

Bioengineering Curriculum - Stream 3 (Biomedical, Diagnostics and High Throughput Screening Engineering)

Non-CEGEP Entry

1st Semester (Fall)		15 credits	Prerequisites/Co-requisites
CHEM 110	General Chemistry 1	4	-
FACC 100	Introduction to the Engineering Profession	1	-
MATH 133	Linear Algebra and Geometry	3	-
MATH 140	Calculus 1	3	-
PHYS 131	Mechanics and Waves	4	C - MATH 140
2nd Semester (Winter)		18 credits	Prerequisites/Co-requisites
BIOL 112	Cell and Molecular Biology	3	-
CHEM 120	General Chemistry 2	4	-
CS	Complimentary Studies - Group B (HSSML) - 1	3	-
MATH 141	Calculus 2	4	P - MATH 140
PHYS 142	Electromagnetism and Optics	4	P - PHYS 131 / C - MATH 141
3rd Semester (Fall)		17 credits	Prerequisites/Co-requisites
BIEN 200	Introduction to Bioengineering	2	P - Permission of Instructor
BIOL 200	Molecular Biology	3	P - BIOL 112 / C - CHEM 212
CHEM 212	Introductory Organic Chemistry 1	4	P - CHEM 110 / C - CHEM 120
MATH 262	Intermediate Calculus	3	P - MATH 141, MATH 133
MATH 263	Ordinary Differential Equations for Engineers	3	P - MATH 262
MECH 210	Mechanics 1	2	-
4th Semester (Winter)		12 credits	Prerequisites/Co-requisites
BIEN 210	Electrical and Optical Properties of Biological Systems	3	P - BIEN 200, BIOL 112
BIOC 212	Molecular Mechanisms of Cell Function	3	P - BIOL 200
BREE 301	Biothermodynamics	3	-
COMP 208	Computers in Engineering	3	P - MATH 140, MATH 141
5th Semester (Fall)		13 credits	Prerequisites/Co-requisites
BIEN 290	Bioengineering Measurement Laboratory	4	P - BIEN 200, PHYS 142
CIVE 281	Analytical Mechanics	3	C - MATH 262, MATH 263
MATH 264	Advanced Calculus for Engineers	3	P - MATH 262 / C - MATH 263
TC STREAM 3 (CHEM 287)	Introductory Analytical Chemistry	2	P - CHEM 110 and CHEM 120, or CHEM 115 / C - CHEM 297
TC STREAM 3 (CHEM 297)	Introductory Analytical Chemistry Laboratory	1	P - CHEM 110 and CHEM 120, or CHEM 115 / C - CHEM 287
6th Semester (Winter)		12 credits	Prerequisites/Co-requisites
CCOM 206	Communication in Engineering	3	-
CHEE 310	Physical Chemistry for Engineers	3	P - CHEE 220 or MIME 212 or BREE 301
FACC 300	Engineering Economy	3	-
PHYS 319	Introduction to Biophysics	3	P - BIOL 200; MATH 222/MATH 262; PHYS 230 and (PHYS 232 or PHYS 253), or Permission of Instructor
7th Semester (Fall)		15 credits	Prerequisites/Co-requisites
BIEN 390	Bioengineering Laboratory	3	P - BIEN 290
TC STREAM 3 (BIEN 350)	Biosystems and Control	3	P - Permission of Instructor
TC STREAM 3 (CHEE 314)	Fluid Mechanics	3	P - CHEE 204 or BIEN 200 / C - MATH 264
TC STREAM 3 (MECH 553)	Design and Manufacture of Microdevices	3	P - Permission of Instructor
TC STREAM 3 (CHEM 367)	Instrumental Analysis 1	3	P - CHEM 257 or CHEM 277 or CHEM 287 and CHEM 297
8th Semester (Winter)		13 credits	Prerequisites/Co-requisites
BIEN 340	Transport Processes in Biological Systems	3	P - Permission of Instructor
FACC 400	Engineering Professional Practice	1	FACC 100 or BREE 205, 60 program credits
TC STREAM 3 (BIEN 530)	Imaging and Bioanalytical Instrumentation	3	P - Permission of Instructor
CS	Complimentary Studies - Group A (Impact)	3	-
CS	Complimentary Studies - Group B (HSSML) - 2	3	-
9th Semester (Fall)		12 credits	Prerequisites/Co-requisites
BIEN 470	Bioengineering Design Project (first half)	3	P - BIEN 390
TC STREAM 3 (ECSE 529)	Computer and Biological Vision	3	*P - ECSE 304 or ECSE 306
TC STREAM 3 (MECH 502)	Topics in Mechanical Engineering (Microfluids and bioMEMs)	3	-
TC STREAM 2 (PHYS 534)	Nanoscience and Nanotechnology	3	-
10th Semester (Winter)		14 credits	Prerequisites/Co-requisites
BIEN 470	Bioengineering Design Project (second half)	3	P - BIEN 390
BIEN 471	Bioengineering Research Project	2	P - Permission of Instructor
TC STREAM 3 (BIEN 520)	High Throughput and Bioanalytical Instrumentation	3	P - Permission of Instructor
TC STREAM 3 (CHEM 560)	Biosensors	3	P - Permission of Instructor
TC STREAM 3 (CIVE 558)	Biomolecular Techniques for Environmental Engineering	3	P - Permission of Instructor

*Prerequisites replaced with BIEN 350 for Bioengineering students

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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). These must be chosen from an approved list

Elective courses (EC) may be chosen from any course at the 200-level or higher in the Desautels Faculty of Management, Faculty of Agricultural and Environmental Sciences, Faculty of Arts, Faculty of Engineering, Faculty of Religious Studies, Faculty of Science, and/or Schulich School of Music

Technical Complementary Courses - Bioengineering

		Credits	Prerequisites/Co-requisites
BIEN 350	Biosystems and Control	3	P - Permission of Instructor
BIEN 520	High Throughput Bioanalytical Devices	3	P - Permission of Instructor
BIEN 530	Imaging and Bioanalytical Instrumentation	3	P - Permission of Instructor
BIEN 560	Biosensors	3	P - Permission of Instructor
CHEE 314	Fluid Mechanics	3	P - CHEE 204 or BIEN 200 / C - MATH 264
CHEM 287	Introductory Analytical Chemistry	2	P - CHEM 110 and CHEM 120, or CHEM 115, or equivalent. C - CHEM 297
CHEM 297	Introductory Analytical Chemistry Laboratory	1	P - CHEM 110 and CHEM 120, or CHEM 115, or equivalent. C - CHEM 287
CHEM 367	Instrumental Analysis 1	3	P - CHEM 257 or CHEM 277 or CHEM 287 and CHEM 297
CIVE 558	Biomolecular Techniques for Environmental Engineering	3	P - Permission of Instructor
ECSE 529	Computer and Biological Vision	3	*P - ECSE 304 or ECSE 306
MECH 502	**Topics in Mechanical Engineering	3	P - CIVE 225 or Permission of Instructor
MECH 553	Design and Manufacture of Microdevices	3	-
PHYS 534	Nanoscience and Nanotechnology	3	-

*Prerequisites replaced with BIEN 350 for Bioengineering students

**When topic is appropriate, as: Microfluidics and bioMEMs.

Last update: July 2016