

# Chemical Engineering Curriculum - Fall 2016

CEGEP Entry

<b>1st Term (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 or equivalent / C - CHEM 120 or equivalent
MATH 262	Intermediate Calculus	3	P - MATH 133 or equivalent, MATH 141 or equivalent
<b>2nd Term (Winter)</b>		16 credits	Prerequisites/Co-requisites
CHEE 204	Chemical Engineering Principles 2	3	P - CHEE 200
CHEE 220	Chemical Engineering Thermodynamics	3	P - CHEE 200 / C - MATH 262
CHEM 234	Topics in Organic Chemistry	3	P - CHEM 212
COMP 208	Computers in Engineering	3	P - differential and integral calculus [MATH 140 and MATH 141] / C: linear algebra [MATH 133]
FACC 100	Introduction to the Engineering Profession	1	-
MATH 263	Ordinary Differential Equations for Engineers	3	C - MATH 262
<b>3rd Term (Fall)</b>		16 credits	Prerequisites/Co-requisites
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>4th Term (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	-
CS	Complementary Studies Group B (HSSML)*	3	-
<b>5th Term (Fall)</b>		16 credits	Prerequisites/Co-requisites
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 314, CHEE 370
FACC 300	Engineering Economy	3	-
<b>6th Term (Winter)</b>		16 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 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>7th Term (Fall)</b>		17 credits	Prerequisites/Co-requisites
CHEE 457	Design Project 2	5	P - CHEE 456
CHEE xxx	Technical Complementary	3	-
CHEE xxx	Technical Complementary	3	-
CS	Complementary Studies Group A (Impact)*	3	-
CS	Complementary Studies Group B (HSSML)*	3	-

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). Students must take one course (3 credits) from Group A and two courses (6 credits) from Group B. The curriculum above includes **suggested** terms during which these courses can be taken. 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 your program listing in the "Browse Academic Units & 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.

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

## List A

3-9 credits from the following:

		Credits	Prerequisites/Co-requisites
CHEE 301	Resource Recovery from Waste	3	P - CHEE 204, CHEE 220
CHEE 452	Particulate Systems	3	P - CHEE 200, CHEE 314
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 permission of instructor
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 permission of instructor
or CIVE 521*	Nanomaterials and the Aquatic Environment	3	
CHEE 541	Electrochemical Engineering	3	P - CHEE 310 or instructor permission
CHEE 543	Plasma Engineering	3	P - CHEE 220, CHEE 314
CHEE 561	Introduction to Soft Tissue Biophysics	3	P - CHEE 315 or instructor permission
CHEE 563*	Biofluids and Cardiovascular Mechanics	3	P - CHEE 314 or MECH 331 or instructor permission
or MECH 563*	Biofluids and Cardiovascular Mechanics	3	
CHEE 571	Small Computer Applications: Chemical Engineering	3	P - Permission of instructor
CHEE 582	Polymer Science & Engineering	3	P - CHEE 314 or equivalent
CHEE 584	Polymer Processing	3	C - CHEE 315 or MIME 356 or equivalent
CHEE 585	Foundations of Soft Matter	3	-
CHEE 587	Chemical Processing: Electronics Industry	3	P - CHEE 310, CHEE 315, and CHEE 380, or equivalent courses, or
CHEE 591	Environmental Bioremediation	3	-
CHEE 593	Industrial Water Pollution Control	3	P - CHEE 314 or equivalent
or CIVE 430	Water Treatment and Pollution Control	3	P - CIVE 225, CIVE 327
MECH 534	Air Pollution Engineering	3	P - MECH 331, MECH 341

\*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 593 or CIVE 430

## List B

0-6 credits from the following:

		Credits	Prerequisites/Co-requisites
BIEN 320	Molecular, Cellular, and Tissue Biomechanics	3	P - Permission of instructor
BIEN 330	Introduction to Tissue Engineering	3	P - Permission of instructor
BIEN 340	Transport Processes in Biological Systems	3	P - Permission of instructor
BIEN 350	Biosystems and Control	3	P - Permission of instructor
BIEN 462	Engineering Principles in Physiological Systems	3	P - CHEE 314, CHEE 370 / BIOL 112, MATH 263, or instructor
BIEN 510	Nanoparticles in the Medical Sciences	3	P - Permission of instructor
BIEN 520	High Throughput Bioanalytical Devices	3	P - Permission of instructor
BIEN 550	Biomolecular Devices	3	P - Permission of instructor
BIEN 570	Active Mechanics in Biology	3	P - Permission of instructor
BIOT 505	Selected Topics in Biotechnology (Biotechnology Minor students)	3	-
BREE 325	Food Process Engineering	3	-
BREE 522	Bio-Based Polymers	3	P - BREE 216 and BREE 341, or permission of instructor
CHEE 363*	Projects Chemical Engineering 1	2	P - CHEE 200
or CHEE 494*	Research Project and Seminar 1	3	-
or CHEE 495*	Research Project and Seminar 2	4	-
or CHEE 496*	Environmental Research Project	3	-
CIVE 557	Microbiology for Environmental Engineering	3	P - CIVE 225 or instructor permission
MIME 470	Engineering Biomaterials	3	P - MIME 261 or equivalent, instructor permission
MIME 558	Engineering Nanomaterials	3	P - MIME 260 or MIME 261, MIME 362, or equivalent, or instructor

\*Students may choose only one project course: CHEE 363, CHEE 494, CHEE 495, or CHEE 496

## List C

0-3 credits

The remaining credits, up to a maximum of 3 credits, may be taken from other suitable undergraduate courses in the Faculty of Engineering, with departmental permission.

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.

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