Bioengineering Curriculum - Stream 2 (Biomolecular & Cellular Engineering)

CEGEP Entry

1st Semester (Fall)		17 credits	Prerequisites/Co-requisites
BIEN 200	Introduction to Bioengineering	2	P - Permission of Instructor
CHEM 212	Introductory Organic Chemistry 1	4	P - CHEM 110 / C - CHEM 120
CIVE 281	Analytical Mechanics	3	C - MATH 262, MATH 263
MATH 262	Intermediate Calculus	3	P - MATH 141, MATH 133
MATH 263	Ordinary Differential Equations for Engineers	3	C - MATH 262
MECH 210	Mechanics 1	2	-
2nd Semester (Winter)		16 credits	Prerequisites/Co-requisites
BIOL 112	Cell and Molecular Biology	3	-
BREE 301	Biothermodynamics	3	-
COMP 208	Computers in Engineering	3	P - MATH 140, MATH 141
CS	Complimentary Studies - Group B (Humanities)	3	-
EC	Elective - 1	3	-
FACC 100	Introduction to the Engineering Profession	1	-
3rd Semester (Fall)		16 credits	Prerequisites/Co-requisites
BIEN 290	Bioengineering Measurement Laboratory	4	P - BIEN 200, PHYS 142
BIOL 200	Molecular Biology	3	P - BIOL 112 / C - CHEM212
MATH 264	Advanced Calculus for Engineers	3	P - MATH 262 / C - MATH 263
TC STREAM 2 (BIEN 310)	Introduction to Biomolecular Engineering	3	P - Permission of Instructor
TC STREAM 2 (BIEN 320)	Molecular, Cellular and Tissue Biomechanics	3	P - Permission of Instructor
4th Semester (Winter)		15 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
CCOM 206	Communication in Engineering	3	-
CHEE 310	Physical Chemistry for Engineers	3	P - CHEE 220 or MIME 212 or BREE 301
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.
5th Semester (Fall)		15 credits	Prerequisites/Co-requisites
BIEN 390	Bioengineering Laboratory	3	P - BIEN 290
EC	Elective - 2	3	-
TC STREAM 2 (BIOC 311)	Metabolic Biochemistry	3	*P - BIOL 200, BIOL 201 or BIOC 212, CHEM 222
TC STREAM 2 (CHEE 370)	Elements of Biotechnology	3	-
TC STREAM 2 (CHEE 390)	Computational Methods in Chemical Engineering	3	*P - CHEE 204, COMP 208, MATH 263
6th Semester (Winter)		15 credits	Prerequisites/Co-requisites
BIEN 340	Transport Processes in Biological Systems	3	P - Permission of Instructor
EC	Elective - 3	3	-
CS	Complimentary Studies - Group A (Impact)	3	-
FACC 300	Engineering Economy	3	-
TC STREAM 2 (BIEN 330)	Introduction to Tissue Engineering	3	P - Permission of Instructor
7th Semester (Fall)		15 credits	Prerequisites/Co-requisites
BIEN 470	Bioengineering Design Project (first half)	3	P - BIEN 390
TC STREAM 2 (BIEN 570)	Active Mechanics in Biology	3	P - Permission of Instructor
TC STREAM 2 (BMDE 509)	Quantitative Analysis and Modelling of Cellular Processes	3	**P or C - MATH 222, MATH 223, BMDE 519
TC STREAM 2 (CIVE 557)	Microbiology for Environmental Engineering	3	P - CIVE 225 or Permission of Instructor
TC STREAM 2 (PHYS 534)	Nanoscience and Nanotechnology	3	-
8th Semester (Winter)		12 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
FACC 400	Engineering Professional Practice	1	P - FACC 100 or BREE 205, 60 program credits
TC STREAM 2 (BIEN 550)	Biomolecular Devices	3	P - Permission of Instructor
TC STREAM 2 (CIVE 558)	Biomolecular Techniques for Environmental Engineering	3	P - Permission of Instructor

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*Prequisites waved for Bioengineering students
**Prerequisites replaced with BIEN 350 and BIEN 462, and MATH 223 waved for Bioengineering students

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

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 310	Introduction to Biomolecular Engineering	3	P - Permission of Instructor
BIEN 320	Molecular, Cellular, and Tissue Biomechanics	3	P - Permission of Instructor
BIEN 330	Introduction to Tissue Engineering	3	P - Permission of Instructor
BIEN 550	Biomolecular Devices	3	P - Permission of Instructor
BIEN 570	Active Mechanics in Biology	3	P - Permission of Instructor
BIOC 311	Metabolic Biochemistry	3	*BIOL 200, BIOL 201 or BIOC 212, CHEM 222
BMDE 509	Quantitative Analysis and Modelling of Cellular Processes	3	P - Permission of Instructor
CHEE 370	Elements of Biotechnology	3	-
CHEE 390	Computational Methods in Chemical Engineering	3	*CHEE 204, COMP 208, MATH 263
CIVE 557	Microbiology for Environmental Engineering	3	P - Permission of Instructor
CIVE 558	Biomolecular Techniques for Environmental Engineering	3	P - CIVE 225 or Permission of Instructor
PHYS 534	Nanoscience and Nanotechnology	3	-

*Prequisites waved for Bioengineering students

**Prerequisites replaced with BIEN 350 and BIEN 462, and MATH 223 waved for Bioengineering students

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