

# Chemical Engineering Curriculum - Fall 2019

## Non-CEGEP Entry

| <b>1st Term (Fall)</b>   |  | <b>18 credits</b> | <b>Prerequisites/Co-requisites</b>                                    |
|--------------------------|--|-------------------|---|
| CHEM 110                 | General Chemistry 1                              | 4                 | P - College level mathematics and physics or permission of instructor |
| FACC 100                 | Introduction to the Engineering Profession       | 1                 | -   |
| MATH 133                 | Linear Algebra and Geometry                      | 3                 | P - A course in functions   |
| MATH 140                 | Calculus 1                                       | 3                 | P - High school calculus  |
| PHYS 131                 | Mechanics and Waves                              | 4                 | C - Calculus course [MATH 140]  |
| CS                       | Complementary Studies Group B (HSSML) - 1*       | 3                 | -   |
| <b>2nd Term (Winter)</b> |  | <b>18 credits</b> | <b>Prerequisites/Co-requisites</b>                                    |
| CHEM 120                 | General Chemistry 2                              | 4                 | P - College level mathematics and physics or permission of instructor |
| 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 Term (Fall)</b>   |  | <b>17 credits</b> | <b>Prerequisites/Co-requisites</b>                                    |
| CHEE 200                 | Chemical Engineering Principles 1                | 3                 | -   |
| CHEE 231                 | Data Analysis and Design of Experiments          | 3                 | -   |
| CHEE 291                 | Instrumentation and Measurement 1                | 4                 | C - CHEE 231  |
| 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 Term (Winter)</b> |  | <b>18 credits</b> | <b>Prerequisites/Co-requisites</b>                                    |
| 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 - MATH 140, MATH 141 / C - MATH 133                                 |
| MATH 263                 | Ordinary Differential Equations for Engineers    | 3                 | C - MATH 262  |
| CHEE xxx                 | Technical Complementary                          | 3                 | -   |
| <b>5th Term (Fall)</b>   |  | <b>18 credits</b> | <b>Prerequisites/Co-requisites</b>                                    |
| CHEE 314                 | Fluid Mechanics                                  | 3                 | C - CHEE 204, 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 250                 | Responsibilities of the Professional Engineer*** | 0                 | P - FACC 100 or BREE 250  |
| FACC 300                 | Engineering Economy                              | 3                 | -   |
| MATH 264                 | Advanced Calculus for Engineers                  | 3                 | P - MATH 262 / C - MATH 263   |
| <b>6th Term (Winter)</b> |  | <b>18 credits</b> | <b>Prerequisites/Co-requisites</b>                                    |
| CHEE 310                 | Physical Chemistry for Engineers                 | 3                 | C - CHEE 220  |
| CHEE 315                 | Heat and Mass Transfer                           | 3                 | P - CHEE 314  |
| CHEE 351                 | Separation Processes                             | 3                 | P - CHEE 220 / C - CHEE 204, CHEE 315                                 |
| CHEE 484                 | Materials Engineering                            | 3                 | P - CHEE 380  |
| CHEE xxx                 | Technical Complementary                          | 3                 | -   |
| CHEE xxx                 | Technical Complementary                          | 3                 | -   |
| <b>7th Term (Fall)</b>   |  | <b>18 credits</b> | <b>Prerequisites/Co-requisites</b>                                    |
| CHEE 360                 | Technical Paper                                  | 1                 | -   |
| CHEE 400                 | Principles of Energy Conversion                  | 3                 | P - CHEE 315 / C - CHEE 390, CHEE 484                                 |
| CHEE 423                 | Chemical Reaction Engineering                    | 3                 | P - CHEE 310, CHEE 315  |
| CHEE 453                 | Process Design                                   | 4                 | C - CHEE 315, CHEE 351  |
| CHEE 456                 | Design Project 1                                 | 3                 | C - CHEE 453  |
| CHEE 474                 | Biochemical Engineering                          | 3                 | P - CHEE 370 / C - CHEE 315   |
| FACC 400                 | Engineering Professional Practice                | 1                 | P - FACC 100, FACC 250, and 60 program credits                        |
| <b>8th Term (Winter)</b> |  | <b>18 credits</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 291 / C - CHEE 423, CHEE 453                                 |
| CHEE 457                 | Design Project 2                                 | 5                 | P - CHEE 456  |
| CHEE 491                 | Instrumentation and Measurement 2                | 4                 | P - CHEE 231, CHEE 291 / C - CHEE 423, 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). 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).

\*\*FACC 250 is not yet indicated as a prerequisite in the eCalendar course information ([www.mcgill.ca/study](http://www.mcgill.ca/study)) but it will be before FACC 400 is taken.

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.

## 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 511     | Catalysis for Sustainable Fuels and Chemicals     | 3       | P - CHEE 204 and CHEE 310 or permission of instructor  |
| 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 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 instructor permission                  |
| 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 550     | Biomolecular Devices   | 3       | P - Permission of instructor  |
| BIOT 505     | Selected Topics in Biotechnology (Biotechnology minor students only) | 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 permission |

\*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.

**Last update: April 30, 2019**

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