



**Department of Chemical Engineering
Graduate Student Handbook
For MEng Students**

September 1, 2017



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Preface

Welcome to Graduate Studies in Chemical Engineering at the University of New Brunswick.

This document, prepared by the Graduate Academic Unit (GAU) of the Department of Chemical Engineering, contains a variety of information that will assist you in pursuing your studies. Information in this document is meant to provide assistance by outlining some University policies and procedures that you will need as graduate students. The document does not supersede nor take precedence over any academic or other regulation of the School of Graduate Studies or the University of New Brunswick.

Students are specifically directed to consult the webpage of the UNB School of Graduate Studies for University Regulations. These are available as "Calendar and Regulations", located at:

<http://www.unb.ca/gradstudies/>

If you have any questions, please do not hesitate to contact me or the Secretary of Graduate Studies in the Chemical Engineering Office.

Dr. Huining Xiao
Director of MEng Program
Department of Chemical Engineering

I've Arrived At UNB - What Should I do First??

Welcome to UNB!! When you first arrive you will no doubt be tired and anxious to get accommodations. The first place you should you should come to when you arrive on campus is the Chemical Engineering office which is located on the bottom right of campus when you are looking South. The office is in room D39 in Head Hall (Engineering Building). Below are the steps on how to activate your UNB E-Services, which includes your email account:

IMPORTANT:

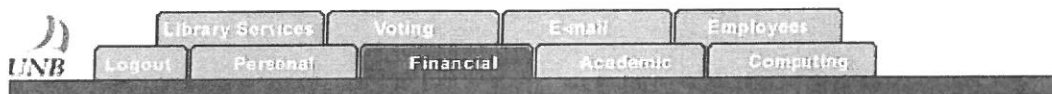
Please ensure you activate your e-services on a lab machine. All new laptops must be registered on the UNB network or you will not have access to the secure wireless network. This can be done after setting up your e-services.

1. Before starting, please have in front of you:
 - Your **student number** (example: 3123456)
 - Your **login id** (example: m1unb)
1. Open a web browser and type in this url: eservices.unb.ca
2. Click "Activate Your IT Services"
3. Follow the instructions and fill in the required information as requested.

Your account is now active and you can now access registration and things such as your course timetable, transcript and payroll notices.

If you have trouble or the system doesn't want to accept your information, here's what you can do:

- Go to <http://helpdesk.unb.ca/> where you will find "Live Help"
- Call UNB's HelpDesk at 1-506-453-5199,
- Send an email to helpdesk@unb.ca explaining your problem and they will email a response to you



My UNB **e**-Services

2. Registration

To register for your courses you can access registration through your eservices by:

- Login to "My UNB e-Service."

- Click the "Academic" tab.
- Click "Course Registration."
- Check the Graduate Course Timetable Fredericton to check for the course number and synonym. The synonym changes for each term but the course number always stays the same.
- Click "Register for Classes."

The information you need for this screen is found in the Timetable. Table 1 is to be filled in with your course selection. An explanation of the column headings follows.

	Synonym	Subject	Course #	Section #	Term	Take For
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Submit

Synonym — 6-digit number identifying the course. This number can be found in the online timetable or on the ChE website.

Subject — GGE, CE, EE, etc., which indicates the department of faculty offering the course.

Course number — e.g., CHE 6997

Section number — e.g., FR01A

Term — e.g., 2011/FA or 2012/WI

Take for — Credit

When you have listed your courses (for both fall and/or winter terms) scroll down and click "Submit". Review the resulting screen carefully to ensure that you've been registered in the appropriate course. If registration for a particular course fails, it will appear with a status of "Failed" along with the reason.

3. U Card (Student ID Card)

Go to U Services which is located at the main floor of the Student Union Building (Open 9:00 am - 4:00 pm) to get your student ID card (you will need your student ID when you go to the bank).

4. Set up a Bank Account.

Most banks will require that you have an appointment to set up an account. Many students will use the Bank of Montreal which is located on campus, however, you can choose any banking institution in Fredericton (Royal Bank of Canada, Credit Union, Scotia Bank, etc.).

5. See Tracie Cameron Financial Services

Tracie Cameron sets up your payroll (if applicable), tuition payment, tax information and arranges for your **health coverage which is mandatory for all students**. UNB allows students to pay their tuition in two payments (September & January).

6. Meet the Director of the MEng Program.

Dr. Xiao likes to welcome and meet all new students. While Dr. Mladen Eic is the Director of Graduate Studies in our department, Dr. Xiao looks after all the MEng students. He is located in Head Hall in E46. Dr. Xiao can also advise you on which courses you should take. It is best to make an appointment with him through email (hxiao@unb.ca). You can also speak with Sylvia, she can assist you with most things related to your graduate program.

Courses and Registration

Registering for Classes

Before registering for courses, you need to consult with Dr. Xiao on the courses you should take each term (whether it be for credit, or extra to degree or audit). The Department requires proof of this exercise and there is a form (see appendix) each term that is required to be filled out by yourself and your supervisor. MEng students may submit this form directly to Sylvia in the department office.

Taking Courses for Credit

Chemical Engineering Courses that begin at the 6000 level are considered graduate level courses ie. ChE6413 or ChE6313. These courses count for the full amount of credit hours assigned to the course (usually 3 ch or 4 ch). At times a supervisor may require their student to take a course at the 4000 or 5000 level; this course would be considered to be undergraduate courses and would only count as ½ credit value. It is important to note that courses taken outside of ChE ie., Civil may consider their 5000 level courses to be graduate level courses.

Taking Extra Courses

At times students may want to take extra courses in addition to the courses required for their MSc, PhD or PEng requirements.

Usually the two main reasons for this is:

- A supervisor may require the student to improve their knowledge in a certain course area, or
- A student may want to take undergraduate courses to fulfill the requirements for PEng status (Professional Engineer).

Students interested in finding out the PEng requirements should speak with Frank Collins, He is located in E230, Room F in Head Hall.

When taking extra courses it is important to remember that if they are not taken as “extra” to their degree the grade obtained will affect their GPA. It is also possible that if the “extra” courses are not required by their supervisor UNB may charge additional fees.

Students will have to complete a Course Change Form (see appendix) for any courses they wish as an extra to their graduate program.

Auditing a Course

To audit a course, a student must receive permission from the instructor, the student's supervisor, and the DoGS of the student's GAU. Students will have to complete a Course Change Form for any course(s) they wish to audit. To audit a course, both the course instructor and the DoGS must approve and sign the course change form. The course instructor is the final arbitrator on whether a student may audit a course. It is up to the student to discuss these regulations with the instructor before registration.

The degree of participation by a student auditing a course is limited and must be agreed to in advance by the student and the instructor. A student may not convert an Audit to Credit or Credit to Audit beyond the normal date for adding or changing course registrations. If, at the end of the course, the student has fulfilled all the requirements set forth by the instructor and agreed to by the student, the instructor will inform the registrar and the course will be retained as an AUDIT course on the transcript. If the student does NOT fulfill the requirements, the course will be deleted from the transcript. A course that has been taken on an audit basis may not be subsequently taken on a normal credit with grade basis.

Courses Offered

The GAU offers the courses that are listed on the next page at least once every two years or as demand dictates. The 6000 courses are for graduate students only and graduate students will receive full credit. The courses are grouped in general subject areas and graduate students are normally expected to make their selection from at least two areas.

Admission and Degree Requirements

ADMISSION REQUIREMENTS

Candidates should normally hold a chemical engineering bachelor's degree from a recognized university with an average of B or better (second division standing). Candidates with a Bachelor's degree in science, applied science or other engineering disciplines are also eligible, provided that they have the requisite academic standing. Candidates with non-chemical Engineering background will be conditionally accepted to our graduate program with the conditions being: the candidate will be instructed at Admission to take 4 courses chosen from Heat Transfer, Staged Processes, Chemical Reaction Engineering, Process Control and Mass Transfer Operations. These courses with grade B or better might be counted as half value towards the graduate degree with approval up to a maximum of 8 credit hours.

By taking appropriate courses to complement their background, candidates may satisfy the requirements for professional engineering registration. It is the responsibility of the student to apply to the Professional Engineering organization and establish which courses are needed to satisfy the requirements.

DEGREE REQUIREMENTS

MEng

The MEng in Chemical Engineering is a 12 to 24 months practically-oriented program intended primarily for students who plan to make their careers in industry. The degree is course-based where the requirement is successful completion of an approved 30 credit-hour program, drawn from three core areas of study important to all chemical engineers working in industry: *Health, Safety and the Environment*; *Business and Management*; and *Engineering Science*.

Admission to the MEng program is normally restricted to individuals holding a bachelors degree in chemical engineering. Students holding a degree in a related discipline (BSc, BEng, or BScEng in another discipline) are also eligible for admission, but will be given additional degree requirements (see below). The M.Eng degree is not terminal and students who successfully complete the M Eng are eligible for admission to the Ph D program on a competitive basis.

Substitutions or alternate courses for each of the M.Eng. categories can be taken upon written approval of the Department.

Health, Safety and the Environment (6 ch required)

CE 6413	Physical & Chemical Processes in Environmental Engineering	3ch
CE 6416	Industrial Wastewater Treatment	3 ch
CE 6443	Water Quality Modelling	3 ch
CE 6483	Environmental Engineering	3 ch
ENVS 6001	Nature, Society and Social Ecology	3 ch
ENVS 6003	Environmental Management Tools	3 ch
ENVS 6004	Environmental Impact Assessment:	3 ch
ENVS 6008	Management of Natural Systems	4 ch
ME 5933	Industrial Ecology	3 ch
ME 5283	Micro/Nano Manufacturing	3 ch

Business and Management (6-9 ch required)

(NOTE: No more than 2 MBA courses can be taken from the list below.)

MBA 6133	Management of Innovation and Technology	3 ch
MBA 6119	Venture Development	3 ch
MBA 6203	Accounting for Managers	3 ch
MBA 6303	Marketing, Theories and Strategies	3 ch
MBA 6403	Financial Management	3 ch
MBA 6503	Organizational Studies	3 ch
MBA 6521	Managerial Leadership	3 ch
MBA 6607	Production and Operations Management	3 ch
MBA 6802	Human Resource Management	1.5 ch
TME 6213	Quality Management	3 ch
TME 6313	Managing Engineering and IT Projects	3 ch
TME 6346	Marketing of Tech Goods and Services	3 ch

Engineering Science (15-18 ch required)

CHE 6235	Oil and Gas Processing	3 ch	
CHE 6244	Enhanced oil Recovery	3 ch	
CHE 6264	Oil Sands Technology	3 ch	
CHE 6313	Energy and Environment	3 ch	
CHE 6314	Air Pollution Control	3 ch	
CHE 6402	Preliminary Project Report and Presentation	6 ch	
CHE 6416	Bioseparations Science and Engineering	3 ch	
CHE 6417	Polymer Materials & Reaction Eng.	3 ch	
CHE 6418	Catalytic Reaction Engineering	3 ch	
CHE 6423	Practice School	2 ch	
CHE 6503	Nanotechnology	3 ch	
CHE 6515	Advanced Surface Characterization	3 ch	
CHE 6714	Electrochemical Engineering	3 ch	
CHE 6824	Corrosion Processes	3 ch	
CHE 6834	Nuclear Engineering	3 ch	
CHE 6913	Pulp Production	3 ch	
CHE 6923	Papermaking	3 ch	
CHE 6933	Biorefining: Principles, Processes & Products	3 ch	
CE 6413	Physical & Chemical Processes in Environmental Engineering	3 ch	3 ch
CE 6416	Industrial Wastewater Treatment	3 ch	
CE 6443	Water Quality Modelling	3 ch	
CE 6483	Environmental Engineering	3 ch	
ME 5373	Nuclear Reactor Engineering	3 ch	
ME 5473	Energy Management	4 ch	
ME 5483	Cogeneration and Combined Cycle Power Generation	4 ch	4ch
ME 5744	Steam Supply Systems	4 ch	
ME 5754	Steam and Gas Turbines	4 ch	

Students **not holding a bachelors degree in chemical engineering** will be required to successfully complete any four (4) of following six undergraduate courses as part of their M.Eng degree requirements.

Please note this is not applicable to students holding a BScE degree and the courses below are considered “extra” and not creditable towards your 30 ch degree requirement.

CHE 3304	Heat Transfer	4 ch	
CHE 3324	Staged Processes	4 ch	
CHE 4601	Process Control	4 ch	
CHE 4101	Chemical Reaction Engineering	3 ch	
CHE 4341	Mass Transfer Operations	4 ch	

These courses, which may be taken at any time throughout the degree program, are taken as “extra” (the courses are not used to calculate a student’s GPA), and will count as half credit towards the degree (maximum of 8 ch). Please complete the Graduate Student Course Change Form.

Updated: July 11, 2017

Below is a list of courses that the Department of Chemical Engineering offers. Please note that courses are offered on a rotational basis as available. Please refer to the Timetable to see what courses are currently being offered.

CHE 6234 Process Design and Simulation	3 ch
CHE 6235 Oil and Gas Process Engineering	3 ch
CHE 6244 Enhanced Oil Recovery	3 ch
CHE 6264 Oil Sands	3 ch
CHE 6313 Energy and the Environment	3 ch
CHE 6314 Air Pollution Control	3 ch
CHE 6402 Preliminary Project Report and Presentation (MEng only)	6 ch
CHE 6414 Chemical Process Industries	3 ch
CHE 6416 Bioseparations Science & Engineering	3 ch
CHE 6417 Polymer Materials & Reaction Engineering	3 ch
CHE 6418 Chemical Reaction Eng. II and Catalysis	3 ch
CHE 6434 Advanced Transport Phenomena	3 ch
CHE 6501 Special Topics in Chemical Engineering	1 ch
CHE 6502 Special Topics in Chemical Engineering	2 ch
CHE 6503 Nanotechnology	3 ch
CHE 6515 Advanced Surface Characterization	3 ch
CHE 6522 Nanoparticle Engineering	3 ch
CHE 6714 Electrochemical Engineering	3 ch
CHE 6824 Corrosion Processes	3 ch
CHE 6834 Nuclear Engineering	3 ch
CHE 6913 Pulp Production	3 ch
CHE 6923 Papermaking	3 ch
CHE 6933 Biorefining: Principles, Procedures and Prod.	3 ch

General Notes

ChE Office D39 Head Hall

Phone: (506) 453-4520 Fax: (506) 453-3591

Office Hours: Fall/Winter 8:15 – 4:30 pm closed from 12:00-1:00

Mail

If we receive any mail for a MEng student we will place that student's name on the whiteboard outside the department office. Please note that personal mail should be directed to your home address not the ChE Department.

Supplies

You will be responsible for your own supplies.

Stores

The Department has a store manager, his name is Carl Murdock and he is located next to the B24 lab. At some point your supervisor will probably request that you get Carl to order you some sort of chemical, gas or equipment (you must be in possession of a valid WHMIS Card)

- He will have a form that you must complete and have your supervisor sign
- He will then arrange for the ordering. Students do not usually buy research related items with their own money.
- All chemicals must be ordered through Carl or obtained through the Chemistry stores. Please do not order chemicals directly.

Machine Shop

The Department also has two machinists on staff. If you require them to make something for your research project, they require you to fill out a form indicating the work required and that you have your supervisor's permission. Adon Briggs is responsible for the handling of shop requisitions.

Health Insurance - leaving the province

Students should note that the health insurance they are enrolled in through UNB is for treatment in New Brunswick only. Should you travel outside of New Brunswick or go to another province for study purposes for any length of time, you must make sure that you apply for additional insurance. Please see Linda Maher in Financial Services for details.

Teaching Assignments

Teaching assignments are usually put together and emailed to the Graduate Student list 2-3 weeks before new term. Assignments are usually a 4-6 hour per week commitment for the entire term. Assignments are given priority according to the Collective Agreement with the Union of Graduate Student Workers and as Teaching Assignments are on a competition basis, there are not always enough positions to go around. Please do not approach a Professor to obtain their permission to TA a particular course. If you are successful in receiving a Teaching Assignment I will email you with the details.

Accepting a Teaching Assignment means a firm commitment to the department that you will be available throughout that term and will not be away on conference or have other commitments that will make it difficult for you to keep your Teaching Assignment responsibilities. Please indicate in the space provided if you think you may have a conflict.

Social Insurance Number (SIN) – Human Resources requires that you have a valid Social Insurance Number for the duration of your Teaching Assignment. Please ensure that the Graduate Secretary always has a copy of your current SIN for your file. If you do not have a SIN please contact the Sylvia Demerson, Graduate Assistant and she will type up a letter for you to take to Human Resources downtown to apply for your Social Insurance Number. Your pay will not be processed by the University until you have a valid SIN on file.

Laboratory Safety

The responsibility for the management of laboratory safety is the responsibility of all Faculty, Staff and Students. Everyone should be concerned with safety whenever they are working in a laboratory setting.



All students/employees require WHMIS training before they are allowed to deal with chemicals. The supervisor is responsible for providing a safety orientation of the working environment to identify all safety equipment, potential hazards and proper safety procedures. This training is usually offered at the beginning of each term. Contact either Sylvia or Karen in the department office if you would like to be included in this training.

If you are not given a safety orientation when you go to work in a new area, you must ask for one. It is your responsibility to know the hazards in the area so you can remain safe. You are responsible for your safety.

Safety is covered in CHE 6511. The Department Office offers WHMIS training every term. Please

General Laboratory Rules

The proper personal protective equipment must be worn at all required times. The required equipment is always a lab coat and safety glasses, and any other pieces the situation calls for. This could be nuclear badges, dust masks, shields etc. The extra pieces of equipment are to be provided by the supervisor if required. NO open toe shoes may be worn in the lab and shorts and skirts should be avoided as exposed skin is always more susceptible to chemical spills.

Always wash your hands with soap before leaving the laboratory.

No food or drink is allowed to be consumed or STORED in the laboratory. Food should always be kept outside the lab. You should never risk the consumption of chemicals.

Always be aware of the emergency equipment in the room and it's location, i.e. fire extinguisher, eye wash station.

The MSDS (Material Safety Data Sheets) binder is located on the wall next to the entrance door. Everyone in the lab is required to know where the MSDS binder is located so that proper emergency procedures can be followed in case of an accident with a chemical. The university is required by law to keep the MSDS data up to date in the laboratories. Therefore it is the students responsibility to insure that every chemical that they introduce into the laboratory had it's accompanied MSDS placed in the binder in alphabetical order and that the chemical inventory sheet is updated. The sheets are only valid for 3 years and are required to be replaced after they expire. Chemicals that are no longer in the lab should have their sheet removed from the binder and the inventory updated.

To avoid accidents the work place should always be kept clean and tidy. Chemicals and equipment that are no longer in use should be returned the Chemical Stores.

Please ensure that windows and doors are secure at the end of each day.

Report water leaks, lab spills (fumes) to the Department Office or your Supervisor immediately.

Emergency Procedures

All emergency procedures can be found in the UNB safety handbook online at www.unb.ca/safety. A guide is located next to all telephones in the laboratories.

The Department Safety Officer, Carl Murdock (453-4518) and your supervisor must be informed of all accidents and near misses. Near misses are just as important to report as accidents. This is to avoid the situation occurring again causing a real accident. If a problem is not identified as a near miss then the result could be an accident.

Should an accident occur a UNB accident report form must be completed within 24 hours.

Chemical Handling

Transporting chemicals must be done with great care. The safety of the general public (everyone in the general vicinity) must always be of the upmost importance. There are proper procedures outlined in the TDG – transport of dangerous goods.

Compressed gas cylinders must always be transported on a cart and must be properly restrained at all times.

For more information on the proper handling please check with the stores manager, Carl Murdock, in room B14.

Chemical Labelling

Every container that holds a chemical requires a label.

Labels should include the following in CLEAR BLOCK LETTERING:

- IN ENGLISH, the name of the chemical (abbreviations, common names, and formulas are not acceptable),
- the concentration of the chemical,
- the date the bottle was first opened, or the date the mixture was created,
- the name of the individual that the chemical belongs to.

Chemical Waste

Chemical Waste is anything that is generated from chemicals that must be disposed of in a special manner.

This could include products from chemical reactions, gas cylinders, contaminated containers and broken glass.

In chemical waste containers only compatible chemicals may be stored together. It is the responsibility of the student to understand what chemicals are in the waste container and to be able to identify if their waste is compatible or not.

All chemical waste containers must be properly labeled as "CHEMICAL WASTE", and must note the names of the chemicals in the container and their approximate quantities. Listing the container as "solvent waste" is NOT an acceptable label.

Detail and care must be taken when labeling the waste since this will make disposal safer.

Gas Cylinders

Gas cylinders are of special concern, they pose 3 hazards. They could fall over and onto someone and cause injury. They could fall and have the valve sheared off, allowing the discharge of contents which could cause the cylinder to become a projectile. Also, if the regulator or valve is leaking, hazardous gas could be released into the air.

Gas cylinders must be properly retained at all times during storage and transportation.

Proper regulators must always be used.

Full and empty cylinders should always be stored separately.

Chemical Storage

All chemicals must be properly stored according to their specific requirements. The Storage requirement must be known (MSDS) and followed.

Acids and bases should always be stored separately from one another. This is to avoid undesired contact between the two types of chemicals. Acids sometimes warrant special storage facilities, but in general simply keeping them in separate designated cabinets is acceptable.

Flammable and corrosive and toxic chemicals must always be stored separately.

Full and empty gas cylinders should always be stored in separate areas, and they should be MARKED as EMPTY or FULL.

The maximum allowable container size is 5 liters (exceptions to this rule are found in the policy on flammable liquids). The maximum quantity of flammable liquids that are allowed to be kept in a given lab is 50 liters.

Your Rights

You always have the right to refuse to do work you do not feel is safe.

According to Work Place Health and Safety no one can be forced to do work they feel puts them at risk. The situation can be assessed and then the proper safety precautions can be put in place

You can request extra PPE (Personal Protection Equipment) if you feel it necessary.

*Wearing Personal Protective Equipment (PPE)
May Not be Fashionable but Neither is an Injury*



UNB Writing Centre

UNB's Writing Centre, located on the top floor of Keirstead Hall in rooms 318-319, helps students improve their academic skills through individual tutoring and small group workshops.

Individual Tutoring: The Writing and Study Skills Program is open to all full and part-time UNB students and provides individual tutoring in writing and other academic skills, including note taking, examination preparation, and time management. Call **453-4646** to make an appointment.

Engineering Library Drop-in Hours: We will be offering a drop-in service in the Engineering Library: Tuesdays and Thursdays from 11:00 to 3:00.

Saturday Workshops: During both terms, the program conducts a number of weekend workshops. For topics and dates consult our web site or the College of Extended Learning calendar; the Fall 2006 schedule is on the reverse of this flyer.

Monday Night Writing Workshops: From September to April, the Writing Centre hosts weekly one-hour workshops concentrating on key writing topics: punctuation, sentence structure, paragraphing, diction, documentation systems, and more. Check our on-line schedule for details and come join us on Mondays at 6:30!

Special Services: Tutoring is also available for distance education students; contact us for more information.

E-Mail: wss@unb.ca
Phone: **Appointments: 453-4646**
(College of Extended Learning)
Writing Centre: 452-6346



Web Site: <http://extend.unb.ca/wss/>