

# Chemical Engineering Curriculum - Fall 2014

## Non-CEGEP Entry

<b>1st Semester (Fall)</b>		18 credits	Prerequisites/Co-requisites
CHEM 110	General Chemistry 1	4	-
FACC 100	Introduction to the Engineering Profession	1	-
MATH 133	Linear Algebra and Geometry	3	-
MATH 140	Calculus 1	3	-
PHYS 131	Mechanics and Waves	4	C - MATH 140
CS	Complementary Studies Group B (HSSML) - 1	3	-
<b>2nd Semester (Winter)</b>		18 credits	Prerequisites/Co-requisites
CHEM 120	General Chemistry 2	4	-
MATH 141	Calculus 2	4	P - MATH 140
PHYS 142	Electromagnetism and Optics	4	P - PHYS 131 / C - MATH 141
CS	Complementary Studies Group A (Impact)	3	-
CS	Complementary Studies Group B (HSSML) - 2	3	-
<b>3rd Semester (Fall)</b>		17 credits	Prerequisites/Co-requisites
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	-
CHEM 212	Introductory Organic Chemistry 1	4	P - CHEM 110 / C - CHEM 120
MATH 262	Intermediate Calculus	3	P - MATH 133, MATH 141
<b>4th Semester (Winter)</b>		18 credits	Prerequisites/Co-requisites
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
COMP 208	Computers in Engineering	3	P - MATH 140, MATH 141
MATH 263	Ordinary Differential Equations for Engineers	3	C - MATH 262
CHEE xxx	Technical Complementary	3	-
<b>5th Semester (Fall)</b>		18 credits	Prerequisites/Co-requisites
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
FACC 300	Engineering Economy	3	-
MATH 264	Advanced Calculus for Engineers	3	P - MATH 262 / C - MATH 263
<b>6th Semester (Winter)</b>		18 credits	Prerequisites/Co-requisites
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	-
<b>7th Semester (Fall)</b>		17 credits	Prerequisites/Co-requisites
CHEE 360	Technical Paper	1	-
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
<b>8th Semester (Winter)</b>		18 credits	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 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

Technical Complementary courses are selected from an approved list given on the next page.

The Complementary Studies (CS) courses are Impact of Technology courses (Group A) and Humanities & Social Sciences, Management Studies and Law courses (Group B). These must be chosen from an approved list of courses/departments, found in the program list under "Complementary Studies" in the Faculty of Engineering Undergraduate section of the *Programs, Courses and University Regulations* publication ([www.mcgill.ca/study](http://www.mcgill.ca/study)) (see the Academic Programs section).

Students are responsible for satisfying pre-/co-requisites and verifying with their department that they are meeting the requirements of their program.

# Technical Complementary Courses - Chemical Engineering

A minimum of 9 credits of complementary courses must be chosen from a list of technical complementaries approved by the Department. The purpose of this requirement is to provide students with an area of specialization within the broad field of chemical engineering. Alternatively, some students use the technical complementaries to increase the breadth of their chemical engineering training.

At least two (2) courses must be chosen from the list below. The remaining course(s) may be taken from other suitable undergraduate courses in the Faculty of Engineering, with departmental permission.

**The Technical Complementary courses currently approved by the Department are as follows:**

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

CHEE 494 or CHEE 495 or CHEE 496

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

6-9 credits from the following:

		Credits	Prerequisites/Co-requisites
BIEN 462	Engineering Principles in Physiological Systems	3	P - CHEE 314, CHEE 370 / BIOL 112, MATH 263
BIOT 505	Selected Topics in Biotechnology (Biotechnology Minor students only)	3	-
CHEE 363	Projects Chemical Engineering 1	2	P - CHEE 200
CHEE 438	Engineering Principles in Pulp and Paper Processes	3	C - CHEE 423
CHEE 494*	Research Project and Seminar 1	3	-
or CHEE 495*	Research Project and Seminar 2	4	-
or CHEE 496*	Environmental Research Project	3	-
CHEE 510	Advanced Separation Processes	3	P - CHEE 351
CHEE 515*	Material Surfaces: A Biomimetic Approach	3	P - (CHEE 310, CHEE 380) or (CHEM 233, MIME 261, MIME 317)
or MIME 515*	Material Surfaces: A Biomimetic Approach	3	
CHEE 521	Nanomaterials and the Aquatic Environment	3	P - (CHEE 315 or CIVE 225 or MIME 356), (CHEE 310 or CIVE 430 or CHEM 233)
or CIVE 521	Nanomaterials and the Aquatic Environment	3	
CHEE 541	Electrochemical Engineering	3	P - CHEE 310
CHEE 543	Plasma Engineering	3	P - CHEE 220, CHEE 314
CHEE 561	Introduction to Soft Tissue Biophysics	3	P - CHEE 315
CHEE 563*	Biofluids and Cardiovascular Mechanics	3	P - CHEE 314 or MECH 331
or MECH 563*	Biofluids and Cardiovascular Mechanics	3	
CHEE 571	Small Computer Applications: Chemical Engineering	3	-
CHEE 582	Polymer Science & Engineering	3	P - CHEE 314
CHEE 584	Polymer Processing	3	C - CHEE 315 or MIME 356
CHEE 585	Foundations of Soft Matter	3	-
CHEE 587	Chemical Processing: Electronics Industry	3	P - CHEE 310, CHEE 315, CHEE 380
CHEE 591	Environmental Bioremediation	3	-
CHEE 592*	Industrial Air Pollution Control	3	P - CHEE 314
or MECH 534*	Air Pollution Engineering	3	P - MECH 331, MECH 341
CHEE 593	Industrial Water Pollution Control	3	P - CHEE 314
or CIVE 430	Water Treatment and Pollution Control	3	P - CIVE 225, CIVE 327
CIVE 557	Microbiology for Environmental Engineering	3	P - CIVE 225 or permission of instructor

Courses CHEE 582 and CHEE 584 comprise a Polymeric Materials sequence. Additional courses in this area are available in the Chemistry Department (e.g., CHEM 455) or at the graduate level (CHEE 681 to CHEE 684). The Department has considerable expertise in the polymer area.

Courses CHEE 370 and CHEE 474 make up a sequence in Biochemical Engineering-Biotechnology. Students interested in this area may take additional courses, particularly those offered by the Department of Food Science and Agricultural Chemistry, Faculty of Agricultural and Environmental Sciences, and courses in biochemistry and microbiology. The food, beverage and pharmaceutical industries are large industries in the Montreal area and these courses are relevant to these industries and to the new high-technology applications of biotechnology.

The third area in which there is a sequence of courses is Pollution Control. The Department offers three courses in this area: CHEE 592, CHEE 593, and CHEE 595. As some water pollution control problems are solved by microbial processes, course CHEE 474 is also relevant to the pollution control area. Additional courses in this area are listed in the Environmental Engineering Minor.

A Minor in Biotechnology is also offered in the Faculties of Engineering and of Science with emphasis on molecular biology and chemical engineering processes. A full description of the program appears in the Biotechnology Minor.

Note that many of the technical complementaries are offered only in alternate years. Students should, therefore, plan their complementaries as far ahead as possible. With the approval of the instructor and academic adviser, students may take graduate (500-level) CHEE courses as technical complementaries.

**Last update: May 2, 2014**

For the official program listing, see the *Programs, Courses and University Regulations* publication ([www.mcgill.ca/study](http://www.mcgill.ca/study)).