

2020 / 2021 CURRICULUM - COMPUTER ENGINEERING

EIGHT SEMESTER PROGRAM Total credits: 133

First Semester (Fall 2020)		14 credits	Second Semester (Winter 2021)		18 credits
XXXX xxx	Humanities & Social Sciences 1*	(3 cr)	CHEM 120	General Chemistry 2	(4 cr, P - College level mathematics and physics or permission of instructor)
MATH 140	Calculus 1	(3 cr, P- High school calculus)	MATH 141	Calculus 2	(4 cr, P - MATH 140)
PHYS 131	Mechanics & Waves	(4 cr, C - Calculus course (MATH 140))	PHYS 142	Electromagnetism & Optics	(4 cr, P - PHYS 131; C - MATH 141)
MATH 133	Linear Algebra and Geometry	(3 cr, P - A course in functions)	ECSE 202	Intro. to Software Development	(3 cr)
FACC 100	Intro. to Engineering Profession	(1 cr)	XXXX xxx	Impact of Technology on Society **	(3 cr)
Third Semester (Fall 2021)		15 credits	Fourth Semester (Winter 2022)		18 credits
ECSE 200	Electric Circuits 1	(3 cr, P - PHYS 142; C - MATH 263)	COMP 250	Introduction to Computer Science	(3 cr) P- Familiarity with a high level programming language and CEGEP level MATH [MATH 133, MATH 140, MATH 141]
ECSE 222	Digital Logic	(3 cr, P - ECSE 202)	ECSE 210	Electric Circuits 2	(3 cr, P - ECSE 200)
MATH 262	Intermediate Calculus	(3 cr, P-MATH 141 or equiv, MATH 133)	ECSE 211	Design Principles and Methods	(3 cr, P - ECSE 200, ECSE 202)
MATH 263	ODEs for Engineers	(3 cr, C - MATH 262)	FACC 300	Engineering Economy	(3 cr)
CCOM 206	Communication in Engineering	(3 cr)	ECSE 223	Model-based Programming	(3 cr, P - ECSE 202)
FACC 250	Resp. of the Prof. Engineer	(0 cr, P - FACC 100 or BREE 250)	XXXX xxx	Humanities & Social Sciences 2*	(3 cr)
Fifth Semester (Fall 2022)		17 credits	Sixth Semester (Winter 2023)		18 credits
ECSE 206	Intro. to Signals & Systems	(3 cr, P - ECSE 200)	MATH 240	Discrete Structures	(3 cr, C - MATH 133)
ECSE 205	Probability & Statistics for Eng.	(3 cr)	ECSE 310	Thermodynamics of Computing	(3 cr, P - ECSE 200, ECSE 205, ECSE 222)
ECSE 324	Computer Organization	(4 cr, P - ECSE 200, ECSE 222)	ECSE 325	Digital Systems	(3 cr, P - ECSE 324)
ECSE 331	Electronics	(4 cr, P - ECSE 210)	ECSE 321	Intro. to Software Engineering	(3 cr, P - ECSE 223 and COMP 202 or COMP 208 or ECSE 202)
ECSE 353	Electromagnetic Fields & Waves	(3 cr, P - ECSE 210, MATH 262, MATH 263)	ECSE 427	Operating Systems	(3 cr, P - ECSE 324 or COMP 273)
ECSE 458 D1	Capstone Design Project	(3 cr, P - ECSE 211 and ECSE 324 and CCOM 206 and (ECSE 331 or COMP 302))	COMP 251	Algorithms and Data Structures	(3 cr, P - COMP 250, C - MATH 240)
Seventh Semester (Fall 2023)		17 credits	Eighth Semester (Winter 2024)		16 credits
ECSE 308	Intro. Comm. Sys. & Networks	(4 cr, P - ECSE 205, ECSE 206)	ECSE 458 D2	Capstone Design Project	(3 cr, P - ECSE 458 D1)
ECSE 444	Microprocessors	(4 cr, P - ECSE 324)	ECSE 425	Computer Architecture	(3 cr, P - ECSE 324)
XXXX xxx	Technical Complementary 1	(3 cr)	XXXX xxx	Technical Complementary 3	(3 cr)
XXXX xxx	Technical Complementary 2	(3 cr)	XXXX xxx	Technical Complementary 4	(3 cr)
			XXXX xxx	Elective course***	(3 cr)
			FACC 400	Engineering Professional Practice	(1 cr, P - FACC 100, FACC 250, and 60 program credits)

Courses shown in boldface above must be passed with a grade "C" or better. A "D" is *only* acceptable in the courses *not* in boldface. Also, a grade of "C" is required in all prerequisites in order to proceed with the follow-on courses. (Exception: A student who fails a course with a grade of D may take an ECSE course that has it as a prerequisite, provided that the failed course is retaken at the same time. Students thinking of doing this should meet with a Departmental advisor).

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

* For instructions on selecting valid "Humanities and Social Sciences" courses, see www.mcgill.ca/ece, then: Undergraduate Studies > Program Information > Complementary Studies.

** For instructions on selecting valid "Impact of Technology on Society" courses, see www.mcgill.ca/ece, then: Undergraduate Studies > Program Information > Complementary Studies.

*** 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. For approval, please contact our office at undergrad.ece@mcgill.ca.

ECSE 458, Capstone Design Project course is a spanned course given in both the fall and winter terms. A course that spans across two semesters may be taken in Fall-Winter or Winter-Fall. Students wishing to take the Fall-Winter sequence will need to register for ECSE 458 D1/D2. For a Winter-Fall sequence, students need to register for ECSE 458 N1/N2.

This sample curriculum is for students who wish to complete their degree requirements in 8 semesters. Students may, at any time, deviate from this structure. However, it is the student's responsibility to devise a study plan that has no course conflicts or prerequisite/corequisite violations. Academic advisors are available for help with course selection.

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COMPUTER ENGINEERING

A: Technical Complementaries

12-16 credits

4 courses must be taken, chosen as follows:

1 course (minimum 3 credits) from List A

The remaining 3 courses from List A or List B

ECSE 500 level technical complementaries are restricted to students with a minimum CGPA of 3.0 and B+ or better in the prerequisites.

List A

3-16 credits from the following:

ECSE 307	Linear Systems & Control	(4 cr, P - ECSE 206, ECSE 210)
ECSE 335	Microelectronics	(4 cr, P - ECSE 331)
ECSE 343	Numerical Methods in Engineering	(3 cr, P - ECSE 205, COMP 250, MATH 263)
ECSE 403	Control	(4 cr, P - ECSE 307)
ECSE 408	Communication Systems	(4 cr, P - ECSE 205, ECSE 308)
ECSE 412	Discrete-Time Signal Processing	(3 cr, P - ECSE 206)
ECSE 415	Intro. to Computer Vision	(3 cr, P - ECSE 205, ECSE 206 or ECSE 316)
ECSE 416	Telecom. Networks	(4 cr, P - ECSE 205, ECSE 308 or ECSE 316, COMP 250)
ECSE 420	Parallel Computing	(3 cr, P - ECSE 427)
ECSE 422	Fault Tolerant Computing	(3 cr, P - ECSE 324, COMP 250)
ECSE 428	Software Engineering Practice	(3 cr, P - ECSE 321 or COMP 335)
ECSE 429	Software Validation	(3 cr, P - ECSE 321 or COMP 303)
ECSE 435	Mixed Signal Test Techniques	(3 cr, P - ECSE 206, ECSE 335)
ECSE 436	Signal Processing Hardware	(3 cr, P - ECSE 206, ECSE 324, ECSE 325)
ECSE 437	Software Delivery	(3 cr, P - ECSE 321 or COMP 303)
ECSE 439	Software Language Engineering	(3 cr, P - ECSE 321 or COMP 303)
ECSE 446	Realistic Image Synthesis	(3 cr, P - ECSE 202, ECSE 205, COMP 250)
ECSE 450	Electromagnetic Compatability	(3 cr, P - ECSE 222, ECSE 331, ECSE 353 or ECSE 354)
ECSE 472	Fundamentals of Circuit Simulation & Modelling	(3 cr, P - ECSE 206, ECSE 331, (ECSE 251 or ECSE 353)
ECSE 501	Linear Systems	(3 cr, C - ECSE 500 or permission from the instructor)
ECSE 508	Multi-Agent Systems	(3 cr, P - ECSE 205 or equivalents)
ECSE 510	Filtering & Prediction for Stochastic Systems	(3 cr, P - ECSE 500, ECSE 509 or equivalents)
ECSE 516	Nonlinear and Hybrid Control Systems	(3 cr, P - ECSE 500 and ECSE 501 or equivalents)
ECSE 544	Computational Photography	(4 cr, P - ECSE 205 and ECSE 206)
ECSE 551*	Machine Learning for Engineers	(4 cr - P - COMP 250 and ESCE 205 or MATH 323; C- ESCE 443 or ESCE 543 or MATH 247)

List B

0-12 credits

The 3 remaining technical complementary courses must be chosen from List A or from List B:

COMP 424**	Artificial Intelligence	(3 cr, P - COMP 206/ECSE 321, MATH 323 or equivalent, COMP 251)
COMP 551*	Applied Machine Learning	(4 cr, MATH 323 or ECSE 205 or ESCE 305 or equivalent)
COMP 559	Fundamentals of Computer Animation	(4 cr - P MATH 222, MATH 223, COMP 206, COMP 250)
ECSE 421	Embedded Systems	(3 cr, P - ECSE 324)
ECSE 424	Human-Computer Interaction	(3 cr, P - ECSE 324, COMP 250 or COMPE 251, COMP 273)
ECSE 500	Mathematical Foundations of Systems	(3 cr, permission from instructor)
ECSE 507	Optimization & Optimal Control	(3 cr, P - (ECSE 343 or ECSE 443) or ESCE 543 or ECSE 501 or COMP 540 or permission of instructor)
ECSE 509	Probability & Random Signals 2	(3 cr, P - (ECSE 206 or ESCE 316) and ECSE 205)
ECSE 521	Digital Communications 1	(3 cr, P - ECSE 411 or ESCE 408 or ECSE 511; C- ECSE 509)
ECSE 526**	Artificial Intelligence	(3 cr, P - ECSE 324)
ECSE 532	Computer Graphics	(4 cr, P - ECSE 324)
MATH 247	Honours Applied Linear Algebra	(3 cr, P - MATH 133 or equiv.)

*ECSE 551 and COMP 551 cannot both be taken.

** COMP 424 and ECSE 526 cannot both be taken.