



McGill University  
Department of Chemical Engineering

## **UNDERGRADUATE STUDENT HANDBOOK**

for students entering the B.Eng. program  
in Chemical Engineering in September 2014 or January 2015

Montreal, July 2014

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*Much information concerning courses and regulations is contained in the current University Calendar, which you are advised to consult for additional information or any changes that may occur during your stay within the department.*

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Prof. Jean-Luc Meunier - Undergraduate Curriculum Committee  
Prof. Pierre-Luc Girard-Lauriault - Undergraduate Curriculum Committee  
Prof. Corinne Hoesli - Undergraduate Curriculum Committee

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**I. TEACHING PERSONNEL IN CHEMICAL ENGINEERING**

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Prof. D. Berk, P.Eng.	4260	514-398-4271
Prof. S. Coulombe, ing.	3100	514-398-5213
Prof. P.-L. Girard-Lauriault	4150	514-398-4006
Prof. J. Gostick, P.Eng.	3140	514-398-4301
Prof. R.J. Hill	4280	514-398-6897
Prof. C. Hoesli, ing.jr.	4230	514-398-4275
Prof. A. M. Kietzig	4140	514-398-3302
Prof. J. Kopyscinski	4310	514-398-4276
Prof. R.L. Leask, P.Eng.	4120	514-398-4270
Prof. M. Maric, P.Eng.	4270	514-398-4272
Prof. J.-L. Meunier, ing.	3070	514-398-8331
Prof. C. Moraes	4330	514-398-4278
Prof. S. Omanovic, P.Eng.	4130	514-398-4273
Prof. A.D. Rey, FRCS	4100	514-398-4196
Prof. P. Servio	4110	514-398-1026
Prof. N. Tufenkji, ing.	4300	514-398-2999
Prof. V.Yargeau, ing.	4160	514-398-2273

## II. DEPARTMENTAL ASSISTANCE TO STUDENTS

### a) Academic Advising

If a student needs help with matters such as course selection, course transfer, internship, study abroad, or needs to meet an academic adviser, the student should contact the McGill Engineering Student Centre (MESC - <http://www.mcgill.ca/engineering/current-students/undergraduate/mesc>). MESC is located on the main floor of the Frank Dawson Adams building, Room 22.

### b) Undergraduate Curriculum Committee (UCC)

The committee is composed of four students elected by their classes (U1, U2, U3 and U4), the president of the Council, the VP Academic and four staff members. The committee provides a forum for all matters involving undergraduate student/staff interactions.

Elections are held in September (U1, U4) and in March (U2, U3). For the Academic Year 2014-2015, the membership is:

U4	- To be elected
U3	- Adeola Odusanya
U2	- Jack Minchom
U1	- To be elected
President	- Alexander Gershanov
VP Academic	- Katie MacDonald
Staff	- Professors S. Omanovic (Chair), J.-L. Meunier, P.-L. Girard-Lauriault and C. Hoesli

### c) Canadian Society for Chemical Engineering, (C.S.Ch.E) Student Chapter

The President of the Student Chapter in 2014-2015 is Oren Singer. Prof. Richard Leask is the Faculty Advisor for the Student Chapter. The role and activities of the Student Chapter are described in the University Announcement.

### d) Financial Aid and Scholarships

Bursaries and loans are applied for through the Scholarships and Student Aid Office, Brown Student Services Bldg., Suite 3200, 3600 McTavish St. (<http://www.mcgill.ca/studentaid/>). The primary criterion is financial need.

The scholarships awarded through the department and/or the Faculty of Engineering, primarily for outstanding academic achievements, do not require an application by students.

Additional scholarships can be identified and applied for through Career Planning Service (CaPS) and Student Awards. Further information can be found here: <http://www.mcgill.ca/engineering/current-students/undergraduate/scholarships-financial-aid/external-scholarships>

### e) Facilities in the Department

There are three breakout rooms that are available to Chemical Engineering Undergraduate students in the space across the hallway from Lab 1160. These rooms can accommodate up to 8 people and two of the rooms have flat screen displays for presentations. These rooms are meant for team work, design meetings, preparation of presentations or for work on projects. They are not social rooms. Please see Ms. Jo-Ann Gadsby on floor 3A for access. Undergraduate students can also use Room Wong 1130 for course and research related meetings and presentations. The room has to be booked in advance through Ms. Jo-Ann Gadsby.

The department owns a substantial amount of equipment in its undergraduate and research laboratories. Specialized department services are provided by:

Undergraduate Laboratories	- Wong 4200 - Mr. F. Caporuscio
Lab. Equipment & Supplies Stores	- Wong 3270 - Ms. M. Gorman
Electronics Shop	- Wong 3250 - Mr. G. Lepkyj
Analytical Laboratory	- Wong 4200 - Mr. R. Roy
	- Wong 4200 - Mr. A. Golsztajn
Secretarial Office	- Wong 3060 - Ms. E. Musgrave

### f) Handbook of Chemical Engineering

An electronic copy of Perry's Chemical Engineers' Handbook is available on the Access Engineering's web-site (<http://accessengineeringlibrary.com>). The handbook is accessible through the McGill Library web-site.

## III. MISCELLANEOUS INFORMATION

### a) French

A knowledge of French, essential for engineers to work and communicate effectively in Quebec, is a valuable additional qualification to maintain your ability to move freely in Canada, and provides an important additional attribute for working and travelling internationally. If you do not have a working knowledge of French, you will greatly reduce your opportunities for summer or permanent jobs with companies with Quebec operations. It is also necessary for an engineer to show competence in French to become a member of the Order of Engineers of Quebec and thus to be licensed to practice as a professional engineer. Moreover, we live in a dynamic French milieu whose social and cultural riches cannot be enjoyed without a knowledge of French. It is, therefore, highly advantageous to acquire or improve your ability in French during your years at McGill.

The needs of individual students in this area vary widely. Some need beginner's courses while others require practice in speaking or technical vocabulary, etc. A number of ways of improving skills in French are:

- Write a technical paper in French. Allowance is made in marking of grammar and style when French is not your first language. Please mention this to the professor.

- Take elective courses at UQAM, École Polytechnique de Montréal or U. de Montreal through the Quebec Inter-University Transfer program. Additional information and the necessary form can be found here: <http://www.mcgill.ca/students/iut>
- Take one or more French Department courses.
- Be a member of a laboratory group which communicates internally and externally (wherever possible) in French.
- Arrange a French discussion or practice group.
- Use all opportunities available (e.g. shopping, television, internet, newspapers, radio) to practice and improve your French.

**b) Photocopying**

Numerous copying machines are available in the Wong and McConnell Buildings and Libraries.

**c) Oral Presentations**

Most classrooms are equipped with projectors for the use of computers in presentations. Other projectors are also available to students from ICS (Audiovisual Equipment Loans - <http://kb.mcgill.ca/kb/?ArticleId=1744&source=article&c=12&cid=2#tab:homeTab:crumb:7:artId:1744>) (688 Sherbrooke St. W. Room 285).

## **IV. COURSE ORGANIZATION**

**a) Course Progress**

At the first advising session, new students should note the Graduation Requirements form (p. 25-27) which can be used to plan and follow their progress at McGill. Students will record on the form all additional admissions requirements, exemptions or advanced credits (see Section V below) and course marks. This form will eventually be turned in to an Academic Adviser as part of a pre-graduation procedure.

Progress and remaining requirements to complete towards graduation can be seen on Minerva (Main Menu/Student/Student Records Menu/Degree Evaluation).

**b) Course Loads and Length of Program**

The normal course load per semester is 15-18 credits. Students taking 11 credits or less per semester are registered as part-time students. Students receiving certain bursaries and loans may be required to maintain full time status. Check with your financing provider prior to taking less than 12 credits in one semester. International students in Canada on a visa may also be required to maintain full time status. Contact International Student Services if you have questions (<http://www.mcgill.ca/internationalstudents/contactus>). A student who wishes to register for more than 18 credits in a term may only do so with special permission of MESC.

Students on probationary standing must take a reduced load of no more than 13 credits per semester including repeated courses (see Section *f* further in the handbook). The exact number of credits will be recommended by an Academic Adviser on the basis of the difficulties experienced by the student. Care should be taken in the choice of courses for a reduced load to try and meet pre-requisites for courses to be taken in following semesters or years. For example, CHEE 204 (given in Winter) is a pre-requisite for both CHEE 314 (given in Fall) and CHEE 351 (given in Winter).

**c) Course Change Deadlines (2014-2015)**

	<u>Fall 2014 Semester</u>	<u>Winter 2015 Semester</u>
Last day to change courses (no financial penalty and no entry on transcript)	Sept. 16 (Tuesday)	Jan. 20 (Tuesday)
Last day for withdrawal (with refund) (with a W)	Sept. 23 (Tuesday)	Jan. 27 (Tuesday)
Last day for withdrawal (without refund)* (with a W)	Oct. 14 (Tuesday)	Feb.17 (Tuesday)

Beyond this time, student names will appear on the examination lists, and in the event of students not taking the examination, they will be given a "J" grade.

\*Please note that these dates are different for multi-term courses beginning in both Fall and Winter. Please consult: [http://www.mcgill.ca/study/2014-2015/university\\_regulations\\_and\\_resources/undergraduate/gi\\_regulations\\_concerning\\_course\\_withdrawal](http://www.mcgill.ca/study/2014-2015/university_regulations_and_resources/undergraduate/gi_regulations_concerning_course_withdrawal)

**d) Course Grades**

Course grades (see the University Calendar under General University Information and Regulations) are defined as follows:

- 1) Grades of A, A-, B+, B, B- and C+ indicate the extent to which ability superior to that required to qualify for the professional degree is demonstrated.
- 2) A grade of C (satisfactory) implies achievement at a level of performance consistent with awarding a B.Eng. degree and thus with the practice of the engineering profession.
- 3) Grades of D and F indicate the extent of deficiency below the required level.

In the Faculty of Engineering, letter grades are assigned according to the grading scheme adopted by the professor in charge of a particular course. This may not correspond to grades indicated in the "Numerical Scale of Grades" column in Grading and Grade Point Averages in the Undergraduate Calendar. A grade of D indicates marginal performance which is acceptable only for Complementary Studies courses (i.e., Group A Impact of



Technology on Society and Group B Humanities and Social Sciences, Management Studies and Law). A grade of D is not acceptable for required (core) courses. For the Department of Chemical Engineering, core courses include all required courses (departmental and non-departmental) as well as complementary courses (departmental).

*NOTE: A grade "D" in a pre-requisite course that is a required course in the Chemical Engineering program is considered sufficient to register for the subsequent courses. A grade "D" is, however, not a passing grade and thus, the course for which a "D" grade was obtained must be passed successfully before graduation.*

**e) Reassessment of a Grade**

You can request a formal reread of a final examination once you have discussed it with your instructor. You must complete a Request for a Reread of a Final Exam form and submit it to the Student Affairs Office (MESC). You may request rereads for only one course per term, unless you obtain permission from the Student Affairs Office (MESC). Grades may be either raised or lowered as the result of a reread. A fee for each reread will be assessed directly to your McGill account if the result remains the same or is lowered. If the grade is raised, there is no charge. Reread application deadlines: Fall courses: last working day of March / Winter courses: last working day of July / Summer courses: last working day of November. Non-Engineering courses: Rereads in courses not in the Faculty of Engineering are subject to the deadlines, rules, and regulations of the relevant faculty.

**f) Standings**

**Satisfactory Standing:**

You are in Satisfactory Standing if you have a CGPA of 2.00 or greater.

You may continue with your studies under the following conditions:

- If you obtained a grade of D or F in a core course, you must repeat the course successfully (grade of C or better) or replace it with an alternative approved course and successfully complete the course.
- If you obtained a grade of F in any other course, you must either repeat the course successfully before graduation or replace it with an alternative approved course and successfully complete the course before graduation.

**Probationary Standing:**

You are in Probationary Standing if you have EITHER:

a CGPA that is less than 2.00 and equal to or greater than 1.20

OR

a TGPA that is equal to or greater than 2.50 and a CGPA that is less than 2.00.

You may continue with your studies under the following conditions:

- You must reduce your credit load to a maximum of 13 credits per term and must obtain, at the end of the term, either a CGPA of 2.00 or greater or a TGPA of 2.50 or greater.
- If you have a TGPA of 2.50 or greater, but you have a CGPA that is less than 2.00, you may continue with your studies but you will remain in Probationary Standing until you obtain a CGPA of 2.0 or greater.
- If you do not obtain either the TGPA or CGPA noted above, you will be placed in Unsatisfactory Standing.
- You must consult a faculty or departmental adviser before withdrawal deadlines concerning your course selection

**Unsatisfactory Standing:**

You are in Unsatisfactory Standing if you have EITHER:

a CGPA that is less than 1.20

OR

a TGPA that is less than 2.50 and a CGPA that is less than 2.00.

If at any time, you were placed in Unsatisfactory Standing and were readmitted to the Faculty of Engineering after one term away, and you are placed in Unsatisfactory Standing again at the end of any subsequent term, you may not continue in your program. You will be asked to withdraw from the Faculty of Engineering for a minimum of one term or permanently, based on the conditions of your last letter of readmission.

If you are in Unsatisfactory Standing for the first time, the regulations below apply.

***Students in Interim Unsatisfactory Standing after the Fall term:***

You may continue with your studies under the following conditions:

- You must reduce your credit load to a maximum of 13 credits per term and must obtain, at the end of the term, either a CGPA of 2.00 or greater or a TGPA of 2.50 or greater.
- If you have a TGPA of 2.50 or greater, but your CGPA is less than 2.00, you may continue with your studies but will remain in Probationary Standing until you obtain a CGPA of 2.00 or greater.
- If you do not obtain either the TGPA or CGPA noted above, you will be placed in Unsatisfactory Standing.
- You must consult a faculty or departmental adviser before withdrawal deadlines concerning your course selection.

***Students in Unsatisfactory Standing after the Winter term:***

- You must withdraw from the Faculty of Engineering for a minimum of one term.

For more information about Academic Standing, see:

<http://www.mcgill.ca/engineering/current-students/undergraduate/advising-programs/academic-standing>

**g) Readmission**

To return to McGill after an absence from a Fall and/or Winter term of an academic year, you must submit an application for readmission using Minerva's Faculty Transfer/Readmission Menu (Minerva Main Menu/Student/Student Records Menu/Faculty Transfer / Readmission). In your application, state the reasons for your absence from the University and give a summary of your activities during that period using the comment section.

If you withdrew because of illness, you must provide the Student Affairs Office (MESC) with a medical note from a physician to support your application for readmission, stating that you are ready and able to resume studies.

For important deadlines regarding readmission, please see: <http://www.mcgill.ca/engineering/student/sao/current/facultytransferreadmission/readmission>

**h) Summer Courses**

Summer course offerings are published in the Summer Session Announcement available in the early winter of the corresponding year. Normally very few engineering courses are offered. CHEM 212 and 234 are usually offered. A considerable number of courses are offered in management (Faculty of Management) and in French (Faculty of Arts and Centre for Continuing Education). Note that prior approval must be obtained from an Academic Adviser for any course that is to count for degree credit.

Courses CHEE 363, CHEE 494, CHEE 495, CHEE 496 are also available in the summer if arrangements can be made with an academic staff member of the Chemical Engineering Department.

**i) Definition of Advanced Credit and Exemption**

Students who have previously taken a required course in the program may be granted advanced credit or exemption for that course. For exemption, the credits of the course must be replaced by an equal or higher number of credits of another course having the same accreditation category breakdown (e.g. Basic Science, Mathematics, Engineering Science, Engineering Design, Complementary Studies). No replacement is needed for advanced credits.

There is no equivalence between Science Math courses and Engineering Math courses for students who do not hold a degree in Science.

Computer courses taken outside McGill, while a student is registered in Engineering, do not count for credit.

**j) Pre-requisites**

Students must have the required pre-requisite in their academic history in order to register in a course through Minerva.

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## **V. SPECIFIC PROGRAM REQUIREMENTS**

### **A. GENERAL**

#### **a) Introduction**

This Handbook states the rules applicable to students entering the first year of the program in September 2014 or January 2015.

#### **b) Classification of Courses**

The program includes several categories of courses:

- 1) Required Departmental courses
- 2) Technical Complementary (TC) courses
- 3) Required Non-departmental courses
- 4) Complementary Studies (CS)

Courses in categories 1), 2) and 3) are referred to as "core" courses.

#### **c) Total and Distribution of Credit Requirements**

See following pages.

## CURRICULUM FOR THE B.ENG. DEGREE IN CHEMICAL ENGINEERING

### REQUIRED COURSES

<b>Non-Departmental Courses</b>		<b>Course Credit</b>	
CHEM 212	Introductory Organic Chemistry 1	4	
CHEM 234	Topics in Organic Chemistry	3	
MATH 262	Intermediate Calculus	3	
MATH 263	Ordinary Differential Equations for Engineers	3	
MATH 264	Advanced Calculus for Engineers	3	
FACC 100	Introduction to the Engineering Profession	1	
FACC 300	Engineering Economy	3	
FACC 400	Engineering Professional Practice	1	
COMP 208	Computers in Engineering	3	<b>24</b>
<b>Chemical Engineering Courses</b>			
CHEE 200	Chemical Engineering Principles 1	3	
CHEE 204	Chemical Engineering Principles 2	3	
CHEE 220	Chemical Engineering Thermodynamics	3	
CHEE 231	Data Analysis and Design of Experiments	3	
CHEE 291	Instrumentation and Measurement 1	4	
CHEE 310	Physical Chemistry for Engineers	3	
CHEE 314	Fluid Mechanics	3	
CHEE 315	Heat and Mass Transfer	3	
CHEE 351	Separation Processes	3	
CHEE 360	Technical Paper	1	
CHEE 370	Elements of Biotechnology	3	
CHEE 380	Materials Science	3	
CHEE 390	Computational Methods in Chemical Engineering	3	
CHEE 400	Principles of Energy Conversion	3	
CHEE 401	Energy Systems Engineering	3	
CHEE 423	Chemical Reaction Engineering	3	
CHEE 440	Process Modelling	3	
CHEE 453	Process Design	4	
CHEE 455	Process Control	3	
CHEE 456	Design Project 1	2	
CHEE 457	Design Project 2	5	
CHEE 474	Biochemical Engineering	3	
CHEE 484	Materials Engineering	3	
CHEE 491	Instrumentation and Measurement 2	4	<b>74</b>

**COMPLEMENTARY COURSES****Technical Complementary Courses (TC) Course Credit**

Courses to be selected from those approved by the Department (see list below) 9

**Complementary Studies (CS) 9**

9 credits from Group A and Group B of Faculty Announcement

**NOTE:** Non-CEGEP students usually take one CS course in their first year of study (year 0); this course counts towards the 9-credit CS requirement.

**TOTAL 116**

**d) Departmental Technical Complementary Courses.**

*For up-to-date curriculum, please consult the University Calendar*

The purpose of this requirement is to provide students with an area of specialization within the broad field of chemical engineering. Alternatively, students use the technical complementaries to increase the breadth of their chemical engineering training.

At least two courses (5-7 credits) must be chosen from the list below. The remaining course(s) (2-4 credits) may be taken from other suitable undergraduate courses in the Faculty of Engineering, with departmental permission. Note that many of the technical complementaries are offered only in alternate years. Students should, therefore, plan their complementaries as far ahead as possible.

The following courses are offered as Technical Complementary (TC). Consult Minerva for TCs that are offered in 2014/2015.

BIOT 505	(3)	Selected Topics in Biotechnology*
CHEE 363	(2)	Projects Chemical Engineering**
CHEE 494	(3)	Research Project and Seminar 1**
CHEE 495	(4)	Research Project and Seminar 2**
CHEE 496	(3)	Environmental Research Project**
CHEE 510	(3)	Advanced Separation Processes
CHEE 515	(3)	Material Surfaces: A Biomimetic Approach <sup>+</sup>
MIME 515	(3)	Material Surfaces: A Biomimetic Approach <sup>+</sup>
CHEE 521	(3)	Nanomaterials and the Aquatic Environment <sup>+</sup>
CIVE 521	(3)	Nanomaterials and the Aquatic Environment <sup>+</sup>
CHEE 541	(3)	Electrochemical Engineering
CHEE 543	(3)	Plasma Engineering
CHEE 563	(3)	Biofluids and Cardiovascular Mechanics <sup>+</sup>
MECH 563	(3)	Biofluids and Cardiovascular Mechanics <sup>+</sup>

CHEE 571	(3)	Small Computer Applications: Chemical Engineering
CHEE 582	(3)	Polymer Science & Engineering
CHEE 584	(3)	Polymer Processing
CHEE 585	(3)	Foundations of Soft Matter
CHEE 587	(3)	Chemical Processing: Electronics Industry
CHEE 591	(3)	Environmental Bioremediation
CHEE 592	(3)	Industrial Air Pollution Control <sup>+</sup>
MECH 534	(3)	Air Pollution Engineering <sup>+</sup>
CHEE 593	(3)	Industrial Water Pollution Control <sup>+</sup>
CIVE 430	(3)	Water Treatment and Pollution Control <sup>+</sup>
CIVE 451	(3)	Geoenvironmental Engineering
CIVE 557	(3)	Microbiology for Environmental Engineering
MIME 470	(3)	Engineering Biomaterials
MIME 558	(3)	Engineering Nanomaterials

\* BIOT 505 can only be chosen by students taking the Minor in Biotechnology.

\*\* Students may choose only one project course:

CHEE 363 or CHEE 464 or CHEE 494 or CHEE 495 or CHEE 496.

+ Students may choose only one course in each of the following sets:

- CHEE 515 or MIME 515
- CHEE 521 or CIVE 521
- CHEE 563 or MECH 563
- CHEE 592 or MECH 534
- CHEE 593 or CIVE 430

#### e) **Other Complementary Courses**

In selecting non-departmental complementary courses, students must verify with the department concerned that they have the pre-requisites and that they will be accepted for enrolment into the desired courses. Some departments place limits on enrolment and give preference to their own students.

For course listings and regulations related to Complementary Studies (Impact of Technology on Society courses and Humanities and Social Sciences, Management Studies and Law courses), students should refer to the “Complementary Studies” section of the B. Eng. Chemical Engineering program requirements in the University Calendar (<http://www.mcgill.ca/study/2014-2015/faculties/engineering/undergraduate/programs/bachelor-engineering-beng-chemical-engineering>).



**f) Minors**

Minors are coherent sequences of courses taken in addition to the courses required for the B.Eng., B.S.E., or B.Sc.(Arch.) degree. Minors normally consist of 18–24 credits, allowing 9–12 credits of overlap with the degree program. The real credit cost to the student is typically 9–15 credits, representing one term beyond the B.Eng., B.S.E., or B.Sc.(Arch.) degree program. All courses in a minor must be passed with a grade of C or better.

Minors are available to Chemical Engineering students in the following areas:

Arts, Biomedical engineering, Biotechnology, Chemistry, Computer Science, Construction Engineering and Management, Economics, Environmental Engineering, Environmental Studies, Finance, Management, Marketing, Operations Management, Materials Engineering, Mathematics, Mining Engineering, Musical Science and Technology, Physics, Technological Entrepreneurship, and Software Engineering. For complete descriptions of these minors, see the Faculty of Engineering's "Minor Programs" page in the University Calendar ([http://www.mcgill.ca/study/2014-2015/faculties/engineering/undergraduate/ug\\_eng\\_minor\\_programs](http://www.mcgill.ca/study/2014-2015/faculties/engineering/undergraduate/ug_eng_minor_programs)).

In addition, students are permitted to register for Minor Concentrations offered through the various departments in the Faculty of Arts. Students are advised to seek approval from the specific department in the Faculty of Arts as well MESC, prior to embarking on these Minors.

Students intending to register for a Minor Concentration must complete a Course Authorization Form ([https://www.mcgill.ca/files/engineering/Request\\_for\\_Course\\_Authorization\\_Revised\\_May\\_12\\_08.pdf](https://www.mcgill.ca/files/engineering/Request_for_Course_Authorization_Revised_May_12_08.pdf)) and submit it to MESC. If subsequently the plan is changed, the student must submit a new Course Authorization Form indicating their desire to drop the Minor. Failure to do so may result in delayed graduation.

In order to register for one of the four minors offered by the Faculty of Management, non-Management students must complete and submit the corresponding application (<http://www.mcgill.ca/desautels/programs/bcom/prospective-students/minors>) to the BCom Student Affairs Office, Bronfman 110).

Students are responsible for verifying that they have met the requirements of their Minor before applying for graduation. Students must see an advisor from the department through which their Minor is offered.

**g) Course Exemptions for CEGEP Graduates**

New students who have completed CEGEP level courses in Organic I and/or II (<http://www.mcgill.ca/students/transferecredit/prospective/cegep>) and who are entering the Department of Chemical Engineering in Fall 2014, or who intend to complete the Minor program in Biomedical Engineering (

[2015/faculties/engineering/undergraduate/programs/bachelor-engineering-beng-minor-biomedical-engineering](http://www.mcgill.ca/engineering/undergraduate/programs/bachelor-engineering-beng-minor-biomedical-engineering)), will have two options available to satisfy these program requirements.

**Option 1:** You may write a McGill Placement Examination in Organic Chemistry I and II (CHEM 212, CHEM 222 (234) at McGill University in August 2014. Should you register to take one or both of these McGill Placement Examinations, and successfully achieve a passing grade in said course/s you will

- be granted full transfer credit on the basis of this examination/s;
- have the transfer credit reflected on your McGill transcript;
- have your program credit requirements decreased to reflect these transfer credits.

OR

**Option 2:** You must register for CHEM 212 Organic and CHEM 234 Organic II during your studies at McGill as outlined in your program requirements.

For application procedures and details related to the time, place and location of the McGill Placement Examinations please VIEW the following link and register accordingly (<http://www.mcgill.ca/students/exams/science>).

## **B. TRANSFERS**

For information on transfer credit for French Baccalaureate, International Baccalaureate exams, Advanced Placement exams, Advanced Levels and Science Placement Exams, see <http://www.mcgill.ca/engineering/current-students/undergraduate/new-students/transfer-credits> and select your basis of admission.

### **a) Transfer from Science Programs to the B.Eng. in Chemical Engineering Programs**

Students who have completed all or most of the requirements for the B.Sc. in Chemistry and other chemistry-oriented disciplines (Major or Honours) may qualify for admission to a reduced B.Eng. program. A typical program is listed in this Handbook.

### **b) Transfer of Credits for Courses Completed Outside this Department**

Students should note that a minimum of 60 credits completed at McGill University are required for a McGill degree.

While registered in the B.Eng. program, core courses may not be taken outside the department. For the Department of Chemical Engineering, core courses include all required courses (departmental and non-departmental) as well as complementary courses (departmental). Engineering students are permitted to take any Freshman (U0) or General Complementary (Impact or Humanities and Social Sciences) course outside McGill. For additional information, please see <http://www.mcgill.ca/engineering/current-students/undergraduate/courses-registration/courses-grades/transfer-credits>.

**c) Summer Session Forms**

Students who wish to take courses at other universities which they want counted towards their B.Eng. requirements should obtain and submit the Request for Transfer Credit or Exemption form to MESC (Rm. 22, Frank Dawson Adams Building). This serves as the written approval form for the Host University upon authorization by the Academic Adviser. Once the transcript of the completed course from the Host University is received by MESC it is matched with the approval form and placed in the student's file.

**C. RECORDING OF COURSE EXEMPTIONS OR ADVANCED CREDIT**

It is the responsibility of students to request such course exemptions or advanced credit and to ensure that they are properly recorded in the department and the Faculty. Students must obtain and submit the Request for Transfer Credit or Exemption form to MESC (Rm. 22, Frank Dawson Adams Building).

A request can only be considered granted and recorded when it appears on the student's McGill transcript or their Degree Evaluation report.

## **IMPORTANT NOTES FOR STUDENTS**

Students are responsible to ensure that they meet the course requirements for the B.Eng. They must complete the appropriate check list (p. 25 to 27) and demonstrate to their Academic Adviser that they meet the degree requirements in each category of courses e.g. core, technical, minor program, complementaries, etc.

Students are advised to meet their Academic Adviser and verify their final year course selection prior to the commencement of their U-3 year. Timetable conflicts may cause difficulties in some cases if course selection is not planned well in advance.

## D. EXAMPLES OF PROGRAMS

<b>CEGEP Entry (September Admission)</b>		
<b>Semester 1 (Fall)</b>		<b>17 Prerequisites/Co-requisites</b>
CHEE 200	Chemical Engineering Principles 1	3 -
CHEE 291	Instrumentation and Measurement 1	4 -
CHEM 212	Introductory Organic Chemistry 1	4 P - CHEM 110 or equivalent / C - CHEM 120 or equivalent
CHEE 231	Data Analysis and Design of Experiments	3 C - CHEE 291
MATH 262	Intermediate Calculus	3 P - MATH 141, MATH 133
<b>Semester 2 (Winter)</b>		<b>16 Prerequisites/Co-requisites</b>
CHEE 204	Chemical Engineering Principles 2	3 P - CHEE 200
CHEE 220	Chemical Engineering Thermodynamics	3 P - CHEE 200
CHEM 234	Topics in Organic Chemistry	3 P - CHEM 212 or equivalent
COMP 208	Computers in Engineering	3 P - MATH 140, MATH 141
FACC 100	Introduction to the Engineering Profession	1 -
MATH 263	Ordinary Differential Equations for Engineers	3 C - MATH 262
<b>Semester 3 (Fall)</b>		<b>16 Prerequisites/Co-requisites</b>
CHEE 314	Fluid Mechanics	3 P - CHEE 204 / C - MATH 264
CHEE 360	Technical Paper	1 -
CHEE 370	Elements of Biotechnology	3 -
CHEE 380	Materials Science	3 -
CHEE 390	Computational Methods in Chemical Engineering	3 P - CHEE 204, COMP 208, MATH 263 / C - MATH 264
MATH 264	Advanced Calculus for Engineers	3 P - MATH 262 / C - MATH 263
<b>Semester 4 (Winter)</b>		<b>18 Prerequisites/Co-requisites</b>
CHEE 310	Physical Chemistry for Engineers	3 P - CHEE 220 or MIME 212
CHEE 315	Heat and Mass Transfer	3 P - CHEE 314
CHEE 351	Separation Processes	3 P - CHEE 204, CHEE 220 / C - CHEE 315
CHEE 484	Materials Engineering	3 P - CHEE 380 / C - CHEE 315
CHEE xxx	Technical Complementary	3 -
***_***	Compl. Studies	3 -
<b>Semester 5 (Fall)</b>		<b>16 Prerequisites/Co-requisites</b>
CHEE 400	Principles of Energy Conversion	3 P - CHEE 315, CHEE 390, CHEE 484
CHEE 423	Chemical Reaction Engineering	3 P - CHEE 310, CHEE 315
CHEE 453	Process Design	4 P - CHEE 315, CHEE 351
CHEE 474	Biochemical Engineering	3 P - CHEE 370
FACC 300	Engineering Economy	3 -
<b>Semester 6 (Winter)</b>		<b>16 Prerequisites/Co-requisites</b>
CHEE 401	Energy Systems Engineering	3 P - CHEE 400
CHEE 440	Process Modelling	3 P - CHEE 423, MATH 264
CHEE 455	Process Control	3 P - CHEE 315, CHEE 351, CHEE 423 / C - CHEE 491
CHEE 456	Design Project 1	2 C - CHEE 453
CHEE 491	Instrumentation and Measurement 2	4 P - CHEE 231, CHEE 291, CHEE 315, CHEE 423 / C - CHEE 455
FACC 400	Engineering Professional Practice	1 P - FACC 100, 60 program credits
<b>Semester 7 (Fall)</b>		<b>17 Prerequisites/Co-requisites</b>
CHEE 457	Design Project 2	5 P - CHEE 456
CHEE xxx	Technical Complementary	3 -
CHEE xxx	Technical Complementary	3 -
***_***	Compl. Studies	3 -
***_***	Compl. Studies	3 -
<b>Total credits:</b>		<b>116</b>

<b>CEGEP Entry (January Admission)</b>		
<b>Semester 1 (Winter)</b>		<b>14 Prerequisites/Co-requisites</b>
CHEM 212	Introductory Organic Chemistry 1	4 P - CHEM 110 or equivalent / C - CHEM 120 or equivalent
MATH 262	Intermediate Calculus	3 P - MATH 141, MATH 133
MATH 263	Ordinary Differential Equations for Engineers	3 C - MATH 262
FACC 100	Introduction to the Engineering Profession	1 -
***_***	Compl. Studies	3 -
<b>Semester 2 (Fall)</b>		<b>16 Prerequisites/Co-requisites</b>
CHEE 200	Chemical Engineering Principles 1	3 -
CHEE 231	Data Analysis and Design of Experiments	3 C - CHEE 291
CHEE 291	Instrumentation and Measurement 1	4 -
MATH 264	Advanced Calculus for Engineers	3 P - MATH 262 / C - MATH 263
***_***	Compl. Studies	3 -
<b>Semester 3 (Winter)</b>		<b>12 Prerequisites/Co-requisites</b>
CHEE 204	Chemical Engineering Principles 2	3 P - CHEE 200
CHEE 220	Chemical Engineering Thermodynamics	3 P - CHEE 200
CHEM 234	Topics in Organic Chemistry	3 P - CHEM 212 or equivalent
COMP 208	Computers in Engineering	3 P - MATH 140, MATH 141
<b>Semester 4 (Fall)</b>		<b>13 Prerequisites/Co-requisites</b>
CHEE 314	Fluid Mechanics	3 P - CHEE 204 / C - MATH 264
CHEE 360	Technical Paper	1 -
CHEE 370	Elements of Biotechnology	3 -
CHEE 380	Materials Science	3 -
CHEE 390	Computational Methods in Chemical Engineering	3 P - CHEE 204, COMP 208, MATH 263 / C - MATH 264
<b>Semester 5 (Winter)</b>		<b>15 Prerequisites/Co-requisites</b>
CHEE 310	Physical Chemistry for Engineers	3 P - CHEE 220 or MIME 212
CHEE 315	Heat and Mass Transfer	3 P - CHEE 314
CHEE 351	Separation Processes	3 P - CHEE 204, CHEE 220 / C - CHEE 315
CHEE 484	Materials Engineering	3 P - CHEE 380 / C - CHEE 315
CHEE xxx	Technical Complementary	3 -
<b>Semester 6 (Fall)</b>		<b>16 Prerequisites/Co-requisites</b>
CHEE 400	Principles of Energy Conversion	3 P - CHEE 315, CHEE 390, CHEE 484
CHEE 423	Chemical Reaction Engineering	3 P - CHEE 310, CHEE 315
CHEE 453	Process Design	4 P - CHEE 315, CHEE 351
CHEE 474	Biochemical Engineering	3 P - CHEE 370
FACC 300	Engineering Economy	3 -
<b>Semester 7 (Winter)</b>		<b>16 Prerequisites/Co-requisites</b>
CHEE 401	Energy Systems Engineering	3 P - CHEE 400
CHEE 440	Process Modelling	3 P - CHEE 423, MATH 264
CHEE 455	Process Control	3 P - CHEE 315, CHEE 351, CHEE 423 / C - CHEE 491
CHEE 456	Design Project 1	2 C - CHEE 453
CHEE 491	Instrumentation and Measurement 2	4 P - CHEE 231, CHEE 291, CHEE 315, CHEE 423 / C - CHEE 455
FACC 400	Engineering Professional Practice	1 P - FACC 100, 60 program credits
<b>Semester 8 (Winter)</b>		<b>14 Prerequisites/Co-requisites</b>
CHEE 457	Design Project 2	5 P - CHEE 456
CHEE xxx	Technical Complementary	3 -
CHEE xxx	Technical Complementary	3 -
***_***	Compl. Studies	3 -
<b>Total credits:</b>		<b>116</b>

<b>non-CEGEP Entry (September Admission)</b>		
<b>Semester 1 (Fall)</b>		<b>18 Prerequisites/Co-requisites</b>
CHEM 110	General Chemistry	4 -
MATH 133	Vectors, Matric. & Geo	3 -
MATH 140	Calculus 1*	3 -
PHYS 131	Mechanics and Waves	4 C - MATH 139 or higher level calculus course
FACC 100	Intro Eng. Profession	1 -
***_***	Compl. Studies	3 -
<b>Semester 2 (Winter)</b>		<b>18 Prerequisites/Co-requisites</b>
CHEM 120	General Chemistry 2	4 -
MATH 141	Calculus 2*	4 P - MATH 139 or MATH 140 or MATH 150
PHYS 142	Electromag. Optics	4 P - PHYS 131
***_***	Compl. Studies	3 -
***_***	Compl. Studies	3 -
<b>Semester 3 (Fall)</b>		<b>17 Prerequisites/Co-requisites</b>
CHEE 200	Chemical Engineering Principles 1	3 -
CHEE 291	Instrumentation and Measurement 1	4 -
CHEM 212	Introductory Organic Chemistry 1	4 P - CHEM 110 or equivalent / C - CHEM 120 or equivalent
CHEE 231	Data Analysis and Design of Experiments	3 C - CHEE 291
MATH 262	Intermediate Calculus*	3 P - MATH 141, MATH 133
<b>Semester 4 (Winter)</b>		<b>18 Prerequisites/Co-requisites</b>
CHEE 204	Chemical Engineering Principles 2	3 P - CHEE 200
CHEE 220	Chemical Engineering Thermodynamics	3 P - CHEE 200
CHEM 234	Topics in Organic Chemistry	3 P - CHEM 212 or equivalent
COMP 208	Computers in Engineering	3 P - MATH 140, MATH 141
MATH 263	Ordinary Differential Equations for Engineers	3 C - MATH 262
FACC 300	Engineering Economy	3 -
<b>Semester 5 (Fall)</b>		<b>18 Prerequisites/Co-requisites</b>
CHEE 314	Fluid Mechanics	3 P - CHEE 204 / C - MATH 264
CHEE 370	Elements of Biotechnology	3 -
CHEE 380	Materials Science	3 -
CHEE 390	Computational Methods in Chemical Engineering	3 P - CHEE 204, COMP 208, MATH 263 / C - MATH 264
MATH 264	Advanced Calculus for Engineers	3 P - MATH 262 / C - MATH 263
CHEE xxx	Technical Complementary	3 -
<b>Semester 6 (Winter)</b>		<b>18 Prerequisites/Co-requisites</b>
CHEE 310	Physical Chemistry for Engineers	3 P - CHEE 220 or MIME 212
CHEE 315	Heat and Mass Transfer	3 P - CHEE 314
CHEE 351	Separation Processes	3 P - CHEE 204, CHEE 220 / C - CHEE 315
CHEE 484	Materials Engineering	3 P - CHEE 380 / C - CHEE 315
CHEE xxx	Technical Complementary	3 -
CHEE xxx	Technical Complementary	3 -

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<b>Semester 7 (Fall)</b>		<b>17</b>	<b>Prerequisites/Co-requisites</b>
CHEE 400	Principles of Energy Conversion	3	P - CHEE 315, CHEE 390, CHEE 484
CHEE 423	Chemical Reaction Engineering	3	P - CHEE 310, CHEE 315
CHEE 453	Process Design	4	P - CHEE 315, CHEE 351
CHEE 456	Design Project 1	2	C - CHEE 453
CHEE 474	Biochemical Engineering	3	P - CHEE 370
FACC 400	Engineering Professional Practice	1	P - FACC 100, 60 program credits
CHEE 360	Technical Paper	1	-
<b>Semester 8 (Winter)</b>		<b>18</b>	<b>Prerequisites/Co-requisites</b>
CHEE 401	Energy Systems Engineering	3	P - CHEE 400
CHEE 440	Process Modelling	3	P - CHEE 423, MATH 264
CHEE 455	Process Control	3	P - CHEE 315, CHEE 351, CHEE 423 / C - CHEE 491
CHEE 457	Design Project 2	5	P - CHEE 456
CHEE 491	Instrumentation and Measurement 2	4	P - CHEE 231, CHEE 291, CHEE 315, CHEE 423 / C - CHEE 455
<b>Total credits:</b>		<b>142</b>	

\* Students having successfully completed a calculus course in High School may take Calculus A (MATH 150) and Calculus B (MATH 151). Students passing MATH 150 & 151 will receive exemption with credit for MATH 262 (Intermediate Calculus). In the event that the student has some prior calculus, but is not sufficiently confident to proceed with MATH 150/151, the appropriate sequence is MATH 140/141.



**75-Credit Program for Students from Science Faculty Program**

- 1) Chemistry Programs: Students who have completed at least the U2 level McGill B.Sc. program in Chemistry, or the equivalent, will normally have completed most of the equivalences noted below. Students who, at the time of transfer, have completed only part of the math equivalence may choose to take the missing courses in the Faculty of Science or to take the equivalent courses in the Faculty of Engineering. The typical 75-credit program outlined on the following page considers that the student has passed MATH 315 and the equivalent courses for MATH 262/264; that the student has 9 credits in allowable complementary studies courses and has courses with laboratory component equivalent to CHEE 291.
- 2) Biochemistry, Biology, Mathematics and Physics Programs: Students from these programs in Faculty of Science also qualify for a credit allowance, the exact number of credits depending on which of the courses on the left below have been taken.

NOTE: Science transfer students can replace up to 6 credits of Technical Complementaries with 6 credits of previously taken 400-level (or equivalent) science courses approved by a Chemical Engineering Academic Adviser.

Faculty of Science Degree Requirements

1. <u>Chemistry</u>	<u>Cr</u>
CHEM 212 Intr.OrgChem.	4
CHEM 222 Organic Chem. II	4
CHEM 204 and CHEM 214	6
or (CHEM 223 and CHEM 253 and CHEM 243 and CHEM 263)	6
2. <u>Mathematics **</u>	
MATH 222 Calculus III	3
MATH 315 or MATH 325	3
MATH 314 or MATH 248	3
3. <u>Computer Science</u>	
COMP 250 Intro. Comp. Sci.	3
4. <u>Courses in Complementary Studies</u>	*9
5. <u>Courses with Identifiable Lab. Component not Counted</u>	
6. <u>400-Level Science Courses</u>	

(Chemical) Requirements

1. <u>Chemistry</u>	<u>Cr</u>
CHEM 212 Intr.Organic Chem.1	4
CHEM 234 Topics in Org. Chem.	3
CHEE 310 Phys.Chem.For Eng.	3
2. <u>Mathematics</u>	
MATH 262 Inter. Calculus	3
MATH 263 Ord.Diff.Eqs.Eng.	3
MATH 264 Adv.Calculus Eng.	3
3. <u>Computer Science</u>	
COMP 208 Comp. in Eng.	3
4. <u>CS Complementaries</u>	9
5. <u>Chemical Engineering</u>	
CHEE 291 Instrum. Meas. 1	4
6. <u>Technical Complementaries</u>	<u>6</u>

**Total Credit Allowance** **41**

\* Courses in Complementary Studies must be clearly identified.

\*\*Note that the Mathematics equivalents will only be considered as a package: credit for individual courses will not be granted

For students of high academic standing who qualify for an equivalence of 41 credits as detailed above, the following 75-credit program applies, provided there are no timetable conflicts.

<b>Semester 1 (Fall)</b>		15	Prerequisites/Co-requisites
CHEE 200	Chemical Engineering Principles 1	3	-
CHEE 314	Fluid Mechanics	3	P - CHEE 204 / C - MATH 264
CHEE 370	Elements of Biotechnology	3	-
CHEE 231	Data Analysis and Design of Experiments	3	C - CHEE 291
FACC 300	Engineering Economy	3	-
<b>Semester 2 (Winter)</b>		14	Prerequisites/Co-requisites
CHEE 204	Chemical Engineering Principles 2	3	P - CHEE 200
CHEE 220	Chemical Engineering Thermodynamics	3	P - CHEE 200
CHEE 315	Heat and Mass Transfer	3	P - CHEE 314
CHEE 351	Separation Processes	3	P - CHEE 204, CHEE 220 / C - CHEE 315
CHEE 360	Technical Paper	1	-
FACC 100	Introduction to the Engineering Profession	1	-
<b>Semester 3 (Fall)</b>		16	Prerequisites/Co-requisites
CHEE 380	Materials Science	3	-
CHEE 423	Chemical Reaction Engineering	3	P - CHEE 310, CHEE 315
CHEE 453	Process Design	4	P - CHEE 315, CHEE 351
CHEE 390	Computational Methods in Chemical Engineering	3	P - CHEE 204, COMP 208, MATH 263 / C - MATH 264
CHEE 400	Principles of Energy Conversion	3	P - CHEE 315, CHEE 390, CHEE 484
<b>Semester 4 (Winter)</b>		18	Prerequisites/Co-requisites
CHEE 401	Energy Systems Engineering	3	P - CHEE 400
CHEE 440	Process Modelling	3	P - CHEE 423, MATH 264
CHEE 455	Process Control	3	P - CHEE 315, CHEE 351, CHEE 423 / C - CHEE 491
CHEE 456	Design Project 1	2	C - CHEE 453
CHEE 491	Instrumentation and Measurement 2	4	P - CHEE 231, CHEE 291, CHEE 315, CHEE 423 / C - CHEE 455
CHEE 484	Materials Engineering	3	P - CHEE 380 / C - CHEE 315
<b>Semester 5 (Fall)</b>		12	Prerequisites/Co-requisites
CHEE 474	Biochemical Engineering	3	P - CHEE 370
CHEE 457	Design Project 2	5	P - CHEE 456
FACC 400	Engineering Professional Practice	1	P - FACC 100, 60 program credits
CHEE xxx	Technical Complementary	3	-
		<b>Total credits:</b>	<b>75</b>

Programs of those who have studied Chemistry at other universities must be examined in detail to determine how many credits, up to the maximum of 41, may be allowed in their case.

Although the above program, in some instances, does not respect the course pre-requisites, they are upheld where possible. Students admitted with advanced standing should, with their Academic Adviser, plan a program in the awareness of the possible difficulties of taking courses out of the pre-requisite sequence. The Adviser must approve this action.

## APPENDIX A COMPLEMENTARY STUDIES FOR CHEMICAL ENGINEERING STUDENTS 2014-2015

9 credits of Complementary Studies (CS) are required in addition to the core courses of the chemical engineering program; of these, 3 credits must be chosen from Group A "Impact of Technology on Society Courses" below, and the remaining 6 credits must be taken from Group B.

**NOTE:** Non-CEGEP students usually take one CS course in their first year of study (U0); this course counts towards the 9-credit CS requirement.

### Group A - Impact of Technology on Society Courses

ANTH 212	(3) Anthropology of Development
BTEC 502	(3) Biotechnology Ethics and Society
CIVE 469	(3) Infrastructure and Society
ECON 225	(3) Economics of the Environments
ECON 347	(3) Economics of Climate Change
ENVR 201	(3) Society and Environment
GEOG 200	(3) Geographical Perspectives: World Environmental Problems
GEOG 203	(3) Environmental Systems
GEOG 205	(3) Global Change: Past, Present and Future
GEOG 302	(3) Environmental Management 1
MECH 526	(3) Manufacturing and the Environment
MGPO 440*	(3) Strategies for Sustainability
MIME 308	(3) Social Impact of Technology
PHIL 343	(3) Biomedical Ethics
RELG 270	(3) Religious Ethics and the Environment
SOCI 235	(3) Technology and Society
SOCI 312	(3) Sociology of Work and Industry
URBP 201	(3) Planning the 21 <sup>st</sup> Century City

\* Note: Management courses have limited enrolment and registration dates. See Important Dates at <http://www.mcgill.ca/importantdates>.

### Group B - Humanities and Social Sciences, Management Studies and Law

1. Humanities and Social Studies
2. Administrative Studies, Law and Social Sciences
3. Language

If you are not proficient in a certain language, 3 credits will be given for one 6-credit course in that language. However, 3 credits may be given for any language course that has a sufficient cultural component. You must have this course approved by a faculty adviser. See the Faculty of Engineering undergraduate section of the Undergraduate Programs, Courses and University Regulations for details of acceptable courses in Group B.

*The above list is subject to revision; please see the Faculty of Engineering undergraduate section of the Undergraduate Programs, Courses and University Regulations for updates.*

## GRADUATION REQUIREMENTS (116 CREDIT PROGRAMME - CEGEP Students)

<b>Name:</b>		<b>ID:</b>		
<b>Admission requirements (if any):</b>				
<b>Advanced credits / exemptions:</b>				
Course		Cr	Mark	Notes
CHEE 200	Chemical Engineering Principles 1	3		
CHEE 204	Chemical Engineering Principles 2	3		
CHEE 220	Chemical Engineering Thermodynamics	3		
CHEE 231	Data Analysis and Design of Experiments	3		
CHEE 291	Instrumentation and Measurement 1	4		
CHEE 310	Physical Chemistry for Engineers	3		
CHEE 314	Fluid Mechanics	3		
CHEE 315	Heat and Mass Transfer	3		
CHEE 351	Separation Processes	3		
CHEE 360	Technical Paper	1		
CHEE 370	Elements of Biotechnology	3		
CHEE 380	Materials Science	3		
CHEE 390	Computational Methods in Chemical Engineering	3		
CHEE 400	Principles of Energy Conversion	3		
CHEE 401	Energy Systems Engineering	3		
CHEE 423	Chemical Reaction Engineering	3		
CHEE 440	Process Modelling	3		
CHEE 453	Process Design	4		
CHEE 455	Process Control	3		
CHEE 456	Design Project 1	2		
CHEE 457	Design Project 2	5		
CHEE 474	Biochemical Engineering	3		
CHEE 484	Materials Engineering	3		
CHEE 491	Instrumentation and Measurement 2	4		
CHEE xxx	Technical Complementary	3		
CHEE xxx	Technical Complementary	3		
CHEE xxx	Technical Complementary	3		
CHEM 212	Introductory Organic Chemistry 1	4		
CHEM 234	Topics in Organic Chemistry	3		
MATH 262	Intermediate Calculus	3		
MATH 263	Ordinary Differential Equations for Engineers	3		
MATH 264	Advanced Calculus for Engineers	3		
FACC 100	Introduction to the Engineering Profession	1		
FACC 300	Engineering Economy	3		
FACC 400	Engineering Professional Practice	1		
COMP 208	Computers in Engineering	3		
CS	Complementary Studies Group B (HSSML) - 1	3		
CS	Complementary Studies Group B (HSSML) - 2	3		
CS	Complementary Studies Group A (Impact)	3		
<b>Minor in:</b>				
<b>Free complementaries (if any):</b>				

## GRADUATION REQUIREMENTS (142 CREDIT PROGRAMME - non-CEGEP Students)

<b>Name:</b>		<b>ID:</b>		
<b>Admission requirements (if any):</b>				
<b>Advanced credits / exemptions:</b>				
Course		Cr	Mark	Notes
CHEM 110	General Chemistry	4		
CHEM 120	General Chemistry 2	4		
MATH 133	Vectors, Matric. & Geo	3		
MATH 140	Calculus 1*	3		
MATH 141	Calculus 2*	4		
PHYS 131	Mechanics and Waves	4		
PHYS 142	Electromag. Optics	4		
CHEE 200	Chemical Engineering Principles 1	3		
CHEE 204	Chemical Engineering Principles 2	3		
CHEE 220	Chemical Engineering Thermodynamics	3		
CHEE 231	Data Analysis and Design of Experiments	3		
CHEE 291	Instrumentation and Measurement 1	4		
CHEE 310	Physical Chemistry for Engineers	3		
CHEE 314	Fluid Mechanics	3		
CHEE 315	Heat and Mass Transfer	3		
CHEE 351	Separation Processes	3		
CHEE 360	Technical Paper	1		
CHEE 370	Elements of Biotechnology	3		
CHEE 380	Materials Science	3		
CHEE 390	Computational Methods in Chemical Engineering	3		
CHEE 400	Principles of Energy Conversion	3		
CHEE 401	Energy Systems Engineering	3		
CHEE 423	Chemical Reaction Engineering	3		
CHEE 440	Process Modelling	3		
CHEE 453	Process Design	4		
CHEE 455	Process Control	3		
CHEE 456	Design Project 1	2		
CHEE 457	Design Project 2	5		
CHEE 474	Biochemical Engineering	3		
CHEE 484	Materials Engineering	3		
CHEE 491	Instrumentation and Measurement 2	4		
CHEE xxx	Technical Complementary	3		
CHEE xxx	Technical Complementary	3		
CHEE xxx	Technical Complementary	3		

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Course		Cr	Mark	Notes
CHEM 212	Introductory Organic Chemistry 1	4		
CHEM 234	Topics in Organic Chemistry	3		
MATH 262	Intermediate Calculus	3		
MATH 263	Ordinary Differential Equations for Engineers	3		
MATH 264	Advanced Calculus for Engineers	3		
FACC 100	Introduction to the Engineering Profession	1		
FACC 300	Engineering Economy	3		
FACC 400	Engineering Professional Practice	1		
COMP 208	Computers in Engineering	3		
CS	Complementary Studies Group B (HSSML) - 1	3		
CS	Complementary Studies Group B (HSSML) - 2	3		
CS	Complementary Studies Group A (Impact)	3		
Minor in:				
Free complementaries (if any):				