## Electrical Engineering Curriculum - Fall 2023

### 1st Term (Fall)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Prerequisites/Co-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 281</td>
<td>Analytical Mechanics</td>
<td>3</td>
<td>C - MATH 262, MATH 263</td>
</tr>
<tr>
<td>COMP 202</td>
<td>Foundations of Programming</td>
<td>3</td>
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</tr>
<tr>
<td>ECSE 200</td>
<td>Electric Circuits 1</td>
<td>3</td>
<td>P - PHYS 142, C - MATH 263</td>
</tr>
<tr>
<td>MATH 262</td>
<td>Intermediate Calculus</td>
<td>3</td>
<td>P - MATH 133 or equiv, MATH 141</td>
</tr>
<tr>
<td>MATH 263</td>
<td>ODEs for Engineers</td>
<td>3</td>
<td>C - MATH 262</td>
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### 2nd Term (Winter)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Prerequisites/Co-requisites</th>
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<tbody>
<tr>
<td>ECSE 205</td>
<td>Probability &amp; Statistics for Eng.</td>
<td>3</td>
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<tr>
<td>ECSE 206</td>
<td>Intro. to Signals &amp; Systems</td>
<td>3</td>
<td>P - ECSE 200</td>
</tr>
<tr>
<td>ECSE 210</td>
<td>Electric Circuits 2</td>
<td>3</td>
<td>P - ECSE 200</td>
</tr>
<tr>
<td>ECSE 211</td>
<td>Design Principles and Methods</td>
<td>3</td>
<td>P - ECSE 200 and (COMP 202 or ECSE 202)</td>
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<tr>
<td>ECSE 251</td>
<td>Electric and Magnetic Fields</td>
<td>3</td>
<td>P - MATH 262, ECSE 200</td>
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<tr>
<td>FACC 100</td>
<td>Intro. to Engineering Profession</td>
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### 3rd Term (Fall)

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<th>Course</th>
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<th>Prerequisites/Co-requisites</th>
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<tbody>
<tr>
<td>ECSE 250</td>
<td>Fundamentals of Software Development</td>
<td>3</td>
<td>P - COMP 202 or equivalent</td>
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<tr>
<td>ECSE 222</td>
<td>Digital Logic</td>
<td>3</td>
<td>P - COMP 202 or ECSE 222</td>
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<tr>
<td>ECSE 302</td>
<td>Fundamentals of Power Eng.</td>
<td>4</td>
<td>P - ECSE 210 and ECSE 251; C - CIVE 281</td>
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<tr>
<td>MIME 262</td>
<td>Properties of Materials in EE</td>
<td>3</td>
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<tr>
<td>COMP 206</td>
<td>Introduction to Software Systems</td>
<td>3</td>
<td>P - (COMP 202 or ECSE 202) or (COMP 250 or ECSE 250)</td>
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### 4th Term (Winter)

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<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Prerequisites/Co-requisites</th>
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</thead>
<tbody>
<tr>
<td>ECSE 308</td>
<td>Intro. Comp. Sys. &amp; Networks</td>
<td>4</td>
<td>P - ECSE 205, ECSE 206</td>
</tr>
<tr>
<td>ECSE 324</td>
<td>Computer Organization</td>
<td>4</td>
<td>P - ECSE 200 and ECSE 222 and COMP 206</td>
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<tr>
<td>ECSE 331</td>
<td>Electronics</td>
<td>4</td>
<td>P - ECSE 210</td>
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<tr>
<td>HSS 1</td>
<td>Humanities &amp; Social Sciences ^</td>
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<tr>
<td>FACC 250</td>
<td>Resp. of the Prof. Engineer</td>
<td>0</td>
<td>P - FACC 100 or BREE 205</td>
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### 5th Term (Fall)

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<th>Prerequisites/Co-requisites</th>
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<tbody>
<tr>
<td>ECSE 307</td>
<td>Linear Systems &amp; Control</td>
<td>4</td>
<td>P - ECSE 206, ECSE 210</td>
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<tr>
<td>WCOM 206</td>
<td>Communication in Engineering</td>
<td>3</td>
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<tr>
<td>ECSE 354</td>
<td>Electromagnetic Wave Propagation</td>
<td>4</td>
<td>P - ECSE 251</td>
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<tr>
<td>FACC 300</td>
<td>Engineering Economy</td>
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### 6th Term (Winter)

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<th>Course</th>
<th>Title</th>
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<th>Prerequisites/Co-requisites</th>
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<tbody>
<tr>
<td>ECSE 456 N1</td>
<td>Capstone Design Project</td>
<td>3</td>
<td>P - ECSE 211, ECSE 324, WCOM 206, ECSE 331</td>
</tr>
<tr>
<td>XXXX xxx</td>
<td>Technical Complementary 1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>XXXX xxx</td>
<td>Technical Complementary 2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ECSE 343</td>
<td>Numerical Methods in Engineering</td>
<td>3</td>
<td>P - ECSE 205 and (COMP 250 or ECSE 250) and MATH 263</td>
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<tr>
<td>Impact</td>
<td>Impact of Technology on Society ^</td>
<td>3</td>
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### 7th Term (Fall)

<table>
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<th>Title</th>
<th>Credits</th>
<th>Prerequisites/Co-requisites</th>
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<tbody>
<tr>
<td>ECSE 456 N2</td>
<td>Capstone Design Project</td>
<td>3</td>
<td>P - ECSE 458 N1</td>
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<tr>
<td>XXXX xxx</td>
<td>Technical Complementary 3</td>
<td>3</td>
<td></td>
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<td>XXXX xxx</td>
<td>Technical Complementary 4</td>
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<td>XXXX xxx</td>
<td>Technical Complementary 5</td>
<td>3</td>
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<tr>
<td>Elective</td>
<td>Elective Course</td>
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<tr>
<td>FACC 400</td>
<td>Engineering Professional Practice</td>
<td>1</td>
<td>P - FACC 250, and 60 program credits</td>
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### 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 one course (3 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) (see your program listing in the "Browse Academic Units & Programs" section).

Elective course (3 credits) must be taken 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 undergrad.ece@mcgill.ca.

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 - Electrical Engineering

17 - 20 credits (courses) must be taken, chosen as follows:

8 credits (2 courses) from List A
9 - 12 credits (3 courses) from List A or List B

### List A
8 - 20 credits from the following list

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites/Co-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECSE 335</td>
<td>Microelectronics</td>
<td>4</td>
<td>P - ECSE 331</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 416</td>
<td>Telecom. Networks</td>
<td>4</td>
<td>P - (ECSE 250 or COMP 250) and ECSE 205 and (ECSE 308 or ECSE 316)</td>
</tr>
<tr>
<td>ECSE 433</td>
<td>Physical Basis of Transistor Devices</td>
<td>4</td>
<td>P - MME 362, ECSE 331, ECSE 251</td>
</tr>
<tr>
<td>ECSE 444</td>
<td>Microprocessors</td>
<td>4</td>
<td>P - ECSE 324</td>
</tr>
<tr>
<td>ECSE 470</td>
<td>Electromechanical and Static Conversion Systems</td>
<td>4</td>
<td>P - ECSE 362</td>
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### List B
0 - 12 credits from the following list:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites/Co-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 549</td>
<td>Brain-Inspired Artificial Intelligence</td>
<td>3</td>
<td>P - MATH 222, MATH 223, and MATH 323; or equivalents.</td>
</tr>
<tr>
<td>COMP 551***</td>
<td>Applied Machine Learning</td>
<td>3</td>
<td>P - MATH 323 or ECSE 205 or equivalent</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>COMP 562</td>
<td>Theory of Machine Learning</td>
<td>4</td>
<td>P - MATH 482 or COMP 451 or (COMP 551, MATH 222, MATH 223 and MATH 324) or ECSE 551</td>
</tr>
<tr>
<td>ECSE 310</td>
<td>Thermodynamics of Computing</td>
<td>3</td>
<td>P - ECSE 206, ECSE 205, ECSE 222</td>
</tr>
<tr>
<td>ECSE 325</td>
<td>Digital Systems</td>
<td>3</td>
<td>P - ECSE 324</td>
</tr>
<tr>
<td>ECSE 405</td>
<td>Antennas</td>
<td>3</td>
<td>P - ECSE 206, ECSE 354</td>
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<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>Intro. to Computer Vision</td>
<td>3</td>
<td>P - ECSE 205, (ECSE 206 or ECSE 316)</td>
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<tr>
<td>ECSE 420</td>
<td>Parallel Computing</td>
<td>3</td>
<td>P - ECSE 427</td>
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<tr>
<td>ECSE 421</td>
<td>Embedded Systems</td>
<td>3</td>
<td>P - ECSE 324</td>
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<tr>
<td>ECSE 422</td>
<td>Fault Tolerant Computing</td>
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<td>P - ECSE 324 and (ECSE 250 or COMP 250)</td>
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<tr>
<td>ECSE 423</td>
<td>Fundamentals of Photonics</td>
<td>3</td>
<td>P - ECSE 354</td>
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<tr>
<td>ECSE 424</td>
<td>Human-Computer Interaction</td>
<td>3</td>
<td>P - ECSE 324 and ECSE 205 or (ECSE 324 and COMP 250) or (COMP 251 and COMP 273)</td>
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<tr>
<td>ECSE 425</td>
<td>Computer Architecture</td>
<td>3</td>
<td>P - ECSE 324</td>
</tr>
<tr>
<td>ECSE 427</td>
<td>Operating Systems</td>
<td>3</td>
<td>P - (ECSE 324 or COMP 273)</td>
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<tr>
<td>ECSE 430</td>
<td>Photonic Devices &amp; Systems</td>
<td>3</td>
<td>P - ECSE 354, MME 202</td>
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<tr>
<td>ECSE 431</td>
<td>Introduction to VLSI CAD</td>
<td>3</td>
<td>P - ECSE 324, ECSE 331</td>
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<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>
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<td>ECSE 440</td>
<td>Realistic Image Synthesis</td>
<td>3</td>
<td>P - (ECSE 205 and ECSE 250) or (ECSE 202 and ECSE 205 and COMP 250)</td>
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<tr>
<td>ECSE 450</td>
<td>Electromagnetic Compatibility</td>
<td>3</td>
<td>P - ECSE 222, ECSE 331, (ECSE 353 or ECSE 354)</td>
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<tr>
<td>ECSE 451</td>
<td>EM Transmission &amp; Radiation</td>
<td>3</td>
<td>P - ECSE 354</td>
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<tr>
<td>ECSE 480</td>
<td>Appareillage electrique</td>
<td>3</td>
<td>P - ECSE 404</td>
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<tr>
<td>ECSE 483*</td>
<td>Electric Power Generation</td>
<td>3</td>
<td>P - (ECSE 362 or ECSE 461)</td>
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<td>ECSE 484</td>
<td>Power Systems Analysis</td>
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<td>P - ECSE 362</td>
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<tr>
<td>ECSE 485**</td>
<td>Power Electronic Systems</td>
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<td>P - ECSE 331, ECSE 362</td>
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<td>ECSE 486</td>
<td>Réseaux de distribution</td>
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<td>P - ECSE 362</td>
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<td>ECSE 487</td>
<td>Comportement des réseaux électriques</td>
<td>3</td>
<td>P - ECSE 464</td>
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<td>ECSE 486</td>
<td>Electric Industrielle</td>
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<td>P - ECSE 362</td>
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<td>ECSE 489</td>
<td>Protection des réseaux électriques</td>
<td>3</td>
<td>P - ECSE 464</td>
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<tr>
<td>ECSE 472</td>
<td>Fundamentals of Circuit Simulation &amp; Modelling</td>
<td>3</td>
<td>P - ECSE 206, ECSE 331</td>
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<td>ECSE 500</td>
<td>Mathematical Foundations of Systems</td>
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<td>ECSE 501</td>
<td>Linear Systems</td>
<td>3</td>
<td>C - ECSE 500 or permission from the instructor</td>
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<tr>
<td>ECSE 507</td>
<td>Optimization &amp; Optimal Control</td>
<td>3</td>
<td>P - (ECSE 343 or ECSE 543 or ECSE 501 or COMP 540 or permission of instructor)</td>
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<tr>
<td>ECSE 508</td>
<td>Multi-Agent Systems</td>
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<td>P - ECSE 205 or equivalent</td>
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<tr>
<td>ECSE 509</td>
<td>Probability &amp; Random Signals 2</td>
<td>3</td>
<td>P - (ECSE 206 or ECSE 316), ECSE 205</td>
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<td>ECSE 510</td>
<td>Filtering &amp; Prediction for Stochastic Systems</td>
<td>3</td>
<td>P - ECSE 500, ECSE 509 or equivalent</td>
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<tr>
<td>ECSE 514</td>
<td>Nonlinear and Hybrid Control Systems</td>
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<td>P - ECSE 560, ECSE 501 or equivalent</td>
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<tr>
<td>ECSE 519</td>
<td>Semiconductor Nanstructures &amp; Nanophotonic Devices</td>
<td>3</td>
<td>P - ECSE 354, (ECSE 433 or ECSE 533)</td>
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<td>ECSE 521</td>
<td>Digital Communications 1</td>
<td>3</td>
<td>P - ECSE 408, C - ECSE 509</td>
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<tr>
<td>ECSE 526*</td>
<td>Artificial Intelligence</td>
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<td>P - ECSE 324</td>
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<td>ECSE 532</td>
<td>Computer Graphics</td>
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<td>P - ECSE 324</td>
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<td>Numerical Methods in EE</td>
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<td>P - ECSE 324, ECSE 331, ECSE 251</td>
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<td>Computational Photography</td>
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<td>ECSE 551***</td>
<td>Machine Learning for Engineers</td>
<td>4</td>
<td>P - (ECSE 250 or COMP 250) and (ECSE 205 or MATH 323); C - ECSE 343 or ECSE 543 or MATH 247</td>
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<td>ECSE 552</td>
<td>Deep Learning</td>
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<td>ECSE 554</td>
<td>Applied Robotics</td>
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<td>P - ECSE 205, COMP 206, ECSE 250, and (ECSE 343 or MATH 247) or equivalents.</td>
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<td>ECSE 556</td>
<td>Machine Learning in Network Biology</td>
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<td>ECSE 557</td>
<td>Intro. to Ethics of Autonomous Intelligent Systems</td>
<td>3</td>
<td>P - (ECSE 202 or ECSE 250 or COMP 250) and (ECSE 205 or MATH 323) or permission of the instructor; C - COMP 451 or COMP 551 or ECSE 551 or permission of the instructor</td>
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<tr>
<td>ECSE 562*</td>
<td>Low-Carbon Power Generation Engineering</td>
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<td>P - (ECSE 362 or ECSE 461)</td>
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<td>ECSE 563</td>
<td>Power Systems Operation &amp; Planning</td>
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<td>P - ECSE 362</td>
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<td>ECSE 565*</td>
<td>Introduction to Power Electronics</td>
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<td>P - ECSE 335, ECSE 362</td>
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<td>ECSE 575</td>
<td>Heterogeneous Integration Systems</td>
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<td>P - ECSE 335 or permission of instructor</td>
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<tr>
<td>PHYS 434</td>
<td>Optics</td>
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<td>C - PHYS 342 or PHYS 352, or permission of the instructor</td>
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<td>PHYS 446</td>
<td>Majors quantum physics</td>
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<td>P - PHYS 230, (PHYS 232, or PHYS 251)</td>
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* ECSE 463 and ECSE 562 cannot both be taken.
** ECSE 465 and ECSE 565 cannot both be taken.
*** ECSE 551 and COMP 551 cannot both be taken.

Last update: February 2023

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