CHEMICAL ENGINEERING (B.ENG.) (143 CREDITS)

Offered by: Chemical Engineering (Faculty of Engineering)
Degree: Bachelor of Engineering
Program credit weight: 143 credits

Program Description

Program credit weight for Quebec CEGEP students: 114 credits

Program credit weight for out-of-province students: 143 credits

The discipline of chemical engineering is distinctive in being based equally on physics, mathematics, and chemistry. Application of these three fundamental sciences is basic to a quantitative understanding of the process industries. Those with an interest in the fourth fundamental science, biology, will find several courses in the chemical engineering curriculum that integrate aspects of the biological sciences relevant to process industries such as food processing, fermentation, biomedical, and water pollution control. Courses on the technical operations and economics of the process industries are added to this foundation. The core curriculum concludes with process design courses taught by practising design engineers. Problem-solving, experimenting, planning, and communication skills are emphasized in courses throughout the core curriculum.

Certain students who take advantage of Summer session courses can complete the departmental program in three calendar years.

In some cases, students from university science disciplines have sufficient credits to complete the requirements for the B.Eng. (Chemical) program in two and a half years. Those concerned should discuss this with their adviser.

Students must obtain a grade of C or better in all core courses. For the Department of Chemical Engineering, core courses include all required courses (departmental and non-departmental) as well as technical complementary courses.

Note to CEGEP Students

If you have successfully completed a course at CEGEP that is equivalent to CHEM 212 Introductory Organic Chemistry 1. or CHEM 234 Topics in Organic Chemistry., you may obtain transfer credits for either or both courses by passing the McGill Science Placement Exam for the course(s). You must complete an application form available on the Science Placement Exam website and an application fee will be charged to your student account. Science placement exams take place in August and September before classes begin. If you pass the exam(s), transfer credits for the course(s) will be reflected on your transcript and your program credit requirements will be decreased to reflect these transfer credits. For information on Science Placement Exams, including application deadlines, the application form, application fee, dates, times, and location of the exams, see www.mcgill.ca/exams/dates/science. If you do not pass the placement exams, you must register for CHEM 212 Introductory Organic Chemistry 1. and CHEM 234 Topics in Organic Chemistry. during your studies at McGill as outlined in your program requirements.

Note: For information about Fall 2025 and Winter 2026 course offerings, please check back on May 8, 2025. Until then, the "Terms offered" field will appear blank for most courses while the class schedule is being finalized.

Required Year 0 (Freshman) Courses (29 credits)

Generally, students admitted to Engineering from Quebec CEGEPs are granted transfer credit for these Year 0 (Freshman) courses and enter a 114-credit program.

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-stud... and select your term of admission.

Expand allContract all

Course	Title	Credits
CHEM 110	General Chemistry 1.	4
CHEM 120	General Chemistry 2.	4
MATH 133	Linear Algebra and Geometry.	3
MATH 140	Calculus 1.	3
MATH 141	Calculus 2.	4
PHYS 131	Mechanics and Waves.	4
PHYS 142	Electromagnetism and Optics.	4

AND 3 credits selected from the approved list of courses in Humanities and Social Sciences, Management Studies and Law, listed below under Complementary Studies (Group B).

Note: FACC 100 Introduction to the Engineering Profession. must be taken during the first year of study.

Required Non-Departmental Courses (24 credits)

Expand allContract all

Course	Title	Credits
CHEM 212	Introductory Organic Chemistry 1.	4
CHEM 234	Topics in Organic Chemistry.	3
COMP 208	Computer Programming for Physical Sciences and Engineering .	3
FACC 100	Introduction to the Engineering Profession.[1]	1
FACC 250	Responsibilities of the Professional Engineer.	0
FACC 300	Engineering Economy.	3
FACC 400	Engineering Professional Practice.	1
MATH 262	Intermediate Calculus.	3
MATH 263	Ordinary Differential Equations for Engineers.	3
MATH 264	Advanced Calculus for Engineers.	3
Total Credits		**24**

[1] Note: FACC 100 Introduction to the Engineering Profession. must be taken during the first year of study.

Required Chemical Engineering Courses (75 credits)

Expand allContract all

Course	Title	Credits
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 370	Elements of Biotechnology.	3
CHEE 380	Materials Science.	3
CHEE 390	Computational Methods in Chemical Engineering.	3
CHEE 400	Principles of Sustainable 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 456D1	Design Project.	4.5
CHEE 456D2	Design Project.	4.5
CHEE 474	Biochemical Engineering.	3
CHEE 484	Materials Engineering.	3
CHEE 491	Instrumentation and Measurement 2.	4

Technical Complementaries (9 credits)

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.

List A

3-9 credits from the following:

Expand allContract all

Course	Title	Credits
CHEE 301	Resource Recovery and Circular Use.	3
CHEE 511	Catalysis for Sustainable Fuels and Chemicals.	3
CHEE 512	Stem Cell Bioprocess Engineering.	3
CHEE 515	Interface Design: Biomimetic Approach.	3
CHEE 521	Nanomaterials and the Aquatic Environment.[1]	3
CHEE 541	Electrochemical Engineering.	3
CHEE 543	Plasma Engineering.	3
CHEE 563	Biofluids and Cardiovascular Mechanics.[1]	3
CHEE 582	Polymer Science and Engineering.	3
CHEE 584	Polymer Processing.	3
CHEE 585	Foundations of Soft Matter.	3
CHEE 591	Environmental Bioremediation.	3
CHEE 593	Industrial Water Pollution Control.[1]	3
CIVE 430	Water Treatment and Pollution Control.[1]	3
CIVE 521	Nanomaterials and the Aquatic Environment.[1]	3
MECH 534	Air Pollution Engineering.[1]	3
MECH 563	Biofluids and Cardiovascular Mechanics.[1]	3

[1] Students may choose only one course in each of the following sets:

- CHEE 521 Nanomaterials and the Aquatic Environment. or CIVE 521 Nanomaterials and the Aquatic Environment.
- CHEE 563 Biofluids and Cardiovascular Mechanics. or MECH 563 Biofluids and Cardiovascular Mechanics.
- CHEE 593 Industrial Water Pollution Control. or CIVE 430 Water Treatment and Pollution Control.

List B

0-6 credits from the following:

Expand allContract all

Course	Title	Credits
BIEN 550	Biomolecular Devices.	3
BREE 325	Food Process Engineering.	3
BREE 522	Bio-Based Polymers.	3
CHEE 494	Research Project and Seminar 1.[1]	3
CHEE 495	Research Project and Seminar 2.[1]	4
CHEE 496	Environmental Research Project.[1]	3
CIVE 557	Microbiology for Environmental Engineering.	3
MIME 470	Engineering Biomaterials.	3
MIME 515	(Bio)material Surface Analysis and Modification.	3

[1] Students may choose only one project course: CHEE 494 Research Project and Seminar 1., CHEE 495 Research Project and Seminar 2., or CHEE 496 Environmental Research Project..

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.

Complementary Studies (6 credits)

Group A - Impact of Technology on Society

3 credits from the following:

Expand allContract all

Course	Title	Credits
ANTH 212	Anthropology of Development.	3
BTEC 502	Biotechnology Ethics and Society.	3
ECON 225	Economics of the Environment.	3
ECON 347	Economics of Climate Change.	3
ENVR 201	Society, Environment and Sustainability.	3
GEOG 200	Geographical Perspectives: World Environmental Problems.	3
GEOG 203	Environmental Systems.	3
GEOG 205	Global Change: Past, Present and Future.	3
GEOG 302	Environmental Management 1.	3
MGPO 440	Strategies for Sustainability.[1]	3
PHIL 343	Biomedical Ethics.	3
RELG 270	Religious Ethics and the Environment.	3
SOCI 235	Technology and Society.	3
SOCI 312	Sociology of Work and Industry.	3
URBP 201	Planning the 21st Century City.	3

[1] 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

3 credits at the 200 level or higher from the following departments:

Anthropology (ANTH)

Economics (any 200- or 300-level course excluding ECON 227 Economic Statistics. and ECON 337 Introductory Econometrics 1.)

History (HIST)

Philosophy (excluding PHIL 210 Introduction to Deductive Logic 1. and PHIL 310 Intermediate Logic.)

Political Science (POLI)

Psychology (excluding PSYC 204 Introduction to Psychological Statistics. and PSYC 305 Statistics for Experimental Design., but including PSYC 100 Introduction to Psychology.)

Religious Studies (RELG) (excluding courses that principally impart language skills, such as Sanskrit, Tibetan, Tamil, New Testament Greek, and Biblical Hebrew)[1]

School of Social Work (SWRK)

Sociology (excluding SOCI 350 Statistics in Social Research.)

OR 3 credits from the following:

Expand allContract all

Course	Title	Credits
ARCH 528	History of Housing.	3
BUSA 465	Technological Entrepreneurship.[2]	3
CLAS 203	Greek Mythology.	3
ENVR 203	Knowledge, Ethics and Environment.	3
ENVR 400	Environmental Thought.	3
FACC 220	Law for Architects and Engineers.	3
FACC 500	Technology Business Plan Design.	3
FACC 501	Technology Business Plan Project.	3
HISP 225	Hispanic Civilization 1.	3
HISP 226	Hispanic Civilization 2.	3
INDR 294	Introduction to Labour-Management Relations.[2]	3
INTG 215	Entrepreneurship Essentials for Non-Management Students.[3]	3
MATH 338	History and Philosophy of Mathematics.	3
MGCR 222	Introduction to Organizational Behaviour.[2]	3
MGCR 352	Principles of Marketing.	3
ORGB 321	Leadership.[2]	3
ORGB 423	Human Resources Management.[2]	3

[1] If you are uncertain whether or not a course principally imparts language skills, please see an adviser in the McGill Engineering Student Centre (Frank Dawson Adams Building, Room 22) or email an adviser.

[2] Note: Management courses have limited enrolment and registration dates. See Important Dates at http://www.mcgill.ca/importantdates.

[3] INTG 215 Entrepreneurship Essentials for Non-Management Students. is not open to students who have taken INTG 201 Integrated Management Essentials 1. and INTG 202 Integrated Management Essentials 2..

Note regarding language courses: Language courses are not accepted to satisfy the Complementary Studies Group B requirement, effective for students who entered the program as of Fall 2017.