Computer Engineering Curriculum - Fall 2020

<table>
<thead>
<tr>
<th>1st Term (Fall)</th>
<th>15 credits</th>
<th>Prerequisites/Co-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECSE 202</td>
<td>Introduction to Software Development</td>
<td>3 -</td>
</tr>
<tr>
<td>ECSE 205</td>
<td>Probability and Statistics for Engineers</td>
<td>3 -</td>
</tr>
<tr>
<td>MATH 262</td>
<td>Intermediate Calculus</td>
<td>3 P - MATH 133 or equivalent, MATH 141 or equivalent</td>
</tr>
<tr>
<td>MATH 263</td>
<td>Ordinary Differential Equations for Engineers</td>
<td>3 C - MATH 262</td>
</tr>
<tr>
<td>CS</td>
<td>Complementary Studies Group B (HSSML)*</td>
<td>3 -</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2nd Term (Winter)</th>
<th>16 credits</th>
<th>Prerequisites/Co-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 250</td>
<td>Introduction to Computer Science</td>
<td>3 P - Familiarity with a high level programming language and CEGEP level Math</td>
</tr>
<tr>
<td>ECSE 200</td>
<td>Electric Circuits 1</td>
<td>3 P - PHYS 142 or CEGEP equivalent / C - MATH 263</td>
</tr>
<tr>
<td>ECSE 222</td>
<td>Digital Logic</td>
<td>3 P - ECSE 202</td>
</tr>
<tr>
<td>CCOM 206</td>
<td>Communication in Engineering</td>
<td>3 -</td>
</tr>
<tr>
<td>FACC 100</td>
<td>Introduction to the Engineering Profession</td>
<td>1 -</td>
</tr>
<tr>
<td>CS</td>
<td>Complementary Studies Group A (Impact)*</td>
<td>3 -</td>
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<table>
<thead>
<tr>
<th>3rd Term (Fall)</th>
<th>16 credits</th>
<th>Prerequisites/Co-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECSE 206</td>
<td>Introduction to Signals and Systems</td>
<td>3 P - ECSE 200</td>
</tr>
<tr>
<td>ECSE 210</td>
<td>Electric Circuits 2</td>
<td>3 P - ECSE 200</td>
</tr>
<tr>
<td>ECSE 211</td>
<td>Design Principles and Methods</td>
<td>3 P - ECSE 200, ECSE 202</td>
</tr>
<tr>
<td>ECSE 223</td>
<td>Model-Based Programming</td>
<td>3 P - ECSE 202</td>
</tr>
<tr>
<td>ECSE 324</td>
<td>Computer Organization</td>
<td>4 P - ECSE 200, ECSE 222</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4th Term (Winter)</th>
<th>15 credits</th>
<th>Prerequisites/Co-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 251</td>
<td>Algorithms and Data Structures</td>
<td>3 P - COMP 250 / C - MATH 240</td>
</tr>
<tr>
<td>ECSE 310</td>
<td>Thermodynamics of Computing</td>
<td>3 P - ECSE 200, ECSE 205, ECSE 222</td>
</tr>
<tr>
<td>ECSE 321</td>
<td>Introduction to Software Engineering</td>
<td>3 P - ECSE 223 and (COMP 202 or COMP 208 or ECSE 202)</td>
</tr>
<tr>
<td>ECSE 325</td>
<td>Digital Systems</td>
<td>3 P - ECSE 324</td>
</tr>
<tr>
<td>FACC 250</td>
<td>Responsibilities of the Professional Engineer</td>
<td>0 P - FACC 100 or BREE 250</td>
</tr>
<tr>
<td>MATH 240</td>
<td>Discrete Structures 1</td>
<td>3 C - MATH 133</td>
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<table>
<thead>
<tr>
<th>5th Term (Fall)</th>
<th>17 credits</th>
<th>Prerequisites/Co-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECSE 308</td>
<td>Introduction to Communication Systems and Networks</td>
<td>4 P - ECSE 205, ECSE 206</td>
</tr>
<tr>
<td>ECSE 331</td>
<td>Electronics</td>
<td>4 P - ECSE 210</td>
</tr>
<tr>
<td>ECSE 353</td>
<td>Electromagnetic Fields and Waves</td>
<td>3 P - ECSE 210, MATH 262, MATH 263</td>
</tr>
<tr>
<td>ECSE 427</td>
<td>Operating Systems</td>
<td>3 P - ECSE 324 or COMP 273</td>
</tr>
<tr>
<td>Science</td>
<td>Natural Science Complementary</td>
<td>3 -</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6th Term (Winter)</th>
<th>16 credits</th>
<th>Prerequisites/Co-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECSE 425</td>
<td>Computer Architecture</td>
<td>3 P - ECSE 324</td>
</tr>
<tr>
<td>ECSE 444</td>
<td>Microprocessors</td>
<td>4 P - ECSE 324</td>
</tr>
<tr>
<td>ECSE 458N1</td>
<td>Capstone Design Project</td>
<td>3 P - ECSE 211 and ECSE 324 and CCOM 206 and (ECSE 331 or COMP 302)</td>
</tr>
<tr>
<td>ECSE xxx</td>
<td>Technical Complementary</td>
<td>3 -</td>
</tr>
<tr>
<td>ECSE xxx</td>
<td>Technical Complementary</td>
<td>3 -</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7th Term (Fall)</th>
<th>16 credits</th>
<th>Prerequisites/Co-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECSE 458N2</td>
<td>Capstone Design Project</td>
<td>3 P - ECSE 458N1</td>
</tr>
<tr>
<td>FACC 300</td>
<td>Engineering Economy</td>
<td>3 -</td>
</tr>
<tr>
<td>FACC 400</td>
<td>Engineering Professional Practice</td>
<td>1 P - FACC 100, FACC 250**, and 60 program credits</td>
</tr>
<tr>
<td>ECSE xxx</td>
<td>Technical Complementary</td>
<td>3 -</td>
</tr>
<tr>
<td>ECSE xxx</td>
<td>Technical Complementary</td>
<td>3 -</td>
</tr>
<tr>
<td>XXXX xxx</td>
<td>Elective Course****</td>
<td>3 -</td>
</tr>
</tbody>
</table>

Technical and Natural Science Complementary course 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 one course (3 credits) from Group B. The curriculum above includes suggested terms during which these courses can be taken. 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) (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) 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 - Computer Engineering

### 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

#### List A
3-16 credits from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Prerequisites/Co-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECSE 307</td>
<td>Linear Systems and Control</td>
<td>4</td>
<td>P - ECSE 206, ECSE 210</td>
</tr>
<tr>
<td>ECSE 335</td>
<td>Microelectronics</td>
<td>4</td>
<td>P - ECSE 331</td>
</tr>
<tr>
<td>ECSE 343</td>
<td>Numerical Methods in Engineering</td>
<td>3</td>
<td>P - ECSE 205, COMP 250, MATH 263</td>
</tr>
<tr>
<td>ECSE 403</td>
<td>Control</td>
<td>4</td>
<td>P - ECSE 307</td>
</tr>
<tr>
<td>ECSE 408</td>
<td>Communication Systems</td>
<td>4</td>
<td>P - ECSE 205, ECSE 308</td>
</tr>
<tr>
<td>ECSE 412</td>
<td>Discrete Time Signal Processing</td>
<td>3</td>
<td>P - ECSE 206</td>
</tr>
<tr>
<td>ECSE 415</td>
<td>Introduction to Computer Vision</td>
<td>3</td>
<td>P - ECSE 205, (ECSE 206 or ECSE 316), COMP 250</td>
</tr>
<tr>
<td>ECSE 416</td>
<td>Telecommunication Networks</td>
<td>4</td>
<td>P - ECSE 205, (ECSE 308 or ECSE 316), COMP 250</td>
</tr>
<tr>
<td>ECSE 420</td>
<td>Parallel Computing</td>
<td>3</td>
<td>P - ECSE 427</td>
</tr>
<tr>
<td>ECSE 422</td>
<td>Fault Tolerant Computing</td>
<td>3</td>
<td>P - ECSE 324, COMP 250</td>
</tr>
<tr>
<td>ECSE 428</td>
<td>Software Engineering Practice</td>
<td>3</td>
<td>P - ECSE 321 or COMP 335</td>
</tr>
<tr>
<td>ECSE 429</td>
<td>Software Validation</td>
<td>3</td>
<td>P - ECSE 321 or COMP 303</td>
</tr>
<tr>
<td>ECSE 435</td>
<td>Mixed-Signal Test Techniques</td>
<td>3</td>
<td>P - ECSE 206, ECSE 335</td>
</tr>
<tr>
<td>ECSE 436</td>
<td>Signal Processing Hardware</td>
<td>3</td>
<td>P - ECSE 206, ECSE 324, ECSE 325</td>
</tr>
<tr>
<td>ECSE 437</td>
<td>Software Delivery</td>
<td>3</td>
<td>P - ECSE 321 or COMP 303</td>
</tr>
<tr>
<td>ECSE 439</td>
<td>Software Language Engineering</td>
<td>3</td>
<td>P - ECSE 321 or COMP 303</td>
</tr>
<tr>
<td>ECSE 446</td>
<td>Realistic Image Synthesis</td>
<td>3</td>
<td>P - ECSE 202, ECSE 205, COMP 250</td>
</tr>
<tr>
<td>ECSE 450</td>
<td>Electromagnetic Compatibility</td>
<td>3</td>
<td>P - ECSE 222, ECSE 331, (ECSE 353 or ECSE 354)</td>
</tr>
<tr>
<td>ECSE 472</td>
<td>Fundamentals of Circuit Simulation and Modelling</td>
<td>3</td>
<td>P - ECSE 206, ECSE 331, (ECSE 251 or ECSE 353)</td>
</tr>
<tr>
<td>ECSE 501</td>
<td>Linear Systems</td>
<td>3</td>
<td>P - ECSE 500 or permission from instructor</td>
</tr>
<tr>
<td>ECSE 508</td>
<td>Multi-Agent Systems</td>
<td>3</td>
<td>P - ECSE 205</td>
</tr>
<tr>
<td>ECSE 510</td>
<td>Filtering and Prediction for Stochastic Systems</td>
<td>3</td>
<td>P - ECSE 500, ECSE 509</td>
</tr>
<tr>
<td>ECSE 516</td>
<td>Nonlinear and Hybrid Control Systems</td>
<td>3</td>
<td>P - ECSE 500, ECSE 501</td>
</tr>
<tr>
<td>ECSE 544</td>
<td>Computational Photography</td>
<td>4</td>
<td>P - ECSE 205, ECSE 206</td>
</tr>
<tr>
<td>ECSE 551</td>
<td>Machine Learning for Engineers*</td>
<td>4</td>
<td>P - (ECSE 205 or MATH 323), COMP 250 / C - (ECSE 343 or ECSE 543)</td>
</tr>
</tbody>
</table>

#### List B
0-12 credits from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Prerequisites/Co-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 424</td>
<td>Artificial Intelligence**</td>
<td>3</td>
<td>P - (COMP 206 or ECSE 321), ECSE 205, COMP 251</td>
</tr>
<tr>
<td>COMP 551</td>
<td>Applied Machine Learning*</td>
<td>4</td>
<td>P - ECSE 205</td>
</tr>
<tr>
<td>COMP 559</td>
<td>Fundamentals of Computer Animation</td>
<td>4</td>
<td>P - MATH 222, MATH 223, COMP 206, COMP 250</td>
</tr>
<tr>
<td>ECSE 421</td>
<td>Embedded Systems</td>
<td>3</td>
<td>P - ECSE 324</td>
</tr>
<tr>
<td>ECSE 424</td>
<td>Human-Computer Interaction</td>
<td>3</td>
<td>P - (ECSE 324, COMP 250) or (COMP 251, COMP 273)</td>
</tr>
<tr>
<td>ECSE 500</td>
<td>Mathematical Foundations of Systems</td>
<td>3</td>
<td>P - departmental permission</td>
</tr>
<tr>
<td>ECSE 507</td>
<td>Optimization and Optimal Control</td>
<td>3</td>
<td>P - ECSE 343 or ECSE 543 or ECSE 501 or COMP 540</td>
</tr>
<tr>
<td>ECSE 509</td>
<td>Probability and Random Signals 2</td>
<td>3</td>
<td>P - ECSE 205, ECSE 206</td>
</tr>
<tr>
<td>ECSE 521</td>
<td>Digital Communications 1</td>
<td>3</td>
<td>P - ECSE 408 or ECSE 511</td>
</tr>
<tr>
<td>ECSE 526</td>
<td>Artificial Intelligence**</td>
<td>3</td>
<td>P - ECSE 324</td>
</tr>
<tr>
<td>ECSE 532</td>
<td>Computer Graphics</td>
<td>4</td>
<td>P - ECSE 324</td>
</tr>
<tr>
<td>MATH 247</td>
<td>Honours Applied Linear Algebra</td>
<td>3</td>
<td>P - MATH 133</td>
</tr>
</tbody>
</table>

* Students are not permitted to take ECSE 551 if they have already taken COMP 551 and vice versa.
** Students are not permitted to take COMP 424 if they have already taken ECSE 526 and vice versa.

## Natural Science Complementary Courses - Computer Engineering

Students from CEGEP are required to complete one 3-credit course at the 200-level or higher, chosen from the following science departments, approved by

- Atmospheric and Oceanic Sciences (ATOC)
- Biology (BIOL)
- Chemistry (CHEM)
- Environment (ENVR)
- Earth and Planetary Sciences (EPSC)
- Earth System Science (ESYS)
- Microbiology (MIMM)
- Physics (PHYS)

**Last update: April 3, 2020**

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