | WB 212 | gradassist.chemeng@utoronto.ca<br>grad.chemeng@utoronto.ca |

## *2009-2010 Dates & Deadlines*

**2009**

| | | | |
|---|---|---|---|
| F | July | 31 | Teaching Assistant Application for September (Fall) 2009 courses due |
| M | August | 3 | Civic Holiday |
| M | August | 10 | Registration for September session begins |
| W | August | 12 | Undergraduate course enrolment begins (1) |
| F | August | 28 | Last date for payment of tuition fees to meet registration deadline |
| M | September | 7 | Labour Day – university closed |
| Tu | September | 8 | Safety Training for new M.A.Sc. and Ph.D. students (all day) |
| W | September | 9 | Safety Training for new M.A.Sc. and Ph.D. students (all day) |
| W | September | 9 | Most formal graduate courses and seminars begin in the week of September 9 (2) |
| W | September | 9 | Fee deferral forms due in the Chem Eng Graduate |
| Th | September | 10 | Chem Eng Graduate Student Orientation |
| F | September | 11 | Registration for September session ends; after this date, a late registration fee will be assessed |
| Tu | September | 15 | Final date to submit Ph.D. theses to SGS to avoid fee charges for 2009-10 |
| Tu | September | 15 | Last day to enroll in undergraduate F and Y courses (1) |
| F | September | 18 | Coursework must be completed and grades submitted for summer session courses and extended courses (3) |
| W | September | 23 | May-June, July-August, and May-August Session grades available for viewing by students on ROSI |
| F | September | 25 | Confirmation that the final corrections to M.A.Sc. theses or M.Eng. project have been made in order to be considered for Fall Convocation; confirmation must be sent directly from the Supervisor to the Chem Eng Grad Office (email is fine) |
| F | October | 2 | Final date for receipt of degree recommendations and submission of any required theses for master's degrees for Fall Convocation (4) |
| F | October | 2 | Final date to submit final Ph.D. thesis for Fall Convocation |
| F | October | 2 | Final date to submit September session Program Plan forms to the Chem Eng Graduate Office |

| | | | |
|---|---|---|---|
| W | October | 7 | Final date to add full-year and September session courses in ROSI |
| M | October | 12 | Thanksgiving Day – university closed |
| Tu | November | 3 | Last day to withdraw from undergraduate F courses (1) |
| W | November | 4 | Final date to drop September session full or half courses without academic penalty; this includes 500-level courses |
| F | November | 27 | Teaching Assistant Application for January (Winter) 2010 courses due |
| | November | | Fall Convocation Information and Dates are posted at: www.convocation.utoronto.ca, choose Fall |
| M | December | 21 | Winter break begins (for last day of classes before Winter break, consult graduate units concerned) – university closed until January 4th |

**2010**

| | | | |
|---|---|---|---|
| M | January | 4 | Most formal graduate courses and seminars begin in the week of January 4th (2) |
| W | January | 6 | Fee deferral forms due in the Chem Eng Graduate Office for students beginning their studies in January 2010 |
| F | January | 8 | Final date for registration of students beginning program in January session; after this date, a late registration fee will be assessed |
| S | January | 10 | Last day to enroll in undergraduate S courses (1) |
| F | January | 15 | Final date to submit Ph.D. theses without fee payment for January session |
| F | January | 15 | Coursework must be completed and grades submitted for September session courses (3) |
| F | January | 15 | Final date to add January session courses (5) |
| M | January | 18 | Final date to submit January session Program Plan forms to the Chem Eng Graduate Office |
| W | January | 20 | September Session grades available for viewing by students on ROSI |

| | | | |
|---|---|---|---|
| F | January | 22 | Confirmation that the final corrections to M.A.Sc. theses or M.Eng. project have been made in order to be considered for March or June Convocation without fees being charged for January session; confirmation must be sent directly from the Supervisor to the Chem Eng Grad Office (email is fine) |
| F | January | 29 | Final date for receipt of degree recommendations and submission of any required theses for March or June graduation for master's students without fees being charged for the January session (4) |
| F | January | 29 | Final date to request March degree deferral (in absentia) (6) |
| F | January | 29 | September dual registrants must be recommended for the master's degree by this date to maintain their Ph.D. registration (4) |
| M | February | 15 | Family Day – university closed |
| M | February | 15 | Last day to withdraw from undergraduate Y courses (1) |
| F | February | 26 | Final date to drop full-year or January session courses without academic penalty; this includes 500-level courses (5) |
| | March | | March Graduation In absentia Information is posted at: www.convocation.utoronto.ca, choose March in absentia |
| S | March | 7 | Last day to withdraw from undergraduate S courses (1) |
| F | April | 2 | Good Friday – university closed |
| F | April | 16 | Confirmation that the final corrections to M.A.Sc. theses or M.Eng. projects have been made in order to be considered for June Convocation; confirmation must be sent directly from the Supervisor to the Chem Eng Grad Office (email is fine) |
| F | April | 23 | For students obtaining degrees at June Convocation, course work must be completed and grades submitted for full-year and January session courses |
| F | April | 23 | Final date for receipt of degree recommendations and submission of any required theses for master's degrees for June Convocation(4) |
| F | April | 23 | Final date for submission of final Ph.D. thesis for students whose degrees are to be conferred at the June Convocation |
| F | April | 23 | Final date for degree recommendations of January dual registrants for the master's degree to maintain their Ph.D. registration (4) |
| | May | | For first day of summer classes, consult graduate unit concerned. |
| F | May | 7 | Final date for registration for May session |
| W | May | 12 | Final date to submit May-June or May-August Program Plan forms to the Chem Eng Graduate Office |
| F | May | 14 | Final date to enroll in May-June or May-August session courses |

| | | | |
|---|---|---|---|
| F | May | 14 | Course work must be completed and grades submitted for full-year and January session courses (except for extended courses) (3) |
| W | May | 19 | January Session grades available for viewing by students on ROSI |
| M | May | 24 | Victoria Day – university closed |
| | June | | Spring Convocation Information and Dates are posted at: www.convocation.utoronto.ca, choose Spring |
| F | June | 4 | Final date to drop May/June F section courses without academic penalty; this includes 500-level courses |
| W | June | 23 | Final date to submit July-August Program Plan forms to the Chem Eng Graduate Office |
| F | June | 25 | Final date for enrolment in July-August courses |
| F | June | 25 | Final date to drop May-August session Y section courses without academic penalty; this includes 500-level courses |
| Th | July | 1 | Canada Day Holiday – university closed |
| F | July | 23 | Final date to drop July-August S section courses without academic penalty; this includes 500-level courses |
| F | July | 23 | Coursework must be completed and grades submitted for May/June F Section Courses (3) |
| W | July | 28 | Grades for May/June F Section Courses available for viewing by students on ROSI |

(1) Graduate students may only enroll in undergraduate courses with the approval of their supervisor or graduate unit. Students are responsible for meeting the deadlines and requirements of the undergraduate course as presented in class and in the undergraduate division's calendar. Graduate students will be graded under the graduate grading scale. 500-level courses follow the graduate course add/drop deadlines, as well as the graduate grading scale.

(2) The precise dates of commencement of courses are determined by the graduate units; students are urged to consult the departmental website for information. The University policy states that the first day of classes in the September session in all teaching divisions should not be scheduled on the first and second days of Rosh Hashanah (from 1 1/2 hours before sunset on Friday, September 18 to about 1 1/2 hours after sunset on Sunday, September 20) or on Yom Kippur (from about 1 1/2 hours before sunset on Sunday, September 27 to about 1 1/2 hours after sunset on Monday, September 28).

(3) Graduate units may establish earlier deadlines for completion of course work and may prescribe penalties for late completion of work and for failure to complete work, provided that these penalties are announced at the time the instructor makes known to the class the methods by which student performance shall be evaluated.

(4) For final dates for completing degree requirements, students should consult their own departments.

(5) Graduate units may establish earlier deadlines to add/drop courses. Please note that the last date to cancel a course or registration with no academic penalty is not the same as the last date to be eligible for a refund.

(6) Students who complete all degree requirements by the end of the September session may graduate at the June convocation ceremony, or in March with no ceremony. Those who chose March graduation may not attend the June convocation ceremony, and will receive their degree certificate in the mail.

## *Registration and Official Student Status*

A student is considered to be registered once they either pay or defer their fees. Having a registered status means that you are officially part of the university and can access university and departmental services and areas.

## *Fees*

The fees website: http://www.fees.utoronto.ca/ is your primary source for general fee information; fee amounts, payment instructions and deadlines, etc. may be accessed from the site.

Please consult the 2009-2010 Dates and Deadlines for relevant deadlines.

### (1) Fee Amounts

Each of the M.A.Sc., M.Eng., and Ph.D. programs have a different program fee; check the fees website for more information.

### (2) Invoices and Interest

Fee invoices are viewable and printable from the student information system (ROSI: http://www.rosi.utoronto.ca); they are no longer sent by mail to students. The invoice will indicate the fees for each session, and will also include the minimum fee payment required in order to register.

### (3) Paying Fees

Fees can either be paid at a bank using a printout of your invoice from ROSI, or through online banking directly from your bank account. Please note that interest will be charged for any fees showing in your account as of November 15th; interest is assessed and charged on the 15th day of every month.

### (4) Request for Fees Arrangement

Students in the M.A.Sc. or Ph.D. program may complete a "Request for Fees Arrangement" form from the School of Graduate Studies website (http://www.sgs.utoronto.ca) which will allow students to pay their fees up until April 30th, 2010, without being charged interest.

M.Eng. students receiving federal or provincial loan support such as OSAP _may_ be able to make be given an extended period of time to pay their fees. This arrangement is made through the School of Graduate Studies at 63 St. George Street.

Even with a fee arrangement in place, you will continue to receive email reminders from the university about your outstanding fees until they are paid in full.

## *Repository of Student Information (ROSI)*

ROSI: http://www.rosi.utoronto.ca. is the university-wide student information system that contains information such as current contact information, course enrolment, fees, and scholarship information. Students are responsible for ensuring the accuracy of their information in ROSI including contact information, course enrolment and final grades.

ROSI can be accessed as soon as your acceptance of the admission offer is processed by the department, so feel free to access it early and check it out! There are instructions for first-time users that can be accessed from the main page of the ROSI site.

## *Student Card (TCard) and Accessing University Services*

Once you have paid or deferred your fees, you can pick up your TCard; for more information on what identification you need, the hours of operation for the TCard Office locations, etc., please visit: http://www.utoronto.ca/tcard/.

After getting your TCard, you can set up your UTORid; this ID is what will allow you to set up your utoronto email address, and access online services such as online library journals, and the new University Portal. To set up your UTORid, please visit: https://www.utorid.utoronto.ca/.

## *Official Communications*

The university primarily uses the web and email to communicate important and official messages. It is now a policy that all University of Toronto students set up and use a "utoronto" email account, and that this email address be entered in ROSI. Students are ultimately responsible for maintaining current contact information in ROSI.

For students starting their studies in September 2009, the deadline to set up a utoronto email address and update ROSI is September 18th; after that date only those with a utoronto email address in ROSI will receive departmental emails.

For students starting in January 2010, the deadline to set up a utoronto email address and update in ROSI is January 15th, 2010.

Students are responsible for ensuring that they are receiving departmental email.

## *The University Portal*

This is a new communication tool within the University. Many professors set up course websites through the portal, which typically contain course descriptions and outlines, assignments, etc. Students who are enrolled in the course and have a utoronto email address listed in ROSI will see a link to the course after entering the portal using their UTORid. The portal can be accessed directly from the main University of Toronto webpage: http://www.utoronto.ca.

## *Courses*

### (1) Course Enrolment

There are 2 parts in the course enrolment process:

- approval to take specific courses as part of their Program
- enrolling in the courses through ROSI

Information on potential courses and links to departments that typically offer courses of interest to Chem Eng Grad students can be found on the Departmental website: http://www.chem-eng.utoronto.ca. This information is provided to help you find appropriate courses, however it is by no means a complete list and these courses may not be offered each year. You are encouraged to consult the website for each department that is likely to offer courses of interest to you.

Please consult the 2009-2010 Dates and Deadlines for relevant deadlines.

## (a) Approval

Students complete the Program Plan form for their specific program; M.Eng. students complete the form and hand it in to the Graduate Office, while M.A.Sc. and Ph.D. students must have their Supervisor sign the form before handing it in to the Graduate Office.

### Why bother completing the form?

Prior to graduation, the department reviews your Program Plan forms and recommends you for graduation only if you have completed the courses that have been approved. Without the appropriate forms, graduation may be delayed until formal approvals are received from the Supervisor and the Graduate Coordinator, or some of the courses may not be credited towards your degree and you will need to take additional courses in order to meet your degree requirements.

## (b) Enrolling

Access ROSI at http://www.rosi.utoronto.ca.

You can enroll in courses through ROSI before you receive approval to take the courses as part of your degree, however only courses that have been approved through the Program Plan will be counted towards your degree so make sure you regularly check your course information in ROSI.

When enrolling in a course be sure to enter:

| | |
|---|---|
| Course number: | e.g. CHE1310H |
| Section Code: | usually F, S or Y. This indicates whether the course is offered in the Fall session (F), the Winter session (S) or continues through both the Fall and Winter sessions (Y). |
| Teaching Method: | All graduate courses have a teaching method of LEC (lecture). |
| Teaching Section: | Most graduate courses only have one teaching session (0101). Although there may be only one teaching section the information must still be entered on the system. |

Not all graduate departments allow students to enroll in courses via ROSI, or there may be additional steps to enrolling in the course. Below is a list of course statuses that may appear in ROSI:

REQ: Course requested. Must be resolved/approved by the last date to add a course.
INT: Course requested pending instructor approval in addition to coordinators'/advisor's approval.
APP: Request approved. Student is enrolled in course.
REF: Request denied. Student is not enrolled and may not make another request for this course via ROSI during this session.
CAN: Course cancelled (student withdrew from course before deadline)
WAIT: No Room in the meeting section. Student has been placed on a waiting list based on category and will be enrolled automatically if space comes available.
DWAIT: Student has cancelled place on the waiting list or been removed.

If you encounter problems adding a course in ROSI and the error message you receive is not clear, take note of it and contact the Graduate Office.

## (2) Courses "Extra" to Degree

If you want to take a course and gain credit but do not want it to count towards your degree, you can take the course as "EXTra to degree". Please include the course on the Program Plan form and alert the Graduate Office by the course enrolment deadline that the course is to be extra to degree.

## (3) Auditing a Course

If you want to attend a course but not complete the assignments or receive a grade, ask the instructor teaching the course if you can "sit in" on it. There is no enrolment form, and no documentation provided that would confirm your attendance in the course. Please note that sitting in on a course is at the discretion of the course instructor.

## (4) Dropping a Course

Students are responsible for dropping (withdrawing) from courses in ROSI by the appropriate deadline.

Students must also complete a Program Change Form and submit it to the Graduate Office so we have documentation that you have dropped the course in ROSI and therefore will not see it on your academic record in ROSI. For M.A.Sc. and Ph.D. students, this form should be signed by the supervisor before it is handed in to the Graduate Office.

## (5) Missed a course enrolment or withdrawal deadline?

Contact the Graduate Office. There is no guarantee that the problem can be resolved, however if there is a solution it will take anywhere from 4 to 10 weeks to complete the paperwork, forward the request to the appropriate offices, and receive confirmation that the change has been made. Avoid the issue by checking ROSI often, especially as important deadlines approach!

## (6) Grading and Evaluation

Graduate grades are reported in Letter Grade format, as indicated in the chart below:

| Grade Meanings | Letter Grade Scale | Numerical Mark Scale |
|---|---|---|
| Excellent | A+ | 90-100% |
| | A | 85-89% |
| | A- | 80-84% |
| Good | B+ | 77-79% |
| | B | 73-76% |
| | B- | 70-72% |
| Inadequate | FZ | 0-69% |

Seminar courses are typically assigned a final grade of “CR/NCR”, where “CR” means you have successfully completed the course, and “NCR” means you have not successfully completed the course.

Graduate students taking undergraduate courses (such as “500-level” courses) are graded using the scale above, and not the scale used for undergraduate courses.

**Other grade reports that may appear in ROSI:**

INC Incomplete: Assigned as a final report by a graduate unit review committee, or SGS Associate Dean on the basis of incomplete course work in special circumstances (e.g. medical reasons or when there are no grounds for assigning a failing grade). INC carries no credit for the course and is not considered for averaging purposes.

IPR In Progress: Assigned by the instructor as the report for a course since it continues in a subsequent session or program. The final grade for the course will appear only once and only for the last enrollment period. IPR carries no credit for the course and is not considered for averaging purposes.

SDF Standing Deferred: Assigned by a graduate unit review committee to a student who has been granted an extension for the completion of course work beyond the SGS deadline for completion of course work, pending receipt from the instructor of a final course report. A final course report is due no later than the SGS deadline for completion of course work and grade submission following the original one for the course. If, by that date, a final grade is not available and the student has not submitted the outstanding course work, then the report of 'SDF' will be replaced by a final report of 'INC'. SDF carries no credit for the course and is not considered for averaging purposes.

TRF Program Transfer: Assigned by the School of Graduate Studies to a continuing research/seminar course begun but not completed in the first program and will not be required in the new program to which the student has been officially transferred.

WDR Withdrawal without academic penalty: Assigned by the graduate unit review committee, when there are extenuating circumstances, upon approval of the student's request for late withdrawal from a course. It carries no credit for the course and is not considered for averaging purposes.

XMP Exemption: Granted on the basis of credit for work done elsewhere. It carries credit for the course, but is not considered for averaging purposes.

Please consult the 2009-2010 Dates and Deadlines for the dates official course grades will be viewable in ROSI.

If a grade does not appear in ROSI on or slightly after the deadline, contact the course instructor or the Graduate Office for more information.

## *Transcripts*

The easiest way to order an Official transcript is through ROSI. You can also order transcripts through the University of Toronto Transcript Centre: http://www.artsci.utoronto.ca/current/undergraduate/transcripts/transcriptform. Please note that if we ask for an official transcript, we mean one that has been prepared by the Transcript Centre, sealed in an envelope by the Transcript Centre, and signed over the back flap by a Transcript Centre official. If we ask for a "ROSI printout" we mean a printout of your academic history from ROSI.

## *University Policies*

There are many policies which affect your status as a graduate student and responsible member of the university community. They are to be found in the School of Graduate Studies Calendar which was given to you at orientation, or online at: http://www.sgs.utoronto.ca/governance/policies.htm.

It is the student's responsibility to remain familiar with these policies, such as Intellectual Property, Inventions, Course Work Extensions, Academic Appeals, Code of Student Conduct, Leaves of Absence, etc.

# Services and Programs Available to Students

There is no way to summarize all the services available to students, however below are some of the key resources that may be of interest to Graduate Students. Feel free to explore the services, clubs, and student organizations available to you.

## *Departmental Services*

### Chemical Engineering Graduate Student Association (CEGSA)

http://cegsa.chem-eng.utoronto.ca/

CEGSA is the Chemical Engineering Graduate Student Association. Graduate students in this Department are elected to the executive of CEGSA and take part in helping to organize a wide variety of social events for the graduate student body, the professors and the staff. These events encourage a greater sense of community within the department and contribute to the graduate student experience. CEGSA also serves as a liaison between the graduate student body and the Department. It represents the graduate students at the Graduate Students Union (a university-wide association), Faculty Council, and the Teaching Assistants Union (Local 3902 of CUPE).

### Leaders of Tomorrow – Graduate (LOT-G), WB240

http://www.chem-eng.utoronto.ca
The mandate of Leaders of Tomorrow is to equip graduate students with professional skills and leadership training that will be essential for success in their future careers.

Created in 2005-2006, the Leaders of Tomorrow: Graduate initiative is driven by a 'working group' of graduate students as a sub-committee of CEGSA (Chemical Engineering Graduate Students Association).

### Prospective Professors in Training (PPIT)

http://www.engineering.utoronto.ca/about/programs/ppit.htm
The PPIT program aims at preparing soon-to-be faculty members to the rigors of the academic position, and how to best manage their time and resources between teaching, research, and university administration. Participants are selected among students applicants nearing the completion of their Ph.D. degree based on their demonstrated research abilities and their passion for teaching and mentoring.

## The Graduate Common Room (Grad Lounge), WB247

The Graduate Common Room is for the use of all graduate students. In, or right outside, it you will find daily newspapers, magazines, comfortable furniture, your mail box, announcements, vending machines, a coffee machine, a television, microwave ovens, and many other graduate students. You will not find an ashtray, as this is a non-smoking Room. Access is granted through your TCard.

## Graduate Office, WB 212

gradassist.chemeng@utoronto.ca

The Graduate Office administers the graduate program, but we, the Graduate Assistant, Graduate Administrator, and Graduate Coordinator are available as a resource to graduate students for both academic and non-academic issues.

Feel free to drop by in person, or contact us by phone or email if you would like to set up a time to meet.

## Photocopiers, WB16

A cash copy card may be purchased in Room 16 or obtained from your supervisor.

## Laptop and Projector, WB 217

Need to borrow a laptop and projector for an upcoming presentation or meeting? These are available on a first-come, first-serve basis from the main office (WB217).

## Theses and Projects, WB 217

Contact Leticia Gutierrez in the main office (WB217) for access to view previous M.A.Sc. and Ph.D. theses, and M.Eng. projects.

## Wireless Internet Access

There is wireless access throughout the building, however with the thick concrete walls, you may need to move around a little in order to get adequate reception.

## *University Services*

### Libraries

http://www.utoronto.ca
There are numerous libraries on campus. The two main libraries for engineering references are the Engineering Library, located on the second floor of the Sandford Fleming Building, and the Science and Medicine Library in the Sigmund Samuel Library. Tours of the latter are organized regularly. There are also many on-line academic resources such as journals, etc. that can be accessed by clicking the "libraries" link on the main university website.

### Student Life Services

http://www.studentlife.utoronto.ca/

The division of Student Life Programs & Services provides the support, opportunities and infrastructure you need to reach your full potential, including:

- Accessibility Services
- Career Centre
- Counselling and Learning Skills
- First Nations House
- International Student Centre
- Multi-Faith Centre
- Psychiatric Service
- Student Housing Service

…just to name a few! If you are looking for a particular service or type of support, the website is the best place to start.

### Hart House

http://www.harthouse.ca/
Hart House is a place for all university students to participate in clubs, social events, and use the athletic facilities. As a graduate student, part of your fees go towards a gym membership, and access is granted using your TCard. Find out more by visiting the Hart House website.

### Graduate Professional Skills (GPS) Program

http://www.sgs.utoronto.ca/informationfor/students/campus/gpsp.htm

The Graduate Professional Skills program (GPS) is a new initiative from the School of Graduate Studies that consists of a variety of offerings providing doctoral stream students with a range of optional opportunities for skills development.

# Funding

The final terms of financial support negotiated between the supervisor and student should be communicated in writing by the supervisor to the student. Graduate students are expected to apply for scholarships. Students are invited to contact the Graduate Coordinator for advice regarding their financial arrangements.

## *M.A.Sc.*

The minimum financial support in the M.A.Sc. program is $20,400/year for the first 1.5 years of the program. This support may be drawn from a combination of scholarships, fellowships and research stipend. Subject to satisfactory performance, further support may be possible, and is at the discretion of your supervisor. Additional details on graduate student funding may be found on the departmental website.

## *M.Eng.*

The M.Eng. program is considered a professional master's program and therefore no departmental funding package is provided. Students in this program who require financial support may apply for governmental student loans through Canada Student Loans, the Ontario Student Assistance Program, or other provincial student assistant programs: http://www.hrsdc.gc.ca/eng/learning/canada_student_loan/index.shtml.

## *Ph.D.*

The minimum financial support in the Ph.D. program is $21,600/year for the first 3.5 years of the program. This support may be drawn from a combination of scholarships, fellowships and research stipend. Subject to satisfactory performance, further support may be possible, and is at the discretion of your supervisor. Additional details on graduate student funding may be found on the departmental website.

## *Major Scholarship Holders*

### (1) OGS/OGSST

For students who receive an OGS or OGSST award, the funding amounts are topped up to:

M.A.Sc. Program: $21,600/year plus TAship for the year they receive the OGS/OGSST scholarship
Ph.D. Program: $22,800/year plus TAship for the year they receive the OGS/OGSST scholarship

### (2) NSERC

For M.A.Sc. and Ph.D. students who receive an NSERC award, the funding amount is topped up by the tuition amount for the academic year, which for 2009-2010 is $6,366.00. TAship is also available for NSERC scholarship recipients, and is complementary to the NSERC and top-up funding.

## *Sources of Funding*

Funding for M.A.Sc. and Ph.D. students usually comes from the following sources:

- Major Scholarships such as NSERC, Ontario Government Scholarships (OGS), Ontario Government Scholarship in Science and Technology (OGSST), and the Connaught Scholarship
- University of Toronto Fellowships
- Research Stipends
- Teaching Assistantship (TAship)
- Additional Sources of Funding

### (1) Major Scholarships

NSERC and OGS award competitions normally occur in September and October of each year, and OGSST competitions usually take place in January or February. The competition is announced when the applications become available, and the Department also informs students of information sessions to help students produce high quality award applications. Connaught Scholarship holders are required to apply for OGS awards in order to have their Connaught award renewed. Visa students may apply for OGS awards, but NSERC and OGSST awards are restricted to students with Canadian citizenship or permanent resident status only.

### (2) University of Toronto Fellowships

All currently enrolled graduate students who have maintained a B+ average in course work and have obtained credit for seminar courses are considered for University of Toronto Open fellowships. This form of funding is managed by the Graduate Office and there is no application for this funding. Students will be contacted by email if they will be receiving this award as part of their funding package.

Students enrolled beyond the second year of a M.A.Sc. program or beyond the fifth year of a Ph.D. program are not eligible to receive a U. of T. Fellowship.

### (3) Research Stipends

Professors in the Department receive grants to support their research programs, and a large proportion of these funds are spent on research stipends. Ultimately, graduate students are responsible for ensuring that their own total compensation meets the minimum funding package levels. Any research stipend issues should first be discussed with the student's supervisor. Research stipends are managed by Ms. Julie Mendonca.

## (4) Teaching Assistantships

A Teaching Assistantship (TA) position of approximately 40 hours is set aside for the first year of study. It is also possible to be allowed up to a maximum of 100 TA hours per year. Teaching assistantship positions will be limited, within the Department, to two years for M.A.Sc. students and four years for students in the Ph.D. program.

The pay rate as of September 2009 is $38.76/hour, which is set through a Collective Agreement between the university and CUPE Local 3902, the union representing Teaching Assistants at UofT. To view the collective agreement, please visit: http://www.hrandequity.utoronto.ca/pca/ca.htm.

Income from TA will be complementary to minimum support.

Teaching Assistantship application forms can be found on the Department's web-site: http://www.chem-eng.utoronto.ca. Please read the Department Guidelines for Teaching Assistants before applying for a Teaching Assistant position. Forms should be submitted to Ms. Julie Mendonça, Room 201C by the deadline posted in the 2009-2010 Dates and Deadlines at the beginning of this handbook.

Students are required to take the Safety Workshop (CHE 2222H) and pass the associated examination to be eligible for Teaching Assistantships.

## (5) Additional Sources of Funding

Beyond the financial package a student receives, there are additional forms of funding available.

## (a) Differential Fee Waiver

Students studying under a study permit/visa and paying international student fees are normally provided with a differential fee waiver that covers the difference between international and domestic fees. For 2009-2010, the waiver is $8,221.00 and will be applied directly to your fees in 2 installments.

## (b) Departmental, Faculty, and University Scholarships

We encourage all graduate students to apply for scholarships they qualify for. Students will receive email notices of Departmental and Faculty scholarships that become available, but are also encouraged the check the SGS website for any other scholarships:
http://www.sgs.utoronto.ca/Assets/current/Awards/Scholarshipsdescription.pdf. There is a "scholarship awards listing" on the above site which is searchable and lists the majority of awards at the University.

## *Social Insurance Number*

All students require a Social Insurance Number (S.I.N.) in order to receive financial support such as research stipend or teaching assistantships from the University. In addition, a S.I.N. is required for all applications for Ontario Graduate Scholarships and NSERC scholarships. S.I.N. application forms can be found at: http://www.servicecanada.gc.ca/en/sc/sin/index.shtml. Please contact Julie Mendonça prior to applying for your S.I.N. so she can provide you with the employment letter required in the S.I.N. card application process.

# Degree Programs

## *Collaborative Programs*

The Department participates in the collaborative programs listed below:

- Biomedical Engineering (M.A.Sc., Ph.D.), http://www.ibbme.utoronto.ca/
- Environmental Engineering (M.A.Sc., M.Eng., Ph.D.), http://www.energy.engineering.utoronto.ca/
- Environmental Studies (M.A.Sc., M.Eng., Ph.D.), http://www.environment.utoronto.ca/
- Genome Biology and Bioinformatics (Ph.D.), http://www.biochemistry.utoronto.ca/

### (1) Admission

Typically, applicants will select the collaborative program through their application for admission, however it is sometimes possible to register in the collaborative program after being admitted into the Chem Eng program. Please review the online information for the collaborative program to determine how to apply.

### (2) Degree Requirements

Students must fulfill the requirements for the collaborative program and the home unit (Chemical Engineering and Applied Chemistry). Please visit the sites above to find out more information on the requirements for the collaborative program.

On successful completion of requirements for the collaborative program, a notation is added to the student's transcript.

## *M.A.Sc. Program Information*

### (1) Program Outline

The M.A.Sc degree program is intended primarily for those who wish to pursue advanced studies at the Master's level with a strong research (usually experimental) focus. It is also intended for those who wish to prepare for a career in research and/or plan to continue their graduate studies through the Ph.D. degree.

### (2) Duration

The minimum program length is 2 sessions (8 months), and the maximum length is 9 sessions (36 months).

After 6 consecutive sessions (24 months), a student's progress will be reviewed by the Graduate Coordinator.

With a normal first session course load of 2 courses a supervisor will assume that their research student has spent 50% of his or her time on research.

### (3) Residence

M.A.Sc. students are to be in full-time attendance (residence) for a minimum of 2 sessions (8 months). Students are to be in full-time attendance until the M.A.Sc. departmental oral examination has taken place.

### (4) Degree Requirements

Students in the program complete 3 half-credit (H) courses, a variety of Seminar courses, plus a thesis. Course and thesis requirements are explained below.

## (a) Course Requirements

- Normally, an M.A.Sc. student takes 2 academic courses in their first session of study and completes all academic courses within the first year of study; this is at the discretion of your supervisor and also depends on course availability
- Courses are normally taken from Engineering or Physical Science departments – check the courses section of the Chem Eng website for course suggestions
- Students in a collaborative program must satisfy the requirements of that program in addition to this Department's requirements
- A maximum of 1 half-credit (H) 500-level course may be taken as part of your degree
- All courses taken for credit, whether as part of the degree or extra to degree, require approval by the supervisor and Graduate Coordinator.

| | |
|---|---|
| **Minimum of 3 Academic Courses** | *Minimum of 1 Fundamental course* |
| | *Minimum of 1 Academic course outside research area* |
| **Seminar Courses** | |
| Attending Seminar:<br>*Seminars in Chemical Engineering* | Successful completion in the Fall *and* Winter session in the first 2 years of study; the code for Fall 2009 is CHE3002H (F), and Winter is CHE3003H (S) |
| Presenting Seminar:<br>*Graduate Student Seminar*<br><br>The Seminar will depend on the degree program you are registered in: | CHE 2011H: students not in a collaborative program or in the Pulp and Paper field of study<br>- Once a year, *either* Fall (F) *or* Winter (S) session<br>CHE 1211H: students in the Pulp and Paper field of study<br>- Once a year, *either* Fall (F) *or* Winter (S) session<br>BME 1010H: students in the Biomedical Collaborative Program (IBBME)<br>- Once a year, *either* Fall (F) *or* Winter (S) session<br>EDE3000H: students in the Environmental Engineering Collaborative Program (CEEP)<br>- Twice in total over your degree |
| **Additional Required Courses** | |
| *CHE2222H*<br>*(Safety Training Workshop)* | Successful completion of CHE2222H before embarking on research or teaching in the undergraduate laboratories. |
| *How to become an Outstanding Graduate Student* | Attend in the first year of study; no enrolment in ROSI is required for this course. See courses page on the Chem Eng website for meeting schedule |
| *JDE1000H*<br>*(Ethics in Research)* | Successful completion of JDE 1000H, normally in the first year of study; enroll in either the F or S section of the course. |

## (b) Thesis

The thesis should give evidence of mastery of the topic, originality and creativity, and be written and defended in an acceptable manner. Although it is desirable that the work reported in the thesis be of such a nature and calibre that it can be published, it is not a requirement for fulfillment of the M.A.Sc. program.

Students may, upon agreement with their supervisor(s), submit a collection of publishable papers as their thesis. This collection must at minimum have a coherent topic with an introduction presenting the general theme of the research and a conclusion summarizing and integrating the major findings. The minimum requirement is one paper submitted to a good quality, peer-reviewed journal, where the student is the principal contributor.

Information about the SGS requirements for theses can be found on the web at: http://www.sgs.utoronto.ca/informationfor/students/finish.htm. These are in addition to the Departmental requirements found in the document: Writing for Engineers, available in the Graduate Office. Theses which do not conform to these guidelines will NOT be accepted by SGS. The SGS website includes information on:

- technical requirements
- previously copyrighted material
- forms to accompany the completed thesis
- authority to distribute (including delayed publication of thesis)
- binding
- microfilming charges

Where someone other than the candidate is a co-author of any portion of the thesis, this fact should be clearly indicated in the introduction, which should also state the actual contribution of the candidate to the work. The examination committee must be satisfied that the candidate's personal contribution to the thesis is sufficient to fulfill the requirements of the M.A.Sc. degree. A candidate who intends to submit jointly authored work must be prepared to satisfy the committee on this issue. A statement from the co-author as to the candidate's contribution may be helpful.

The thesis should contain sufficient information so that others can replicate the experiments conducted.

**Length of Thesis**

The thesis should be no longer than 70 pages plus relevant appendices. If the student believes the thesis must be significantly longer, then he or she should consult his or her supervisor and the Graduate Coordinator.

Bound copies of previously completed theses are available through the Main Office (WB 217). Please note that these theses may not necessarily meet SGS requirements, and that the best source of information around thesis preparation (including templates) is through SGS.

## (5) M.A.Sc. Departmental Oral Examination

Once completed, the thesis must be presented and defended before a committee in a Departmental Oral Examination.

## (a) Examination Committee Members

The Examination Committee is comprised of:

- the supervisor(s), and
- two other faculty members, one of whom must be from this Department.

The supervisor and student select the members of the examining committee and arrange a date and time convenient for all members.

## (b) Distributing Thesis Document

Copies of the thesis should be distributed to the members of the examining committee at least two weeks in advance of the date of the oral. Committee members may refuse to participate in an oral examination if less time is given for the appraisal of the thesis.

## (c) Formal Request for the M.A.Sc. Departmental Oral Exam

Once the committee membership has been determined, an M.A.Sc. Oral Examination Request Form is to be completed and submitted to the Graduate Office. The form can be found on the "Forms and Handbooks" page under the "Graduate Studies" section of the Chemical Engineering website: http://www.chem-eng.utoronto.ca.

In order to hold the Examination, the form is to be submitted to the Graduate Office (WB 212) a minimum of one week (5 business days) prior to the examination. Please ensure that a ROSI printout of your transcript is attached to the form.

The meeting room and laptop/projector can be booked through Ms. Gorette Silva in the main office (GB 217).

## (d) Conduct of M.A.Sc. Oral Examination

### *(i) Pre Oral Review*

At the start of the oral the candidate will be asked to leave the room while the following procedures are carried out:

- The Chair will review the Departmental Policies related to the M.A.Sc. program
- The Committee will review the length of time the candidate has been registered in the M.A.Sc. program
- The Committee will review the student's course performance.

### *(ii) Oral Examination*

The candidate and any graduate student observers will then be asked to enter the room, and the candidate will make a 20 minute presentation on his/her research.

The committee members will then question the student on his/her research. Student observers may also ask questions.

At the end of the question period, the candidate and any observers will be requested to leave the room.

### *(iii) Post Oral Review*

On the basis of the thesis and the oral defense, the committee may recommend that:

- The thesis may be accepted as is and the candidate be awarded the M.A.Sc degree
- The candidate be awarded the degree subject to minor modifications of the thesis
- The candidate be given an opportunity to address shortcomings in his/her thesis or defense with the objective of a reconvened oral being held at a later date
- The candidate withdraw from the program

The qualifications of the candidate for a Ph.D. program are reviewed at the meeting. The committee reviews qualifications based on the following factors:

- A student wishing to proceed to the Ph.D. program is normally expected to complete the M.A.Sc program in four consecutive sessions
- The student must obtain a B+ average in the 3 required courses. Students failing a required course would not normally be eligible for proceeding to a Ph.D. program
- Although no official grade is given to the thesis and its defense, the overall B+ average required by SGS at the master's level for procedure to a Ph.D. program will be taken into account

## (6) Thesis Submission

Once any modification/corrections have been made and the supervisor has approved the thesis, the thesis may be submitted according to the requirements below:

- 1 electronic copy to School of Graduate Studies submitted online at: http://www.sgs.utoronto.ca/informationfor/students/finish/final/etd.htm
- 2 bound copies to the Main Office (see Ms. Leticia Gutierrez, Room 217)
- 1 bound copy to each supervisor

Please check Appendix A for information on the policy regarding thesis preparation costs.

## (7) Graduation

The Department must make a degree recommendation to SGS before a student's degree may be considered complete. In order for the Department to make this recommendation, the following items must be completed:

- The supervisor informs the Graduate Office via email that any required thesis corrections/modifications have been made
- The Graduate Office reviews the students file to ensure that degree requirements have been met
- The student completes and hands in the Materials Sign-Off form to the Graduate Office (form can be found on the Chem Eng website: http://www.chem-eng.utoronto.ca)

The 2009-2010 Dates and Deadlines at the beginning of this handbook indicates all the relevant deadlines for degree completion. Please ensure you meet the deadline set by SGS in order to avoid additional tuition charges.

## (8) Entering the Ph.D. Program directly after completing the M.A.Sc.

For students who complete an M.A.Sc. in the Department of Chemical Engineering and wish to begin a Ph.D. in the department immediately after finishing the M.A.Sc., a complete online SGS admission application must be submitted. For more information on the admission requirements for Chemical Engineering and Applied Chemistry, please visit "Admissions" under the "Graduate Studies" section of the departmental website: http://www.chem-eng.utoronto.ca.

## (9) Transfer to the Ph.D. Program (M.A.Sc. By-Pass)

Strong M.A.Sc. candidates may apply to bypass the M.A.Sc program and transfer directly to the Ph.D. program. The M.A.Sc. by-pass typically occurs 12 months into the M.A.Sc. program, but may occur as early as 8 or as late as 16 months after starting the M.A.Sc. program. Times outside of the 8-16 month window require approval of the Graduate Coordinator.

A student who wishes to bypass the M.A.Sc degree and proceed to a Ph.D. program must successfully complete and obtain an average of A- in the three courses taken in the M.A.Sc., and have completed the relevant seminar courses prior to by-passing to the Ph.D. program.

## (a) M.A.Sc. By-Pass Oral Examination

Transfer into the Ph.D. program requires successful completion of the M.A.Sc. By-Pass Oral Examination.

### *(i) Examination Committee Members*

The Examination Committee is comprised of:

- the supervisor(s)
- two other faculty members, one of whom must be from this Department (determined by the supervisor(s) and candidate), and
- a Chair, who is selected by the Graduate Coordinator

### *(ii) Distributing Research Summary*

Copies of the summary (20-50 pages is typical) of completed and proposed research should be distributed to the members of the examining committee at least two weeks in advance of the date of the examination. Committee members may refuse to participate in the examination if less time is given to review the document.

### *(iii) Assigning a Chair*

The candidate must email the following items to the Graduate Coordinator, who will select the Chair for the examination:

- a copy of their Abstract
- the research cluster they are studying in
- the name of each Committee member

Once the Graduate Coordinator has provided the candidate with the name of the Chair, the candidate may make a formal request to hold the M.A.Sc. By-Pass examination.

## *(iv) Formal Request for the M.A.Sc. By-Pass Oral Examination*

An M.A.Sc. Oral Examination Request Form is to be completed and submitted to the Graduate Office. The form can be found on the "Forms and Handbooks" page under the "Graduate Studies" section of the Chemical Engineering website: http://www.chem-eng.utoronto.ca.

In order to hold the Examination, the form is to be submitted to the Graduate Office (WB 212) a minimum of two weeks (10 business days) prior to the examination. Please ensure that a ROSI printout of your transcript is attached to the form.

The meeting room can be booked by contacting Ms. Gorette Silva in the main office (GB 217).

## *(v) Conduct of the M.A.Sc. By-Pass Oral Examination*

### (1) Pre Oral Review

At the start of the oral the candidate will be asked to leave the room while the following procedures are carried out:

- The Chair will briefly review the relevant Departmental Policies related to the M.A.Sc. program
- The Committee will review the length of time the candidate has been registered in the M.A.Sc. program
- The Committee will review the student's course performance.

### (2) Oral Examination

The candidate and any graduate student observers will then be asked to enter the room, and the candidate will make a 20 minute presentation on his/her research.

The committee members will then question the student on his/her research. Student observers may also ask questions.

At the end of the question period, the candidate and any observers will be requested to leave the room.

### (3) Post Oral Review

On the basis of the research summary, presentation, and academic standing, the committee may recommend that:

- the student transfer to the Ph.D. program
- the student remain in the M.A.Sc. program

### (4) Transfer Process

Upon successful completion of the bypass oral, students should fill out a Transfer Request form which is available on the School of Graduate Studies website, www.sgs.utoronto.ca. This is necessary for the official transfer into the Ph.D. program.

Students who successfully by-pass into the Ph.D. program are not required to hold a Ph.D. Qualifying Examination during their Ph.D. studies, as the M.A.Sc. by-pass exam fulfills this requirement.

## (10) Unsatisfactory Progress

After each semester, the Departmental Graduate Studies Committee will consider the cases of those students who fail one graduate course. Students who at any time accumulate two failing grades will be required to withdraw unless extenuating circumstances exist. Students with one failure who are allowed to proceed will have their cases reviewed at a later date.

Students whose research work is unsatisfactory in the opinion of their supervisor, and/or who have not completed the degree requirements after 18 months may have their progress to date assessed by a three-person committee made up of the supervisor and two faculty knowledgeable in the research area. The committee has complete authority to recommend the termination of a student's degree program if adequate progress is not demonstrated.

## *M.Eng. Program Information*

### (1) Program Outline

The M.Eng Program is primarily intended for engineers in professional practice or recent undergraduate engineering program graduates who wish to pursue advanced studies at the Master's level without committing themselves to experimental research.

### (2) Duration

The program may be completed on a full-time or part-time basis. The minimum program length is 2 sessions (8 months), and all requirements must be completed within 6 years. Full-time students normally complete the program within 1 to 2 years.

### (3) Residence

M.Eng. students are not required to be in full-time attendance (residence) and do not need to be continually enrolled in courses; they may “stop out” for a session or two. The one exception is the M.Eng. project. Once an M.Eng. student enrolls in the project course, they will be continually enrolled in the project (and pay fees) until the project is complete.

During the sessions that an M.Eng. student has stopped out, no academic fees will be charged, and access to university services are suspended until the student enrolls in courses.

Stopping out has no effect on program duration, however all degree requirements are to be completed within 6 years of commencement of the program.

### (4) Degree Requirements

Students in the program complete 10 half-credit (H) courses, or 7 half-credit (H) courses plus a research project supervised by a Faculty member. Students must complete at least 1 course in the first session of study in order to maintain their registration status.

## (a) Course Requirements

- No more than 3 half-credit (H) courses taken as part of the degree may be 500-level courses; no other undergraduate courses may be used to meet M.Eng. degree requirements
- Students in a collaborative program must satisfy the requirements of that program in addition to this Department's requirements
- Check the departmental website to determine which courses are technical and which are non-technical
- You may take courses from outside the Department; check the Chem Eng website for both the suggested course list and links to other Departments often offering courses of interest to Chem Eng Grad Students.

### *Scenario 1: Program does not include the M.Eng. Project*

| **Technical Courses: 6 to 10 half-credit (H) courses** | |
|---|---|
| Normally taken from Engineering or Physical Science departments – check the courses section of the Chem Eng website for course suggestions | |
| If in the Environmental Engineering (CEEP) Collaborate Program, 2 half-credit (H) courses may be from the Institute of Environmental Studies | |
| **Non-Technical Courses: 0 to 4 half-credit (H) courses** | |
| Taken from either the Faculty of Management Studies or Engineering Management (ELITE). Only 1 half-credit (H) non-technical course may be taken through the Faculty of Management Studies | |
| **Additional Course** | |
| *EDE3000H (Environmental Engineering Seminar)* | Only for students in the Environmental Engineering Collaborative Program (CEEP). This course is optional. |

### *Scenario 2: Program includes the M.Eng. Project*

| **Technical Courses: 3 to 7 half-credit (H) courses** | |
|---|---|
| Normally taken from Engineering or Physical Science departments – check the courses section of the Chem Eng website for course suggestions | |
| If in the Environmental Engineering (CEEP) Collaborate Program, 2 of the half-credit (H) Technical courses may be from the Institute of Environmental Studies | |
| **Non-Technical Courses: 0 to 4 half-credit (H) courses** | |
| Taken from either the Faculty of Management Studies or Engineering Management (ELITE). Only 1 half-credit (H) non-technical course may be taken through the Faculty of Management Studies | |
| **Additional Courses** | |
| *CHE1800Y (M.Eng. Project)* | The project is optional. See the "M.Eng. Project" section of this handbook for more information. |
| *CHE2222H (Safety Training Workshop)* | Successful completion of CHE2222H before starting the M.Eng. Project. |
| *EDE3000H (Environmental Engineering Seminar)* | Only for students in the Environmental Engineering Collaborative Program (CEEP). This course is optional. |

## (5) Unsatisfactory Grades

The Department allows each M.Eng. candidate to have up to two failed or incomplete courses, but at least one of these must be retaken and passed. Candidates obtaining 2 failing or incomplete grades will normally have their registration terminated.

## (6) ELITE Certificate

An ELITE (Entrepreneurship, Leadership, Innovation and Technology in Engineering) Certificate will be issued when any four ELITE courses are successfully completed. This certificate would be granted in addition to the M.Eng. degree. More information on the certificate, including a current list of ELITE courses, can be found at: http://www.engineering.utoronto.ca/informationfor/graduate/elite.htm.

## (7) M.Eng Project

The project can (but not necessarily) be of an original nature, and must be carried out under the supervision of a Faculty member. The topic of the project should be selected in consultation with the prospective supervisor, and may entail experiments or data collection at the student's place of employment, if suitable arrangements can be made. The project should entail a critical review of the relevant literature, data collection and analysis, and possibly new theory.

The effort required to complete the project should be approximately equivalent to three half courses.

Bound copies of previously completed projects are available through the Main Office (WB 217).

**Length of Report**
The report should be approximately 50 pages long plus relevant appendices.

## (a) M.Eng Project Departmental Oral Examination

Once completed, the project must be presented and defended before a committee in a Departmental Oral Examination.

### *(i) Examination Committee Members*

The Examination Committee is comprised of:

- the project supervisor(s), and
- two other faculty members, one of whom must be from this Department.

The supervisor(s) and student select the members of the examining committee and arrange a date and time convenient for all members.

## *(ii) Distributing Project Document*

Copies of the project document should be distributed to the members of the examining committee at least two weeks in advance of the date of the oral. Committee members may refuse to participate in an oral examination if less time is given for the appraisal of the document.

## *(iii) Formal Request for the M.Eng. Departmental Oral Examination*

Once the committee membership has been determined, an M.Eng. Oral Examination Request Form is to be completed and submitted to the Graduate Office. The form can be found on the "Forms and Handbooks" page under the "Graduate Studies" section of the Chemical Engineering website: http://www.chem-eng.utoronto.ca.

In order to hold the Examination, the form is to be submitted to the Graduate Office (WB 212) a minimum of one week (5 business days) prior to the examination. Please ensure that a ROSI printout of your transcript is attached to the form.

The meeting room and laptop/projector can be booked by contacting Ms. Gorette Silva in the main office (GB 217).

## *(iv) Conduct of M.Eng. Orals*

### (1) Pre Oral Review

At the start of the oral the candidate will be asked to leave the room while the following procedures are carried out:

- The Chair will briefly review the relevant Departmental Policies related to the M.Eng program
- The Committee will review the student's course performance.

### (2) Oral Examination

The candidate and any graduate student observers will then be asked to enter the room, and the candidate will make a 20 minute presentation on his/her project.

The committee members will then question the student on his/her project. Student observers may also ask questions.

At the end of the question period, the candidate and any observers will be requested to leave the room.

### (3) Post Oral Review

On the basis of the oral defense, the committee may recommend that:

- the project be accepted as is, and the candidate be awarded the M. Eng degree, or
- the candidate be awarded the degree subject to minor corrections of the project, or
- the candidate be awarded the degree subject to minor modifications of the project, or
- the meeting be adjourned and reconvened in order to give the candidate the opportunity to address shortcomings in his/her defense

If minor modifications or corrections are recommended, they will be identified by the Examination Chair at the time of the examination. Following the oral examination, the student must make all corrections to the project as required by the examining committee and submit the final project to their supervisor(s).

## (8) Project Document Submission

Once the supervisor(s) approve the corrected thesis (if applicable), the student should submit 2 bound copies to the Main Office (room 217 - see Ms. Leticia Gutierrez); and 1 bound copy to each supervisor.

## (9) Graduation

Roughly one month prior to completion of your final course(s) and/or project, send an email to the Graduate Office with your intention to graduate. If you have completed an M.Eng. project as part of your degree, the supervisor must notify the Graduate Office that all required modifications/corrections have been made to the project before a degree recommendation can be considered.

The 2009-2010 Dates and Deadlines at the beginning of this handbook indicates all the relevant deadlines for degree completion.

## *Ph.D. Program Information*

### (1) Program Outline

The Ph.D. degree program is intended primarily for those who wish to prepare for an advanced career in research and/or academia.

### (2) Duration

The minimum program length is 3 sessions (1 calendar year), and all degree requirements must be completed within 15 sessions (5 calendar years).

Students who by-pass from the M.A.Sc. program have 15 sessions (5 calendar years) from the start date of their M.A.Sc. program to complete the Ph.D. requirements.

### (3) Residence

The candidate is expected to remain in continuous residence until the Departmental recommendation for the Final Oral Examination has been made.

If academic matters prevent a student from maintaining residency (such as conducting research at a location away from the university) the supervisor must request and receive approval from the Graduate Coordinator for the accommodation. Additional approvals or documentation may be required; contact the Graduate Office for more information.

If continuous residence is not maintained and no accommodation has been granted by the Graduate Coordinator, the Reading Committee and Departmental oral may be withdrawn, and the candidate may be required to appeal to the Dean of the School of Graduate Studies to schedule the Final Oral Examination.

### (4) Degree Requirements

The Ph.D. Program is comprised of course requirements, regular review of research and program progress and a thesis requirement. Each requirement is described in detail below.

## (a) Course Requirements

- Normally, a Ph.D. student completes all academic courses within the first year of study; this depends on course availability and is at the discretion of your supervisor
- Courses are normally taken from Engineering or Physical Science departments; check the courses section of the Chem Eng website for course suggestions
- A maximum of 1 half-credit (H) Faculty of Management Studies or Engineering Management (ELITE) courses may be taken
- No 500-level courses may be used towards your Ph.D. degree requirements
- Students in a collaborative program must normally satisfy the requirements of that program in addition to this Department's requirements
- All courses taken for credit, whether as part of the degree or extra to degree, require approval by the supervisor and Graduate Coordinator.

| **Academic Courses** | |
|---|---|
| If you have: | You need to take: |
| Previously completed an M.A.Sc. degree | At least 4 half-credit (H) courses |
| Started in the M.A.Sc. program, by-passed to the Ph.D. | At least 3 half-credit (H) courses |
| Started in the M.A.Sc. program, by-passed to the Ph.D. and already have a Master's degree from a non-North American university | At least 1 half-credit (H) course |
| Entered the Ph.D. program directly after completing a Bachelor's degree | At least 6 half-credit (H) courses |
| **Seminar Courses** | |
| Attending Seminars:<br>*Seminars in Chemical Engineering* | Successful completion in the Fall *and* Winter session in the first 4 years of study; the code for Fall 2009 is CHE3002Y (F), and Winter is CHE3003Y (S) |
| Presenting Seminars:<br>*Graduate Student Seminar*<br><br>The Seminar will depend on the degree program you are registered in: | CHE 2011H: students not in a collaborative program or in the Pulp and Paper field of study<br>- Twice; once in year 1 and once in year 3 of study<br>CHE 1211H: students in the Pulp and Paper field of study<br>- Once a year, *either* Fall (F) *or* Winter (S) session<br>BME 1011H: students in the Biomedical Collaborative Program (IBBME)<br>- Once a year, *either* Fall (F) *or* Winter (S) session<br>EDE3000H: students in the Environmental Engineering Collaborative Program (CEEP)<br>- Twice in total over your degree |
| **Additional Required Courses:**<br>The courses below are to be taken once in your graduate studies at the University of Toronto; if you have taken the course in your M.A.Sc., you do not need to take the course in your Ph.D.. | |
| *CHE2222H*<br>*(Safety Training Workshop)* | Successful completion of before embarking on research or TA'ing. |
| *How to become an Outstanding Graduate Student* | Attend in the first year of study; no enrolment in ROSI is required. |
| *JDE1000H*<br>*(Ethics in Research)* | Enroll in either the F or S section of the course. |

## (b) Review of Research and Program Progress

A Ph.D. student in good standing who has achieved all program requirements including course requirements, qualifying departmental examinations, approved thesis topic and regular reading committee meetings, is eligible for candidacy. Note: A Ph.D. student may be denied further registration in their program and will have their eligibility terminated at the end of the third year of registration if by that time candidacy is not achieved.

With supervisor and Departmental approval, a request for extension to achieve candidacy may be submitted to SGS in order to grant additional time to meet candidacy requirements.

### *(i) Ph.D. Reading Committee*

Each candidate, in consultation with his or her research supervisor, is to arrange for the establishment of a Reading Committee at the beginning of his or her program.

Following the Ph.D. Qualifying Examination, the committee normally meets every 9 months to review the progress of the research program. Should there be extenuating circumstances preventing a Reading Committee meeting at the scheduled time, the student should notify the Graduate Coordinator, in writing, of the circumstances and request permission to delay the meeting.

The committee has complete authority to recommend the termination of a student's degree program if adequate progress is not demonstrated. Ph.D. students should note that they are now required to give the date of their last Reading Committee Meeting on their enrolment forms.

In addition to the regular consultation between candidate and supervisor, the candidate should seek advice and consultation informally with other members of the Reading Committee throughout his or her program.

Planning of the format and length of the thesis should be carried out in close consultation with the supervisor and Reading Committee.

The committee will also meet with the candidate to offer advice on the written thesis before the Departmental Final Oral Examination. At this final Reading Committee meeting, the members decide on three possible candidates for external examiner/ appraiser for the SGS Ph.D. Final Oral Examination.

#### (1) Ph.D. Reading Committee Members

The supervisor and candidate work together at the beginning of the program to select the Ph.D. Reading Committee, which is comprised of:

- the supervisor(s)
- two other faculty members, one of whom must hold their primary appointment in this Department

**(2) Conduct of Ph.D. Reading Committee Meetings**

For each meeting, the student should prepare a brief progress report and make an oral presentation on the work to date and future plans to complete his/her degree.

On the basis of the progress report, the oral presentation and the student's answers to questions, the committee will evaluate the student's performance to date and make recommendations regarding modifications to the research plan or emphasis of the work.

The student will sign the evaluation form and pick up a copy of it from the Graduate Office (Room 212).

## *(ii) Ph.D. Qualifying Examination*

The examination is to be held within the first 9 to 12 months of registration in the Ph.D. program.

Students who successfully by-pass from the M.A.Sc. to the Ph.D. program are not required to hold a Ph.D. Qualifying Exam.

**(1) Examination Committee Members**

The Examination Committee is comprised of:

- the supervisor(s)
- two other faculty members, one of whom must be from this Department (determined by the supervisor(s) and candidate), and
- a Chair, who is selected by the Graduate Coordinator

**(2) Distributing Research Proposal**

Copies of the research proposal (up to 30 pages double-spaced, introduction to conclusions) should be distributed to the members of the examining committee at least two weeks in advance of the date of the examination. Committee members may refuse to participate in an oral examination if less time is given to review the document.

**(3) Assigning a Chair**

The candidate must email the following items to the Graduate Coordinator, who will select the Chair for the examination:

- a copy of their Abstract
- the research cluster they are studying in
- the name of each Committee member

Once the Graduate Coordinator has provided the candidate with the name of the Chair, the candidate may make a formal request to hold the Ph.D. Qualifying examination.

### (4) Formal Request for the Ph.D. Qualifying Examination

A Ph.D. Qualifying Examination Request Form is to be completed and submitted to the Graduate Office. The form can be found on the "Forms and Handbooks" page under the "Graduate Studies" section of the Chemical Engineering website: http://www.chem-eng.utoronto.ca.

In order to hold the Examination, the form is to be submitted to the Graduate Office (WB 212) a minimum of two weeks (10 business days) prior to the examination. Please ensure that a ROSI printout of your transcript is attached to the form.

The meeting room and laptop/projector can be booked by contacting Ms. Gorette Silva in the main office (GB 217).

### (5) Conduct of the Ph.D. Qualifying Examination

**Pre Oral Review**

At the start of the oral the candidate will be asked to leave the room while the following procedures are carried out:

- The Chair will briefly review the relevant Departmental Policies related to the Ph.D. program
- The Committee will review the length of time the candidate has been registered in the Ph.D. program
- The Committee will review the student's course performance.

**Oral Examination**

The candidate and any graduate student observers will then be asked to enter the room, and the candidate will make a 20 minute presentation on his/her research.

The committee members will then question the student on his/her research. Student observers may also ask questions. Questions may extend to fundamentals in chemical engineering beyond the main research area of the student.

At the end of the question period, the candidate and any observers will be requested to leave the room.

**Post-Oral Review**

On the basis of the research proposal, presentation and academic standing, the committee may recommend that:

- the student continue in the Ph.D. program
- the examination is adjourned and reconvened within 4 months
- the student's registration in the program be terminated

## (c) Thesis

The thesis must involve an original contribution to knowledge, and be written and defended in an acceptable manner.

Students may, upon agreement between the student, supervisor(s) and the Graduate Coordinator, submit a collection of publishable papers as their thesis. This collection must at minimum have a coherent topic with an introduction presenting the general theme of the research and a conclusion summarizing and integrating the major findings. The minimum requirement is 3 papers, 2 published and 1 submitted to a good quality, peer-reviewed journal.

Information about the SGS requirements for theses can be found on the web at: http://www.sgs.utoronto.ca/informationfor/students/finish.htm. These are in addition to the Departmental requirements to be found in the document: Writing for Engineers, available in the Graduate Office. Theses which do not conform to these guidelines will NOT be accepted by SGS. The SGS website includes information on:

- technical requirements
- previously copyrighted material
- forms to accompany the completed thesis
- authority to distribute (including delayed publication of thesis)
- binding
- microfilming charges

Where someone other than the candidate is a co-author of any portion of the thesis, this fact should be clearly indicated in the introduction, which should also state the actual contribution of the candidate to the work. The examination committee must be satisfied that the candidate's personal contribution to the thesis is sufficient to fulfill the requirements of the Ph.D. degree. A candidate who intends to submit jointly authored work must be prepared to satisfy the committee on this issue. A statement from the co-author as to the candidate's contribution may be helpful.

The thesis should contain sufficient information so that others can replicate the experiments conducted.

**Length of Thesis**

It is recommended that the thesis be no longer than 200 pages, double-spaced, plus relevant appendices. If the student believes that the thesis should be significantly longer than 200 pages, then he or she should consult his or her Reading Committee and the Graduate Coordinator. Students are cautioned that should they wish to deviate from a normal thesis length and format (i.e., the thesis being the primary focus of the research work); they may encounter problems due to the number of faculty involved in examination of the thesis.

## (5) Ph.D. Departmental Final Oral Examination

## (a) Examination Committee Members

The Examination Committee is comprised of:

- members of the Reading Committee, and
- 1 to 2 additional Faculty Members, preferably from this Department

The supervisor and student select the members of the examining committee and arrange a date and time convenient for all members.

The Graduate Office will appoint a Chair from the list of Committee members, exclusive of the candidate's primary supervisor.

## (b) Distributing the Thesis

Copies of the thesis should be distributed to the members of the examining committee at least two weeks in advance of the date of the oral. Committee members may refuse to participate in the examination if less time is given for the appraisal of the thesis.

## (c) Formal Request for the Ph.D. Departmental Final Oral Examination

Once the committee membership has been determined, a Ph.D. Departmental Final Oral Examination Request Form is to be completed and submitted to the Graduate Office. The form can be found on the "Forms and Handbooks" page under the "Graduate Studies" section of the Chemical Engineering website: http://www.chem-eng.utoronto.ca.

In order to hold the Examination, the form is to be submitted to the Graduate Office (WB 212) a minimum of one week (5 business days) prior to the examination. Please ensure that a ROSI printout of your transcript is attached to the form.

The meeting room and laptop/projector can be booked through Ms. Gorette Silva in the main office (GB 217).

## (d) Conduct of the Ph.D. Departmental Final Oral Examination

### *(i) Pre Oral Review*

At the start of the oral the candidate will be asked to leave the room while the following procedures are carried out:

- The Chair will briefly review the relevant Departmental Policies related to the Ph.D. program
- The Committee will review the length of time the candidate has been registered in the Ph.D. program
- The Committee will review the student's course performance.

### *(ii) Oral Examination*

The candidate and any graduate student observers will then be asked to enter the room, and the candidate will make a 20 minute presentation on his/her research.

The committee members will then question the student on his/her research. Student observers may also ask questions.

At the end of the question period, the candidate and any observers will be requested to leave the room.

### *(iii) Post Oral Review*

On the basis of the thesis and the oral defense, the committee may recommend that:

- the candidate proceed to the SGS Ph.D. Final Oral Examination with the thesis as it stands
- the candidate proceed to the SGS Ph.D. Final Oral Examination with minor corrections to the thesis
- the candidate proceed to the SGS Ph.D. Final Oral Examination with minor modifications to the thesis
- the examination be adjourned, to be reconvened at a date decided upon at the examination

## (6) SGS Ph.D. Final Oral Examination

The regulations governing this examination are determined by the School of Graduate Studies and are outlined in detail in the SGS calendar.

Students are advised that at least 10 weeks notice is required by the Graduate Office to set up the examination.

## (a) Examination Committee Members

This committee is comprised of 5 to 6 voting members, as follows:

- a maximum of 3 three members of the Reading Committee;
- 1 to 3 additional members of the graduate Faculty at the University who have not been closely associated with the candidate's research
- an External Appraiser who has not been closely associated with the research of either the candidate or the candidate's supervisor(s). The Appraiser must be at the rank of Associate Professor or Professor.

## (b) Formal Request for the SGS Ph.D. Final Oral Examination

### *(1) Completion of the SGS Ph.D. Final Oral Exam Request Form*

Once the committee membership has been determined, an SGS Ph.D. Final Oral Examination Request Form is to be completed and submitted to the Graduate Office. The form can be found on the "Forms and Handbooks" page under the "Graduate Studies" section of the Chemical Engineering website: http://www.chem-eng.utoronto.ca.

When completing the form, ensure that:

- the form lists, in order of preference, the names of three potential External Appraisers agreed upon by the Reading Committee
- a brief justification for each nominee is included
- An electronic copy of the C.V. for each potential Appraiser is sent to the Graduate Administrator. The C.V. may be the web page content from a website if it contains the following information:
    - affiliation
    - up-to-date publication list
    - employment history

To avoid any prejudicing of the examination, the candidate must not contact the potential Appraisers, so any communications with the Appraiser regarding the C.V. or examination arrangements must be made by the supervisor or other committee member.

### *(2) Selecting the External Appraiser*

Once the form is reviewed and the potential External Appraiser is approved by the Graduate Coordinator, the supervisor then contacts that individual and obtains:

- his or her agreement to serve as external examiner or appraiser and
- possible dates and times for the oral examination.

In order to maintain an "arm's length" relationship, the supervisor must limit contact with the external examiner to getting his/her agreement and determining possible dates and times for the examination.

### *(3) SGS Examination Committee and External Appraiser Approval*

The above information is submitted electronically by the Graduate Administrator to SGS for approval by the Vice Dean of Graduate Programs at SGS.

### *(4) Examination Arrangements*

Once approval from SGS is received, the date and time of the examination may be confirmed. The date must be a minimum of 8 weeks from the date that the supervisor and student receive notification that SGS has approved the committee and Appraiser.

Once the date and time are selected, the Graduate Office works with SGS to book a meeting location and locate a Chair for the examination.

## *(5) Distribution of the Thesis*

The student is to distribute a copy of their thesis to all committee members exclusive of the External Appraiser. This should be done a minimum of 6 weeks prior to the examination

Candidates are to submit a paper copy of the thesis to the Graduate Administrator, who will forward it to the External Appraiser. Please note that the Graduate Office must receive the thesis at least 8 weeks in advance of the date of the oral to provide sufficient time for the Appraiser to receive, review, and appraise the thesis

## *(6) External Appraisal*

The appraisal is received by the Graduate Office, and forwarded to the student at least 2 weeks prior to the examination. The Department will send a copy of the appraisal to SGS and the examining committee.

Should the appraisal not be received by the student at least 2 weeks prior to the examination, the candidate may:

- agree to continue with the examination on the scheduled date, despite having less than 2 weeks prior to the examination to review the appraisal, or
- postpone the examination to a later date

If the examination is postponed, no changes to the Examination Committee membership may be made.

To avoid prejudicing the result of the examination, and to ensure that the defense of the thesis is his or her own work, the candidate may not discuss the appraisal or the examination with members of the Examination Committee until the examination is underway.

## *(7) The Examination*

The examination procedures are located on the School of Graduate Studies website at: http://www.sgs.utoronto.ca/informationfor/students/finish.htm. The procedures are very similar to those of the Departmental Ph.D. Final Oral Examination.

## *(8) Post Examination*

Immediately after the oral examination, the candidate must return to the SGS Ph.D. Orals Office (SGS building, 63 St. George Street) where several documents have to be signed.

## (7) Graduation

Following the oral examination, the student makes all corrections to the thesis as required by the examining committee. Once the supervisor has approved the corrected thesis and informed the SGS Ph.D. Orals Office via email that the corrections have been made, the student submits copies as follows:

- 1 electronic copy to School of Graduate Studies submitted online at: http://www.sgs.utoronto.ca/informationfor/students/finish/final/etd.htm
- 2 bound copies to the Main Office (see Ms. Leticia Gutierrez, Room 217)
- 1 bound copy to each supervisor

Bound copies of the thesis and the completion form should normally be returned to the Department before graduation.

The candidate must also complete and hand in the Materials Sign-Off form to the Graduate Office; the form can be found on the departmental website: http://www.chem-eng.utoronto.ca.

Please check Appendix A for information on thesis preparation costs.

In the final year of Ph.D. study, tuition fees are calculated on a monthly basis, and charged on the 15th day of each month.

The 2009-2010 Dates and Deadlines at the beginning of this handbook includes deadlines that affect the convocation (graduation) date of your degree.

# Appendix A: Thesis Preparation Costs

The Department will cover the photocopying costs associated with the three preliminary copies of the Ph.D. thesis to a maximum per copy of 200 pages plus appendices required by the Reading Committee which meets prior to the Departmental oral. Charges for pages in excess of this must be paid for by the Supervisor. These copies must be made on the photocopying machine in Room 16 and charged to the Graduate Department.

The Department will provide a $150 subsidy towards the actual costs incurred by the student, provided the degree has been earned on a "full-time" basis, and the final oral is completed within two months of the student commencing full time employment.

No monies will be paid until an authorization slip and the required number of bound copies are received in the Main Office.

All original receipts for costs must be presented before you can be reimbursed. These receipts are to be attached to a completed Expense Reimbursement Form and then should be given to Ms. Arlene Fillatre or Ms. Leticia Gutierrez in Room 217. Please keep in mind that a “transaction record” of a credit card or debit card purchase is not a receipt. A proper receipt lists what was purchased as well as any taxes paid. Transaction records do not give that information – they merely report a total.