# COMPUTER ENGINEERING (B.ENG.) (133 CREDITS)

**Offered by:** Electrical & Computer Engr (Faculty of Engineering)
**Degree:** Bachelor of Engineering
**Program credit weight:** 133 credits

## Program Description

Program credit weight: 133-136 credits

Program credit weight for Quebec CEGEP students: 108-111 credits

Program credit weight for out-of-province students: 133-136 credits

The Computer Engineering program provides students with greater depth and breadth of knowledge in the hardware and software aspects of computers. Students are exposed to both theoretical and practical issues of both hardware and software in well-equipped laboratories. Although the program is designed to meet the growing demands by industry for engineers with a strong background in modern computer technology, it also provides the underlying depth for graduate studies in all fields of Computer Engineering.

In addition to technical complementary courses, students in the program take general complementary courses in social sciences, management studies, and humanities. These courses allow students to develop specific interests in areas such as psychology, economics, management, or political science.

**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 (25 credits)

Generally, students admitted to Engineering from Quebec CEGEPs are granted transfer credit for these Year 0 (Freshman) courses and enter a 108- to 111 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.

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| Course | Title | Credits |
|---|---|---|
| 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 Administrative 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 (26 credits)

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| Course | Title | Credits |
|---|---|---|
| COMP 202 | Foundations of Programming. | 3 |
| COMP 206 | Introduction to Software Systems. | 3 |
| COMP 251 | Algorithms and Data Structures. | 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 240 | Discrete Structures. | 3 |
| MATH 262 | Intermediate Calculus. | 3 |
| MATH 263 | Ordinary Differential Equations for Engineers. | 3 |
| WCOM 206 | Communication in Engineering. | 3 |

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

## Required Computer Engineering Courses (64 credits)

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| Course | Title | Credits |
|---|---|---|
| ECSE 200 | Electric Circuits 1. | 3 |
| ECSE 205 | Probability and Statistics for Engineers | 3 |
| ECSE 206 | Introduction to Signals and Systems. | 3 |
| ECSE 210 | Electric Circuits 2. | 3 |
| ECSE 211 | Design Principles and Methods. | 3 |
| ECSE 222 | Digital Logic. | 3 |
| ECSE 223 | Model-Based Programming. | 3 |
| ECSE 250 | Fundamentals of Software Development. | 3 |
| ECSE 308 | Introduction to Communication Systems and Networks. | 4 |
| ECSE 310 | Thermodynamics of Computing. | 3 |
| ECSE 321 | Introduction to Software Engineering. | 3 |
| ECSE 324 | Computer Organization. | 4 |
| ECSE 325 | Digital Systems. | 3 |
| ECSE 331 | Electronics. | 4 |
| ECSE 353 | Electromagnetic Fields and Waves. | 3 |

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| ECSE 425 | Computer Architecture. | 3 |
| ECSE 427 | Operating Systems. | 3 |
| ECSE 444 | Microprocessors. | 4 |
| ECSE 458D1 | Capstone Design Project. | 3 |
| ECSE 458D2 | Capstone Design Project. | 3 |

Note: ECSE 458N1 Capstone Design Project. and ECSE 458N2 Capstone Design Project. can be taken instead of ECSE 458D1 Capstone Design Project. and ECSE 458D2 Capstone Design Project..

# Complementary Courses (15-18 credits)

## Technical Complementaries

9-12 credits (3 courses) must be taken, chosen as follows:

3-4 credits (1 course) from List A

6-8 credits (2 courses) from List A or List B

### List A

3-12 credits from the following:

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| Course | Title | Credits |
|---|---|---|
| ECSE 307 | Linear Systems and Control. | 4 |
| ECSE 335 | Microelectronics. | 4 |
| ECSE 403 | Control. | 4 |
| ECSE 408 | Communication Systems. | 4 |
| ECSE 412 | Discrete Time Signal Processing. | 3 |
| ECSE 415 | Introduction to Computer Vision. | 3 |
| ECSE 416 | Telecommunication Networks. | 4 |
| ECSE 420 | Parallel Computing. | 3 |
| ECSE 428 | Software Engineering Practice. | 3 |
| ECSE 435 | Mixed-Signal Test Techniques. | 3 |
| ECSE 439 | Software Language Engineering. | 3 |
| ECSE 508 | Multi-Agent Systems. | 3 |
| ECSE 544 | Computational Photography. | 4 |

### List B

0-12 credits from the following:

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| Course | Title | Credits |
|---|---|---|
| COMP 307 | Principles of Web Development. | 3 |
| COMP 370 | Introduction to Data Science. | 3 |
| COMP 421 | Database Systems. | 3 |
| COMP 424 | Artificial Intelligence.[1] | 3 |
| COMP 445 | Computational Linguistics. | 3 |
| COMP 512 | Distributed Systems. | 4 |
| COMP 520 | Compiler Design. | 4 |
| COMP 549 | Brain-Inspired Artificial Intelligence. | 3 |
| COMP 550 | Natural Language Processing. | 3 |
| COMP 551 | Applied Machine Learning.[2] | 4 |
| COMP 559 | Fundamentals of Computer Animation. | 4 |
| COMP 562 | Theory of Machine Learning. | 4 |
| COMP 579 | Reinforcement Learning. | 4 |
| COMP 588 | Probabilistic Graphical Models. | 4 |
| ECSE 343 | Numerical Methods in Engineering. | 3 |
| ECSE 421 | Embedded Systems. | 3 |
| ECSE 422 | Fault Tolerant Computing. | 3 |
| ECSE 424 | Human-Computer Interaction. | 3 |
| ECSE 429 | Software Validation. | 3 |
| ECSE 437 | Software Delivery. | 3 |
| ECSE 446 | Realistic Image Synthesis. | 3 |
| ECSE 472 | Fundamentals of Circuit Simulation and Modelling. | 3 |
| ECSE 500 | Mathematical Foundations of Systems. | 3 |
| ECSE 501 | Linear Systems. | 3 |
| ECSE 507 | Optimization and Optimal Control. | 3 |
| ECSE 509 | Probability and Random Signals 2. | 3 |
| ECSE 516 | Nonlinear and Hybrid Control Systems. | 3 |
| ECSE 521 | Digital Communications 1. | 3 |
| ECSE 525 | Satellite Navigation Systems . | 4 |
| ECSE 526 | Artificial Intelligence.[1] | 3 |
| ECSE 532 | Computer Graphics. | 4 |
| ECSE 551 | Machine Learning for Engineers. | 4 |
| ECSE 552 | Deep Learning. | 4 |
| ECSE 554 | Applied Robotics . | 4 |
| ECSE 556 | Machine Learning in Network Biology. | 4 |
| ECSE 557 | Introduction to Ethics of Intelligent Systems. | 3 |
| ECSE 561 | Automated Program Analysis and Testing. | 3 |
| ECSE 575 | Heterogeneous Integration Systems. | 3 |
| MATH 247 | Honours Applied Linear Algebra. | 3 |

1 COMP 424 Artificial Intelligence. and ECSE 526 Artificial Intelligence. cannot both be taken.

2 ECSE 551 Machine Learning for Engineers. and COMP 551 Applied Machine Learning. cannot both be taken.

# Complementary Studies

## Group A - Impact of Technology on Society

3 credits from the following:

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| 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 |

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|---|---|---|
| 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:

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| 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 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.[2] | 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.

# Elective Course (3 credits)

One 3-credit course at the 200-level or higher from any department at McGill, approved by the Undergraduate Programs Office in the Department of Electrical and Computer Engineering.