Chemical and Biological Engineering Curriculum

The Chemical and Biological Engineering curriculum is currently tentative, pending a review of the curriculum in the context of the Accreditation Board for Engineering and Technology (ABET) requirements. This new degree program is open to students entering as freshman in the Fall of 2006 and later.

Freshman Fall		Freshman Spring		Sophomore Fall		Sophomore Spring	
Calc 1	4	Calc 2	4	Calc 3	4	LinAlgODE	4
Chem for Eng	3	Biol Engr[1]	3	OChem 1	4	OChem 2	4
Chem Lab Engrs	2	Physics 1	4	OChem Lab 1	1	OChem Lab 2	1
Computing	3	Intro ChE	1	Physics 2	4	PChem Engr	3
H&SS	3	H&SS	3	Physics Lab	1	ChE Fluids	3
				MatEnBal	3	H&SS	3
Total	15	Total	15	Total	17	Total	18
Junior Fall		**Junior Spring**		**Senior Fall**		**Senior Spring**	
ChE Thermo	3	Biokinetics	3	CBEN Lab 2	2	Design Proj	2
AppData	3	ChE Lab 1	2	Sr. Seminar	1	Control	4
ChE Heat Tfr	3	Biochem[3]	3	Design	3	Focus Tech[4]	3
Elective	4	Separations/MT	3	Bioseparations	3	Tech Elective	3
WRTG[2]	3	Biomaterials[4]	3	Tech Elective	3	H&SS	3
		H&SS	3	Tech Elective	3		
Total	16	Total	17	Total	15	Total	15

Total Credit Hours: 128

[1]Alternates are MCDB 1150 or EBIO 1210 and 1220
[2]Alternates are HUEN 3100, WRTG 3035, or GEEN 3000
[3]Alternate is CHEM 4611
[4]These courses will be taught in alternating years and should be taken in the junior or senior year as available

The table on the following page provides the complete course numbers and titles for the short-hand notation used in the chart above.

FOCUS Tech
One required out of: CHEN 4801 – Pharmaceutical Biotechnology
CHEN 4838 – Tissue Engineering/Biomedical Devices
CHEN 4838 – Metabolic Engineering

Recommended Tech Electives:

Biofuels Focus	Tissue Engineering Focus	Pharm. Biotechnology Focus
MCDB 2150 Genetics	IPHY 3410 Human Anatomy	CHEM 4731 Biochem 2
CHEN 4838 Energy Fund.	IPHY 3430 Human Physiology	IPHY 3410 Human Anatomy
MCEN 4162 Energy Conv.	MCDB 2150 Genetics	MCDB 2150 Genetics
CHEM 4621 Genome Datab.	MCDB 4615 Biol. Stem Cells	CHEM 4791 Bioorg. Chem.
IPHY 4200 Physiological Genetics and Genomics	CHEM 4731 Biochem 2	CHEM 5341 Chemical Biology and Drug. Design
CHEN 3000+ Ind. Study	CHEN 3000+ Ind. Study	CHEN 3000+ Ind. Study

Course Notation	Course Number	Credit Hours	Title
App Data	CHEN 3010	3	Applied Data Analysis
Biochem 1	CHEM 4711	3	Biochemistry 1
Biokinetics	CHEN 3XXX	3	Biokinetics
Biol Engr	CHEN 2810	3	Biology for Engineers
Biomaterials	CHEN 4805	3	Biomaterials
Bioproc Engr	CHEN 4800	3	Bioprocess Engineering
Bioseparations	CHEN 3XXX	3	Bioseparations
Calc 1	APPM 1350	4	Calculus 1 for Engineers
Calc 2	APPM 1360	4	Calculus 2 for Engineers
Calc 3	APPM 2350	4	Calculus 3 for Engineers
CBEN Lab 2	CHEN 4810	2	Chemical and Biological Engineering Laboratory 2
ChE Lab 1	CHEN 3130	2	Chemical Engineering Laboratory 1
ChE Fluids	CHEN 3200	3	Chemical Engineering Fluid Mechanics
ChE Heat Tfr	CHEN 3210	3	Chemical Engineering Heat Transfer
ChE Thermo	CHEN 3320	3	Chemical Engineering Thermodynamics
Chem for Engr Chem Lab Engr	CHEN 1211 CHEM 1221	3 2	General Chemistry for Engineers General Chemistry Laboratory for Engineers
Computing	GEEN 1300	3	Introduction to Engineering Computing
Control	CHEN 4570	4	Instrumentation and Process Control
Design	CHEN 4520	3	Chemical Process Synthesis
Design Proj	CHEN 4530	2	Chemical Engineering Design Project
Found BioE	CHEN 2820	3	Foundations of Bioengineering
Genetics	MCDB 2150	3	Principles of Genetics
Genetics Lab	MCDB 2151	1	Principles of Genetics Laboratory
H&SS	various	≈3	Humanities and Social Science course see H&SS section of this Guide
IntroChE	CHEN 1300	1	Introduction to Chemical Engineering
LinAlgODE	APPM 2360	4	Introduction to Linear Algebra and Differential Equations
MatEnBal	CHEN 2120	3	Chemical Engineering Material and Energy Balances
OChem 1	CHEM 3311 CHEM 3321	4 1	Organic Chemistry 1 Laboratory in Organic Chemistry 1
OChem 2	CHEM 3331 CHEM 3341	4 1	Organic Chemistry 2 Laboratory in Organic Chemistry 2
PChem Engr	CHEM 4521	3	Physical Chemistry for Engineers
Pharm Biotech	CHEN 4801	3	Pharmaceutical Biotechnology
Physics 1	PHYS 1110	4	General Physics 1
Physics 2	PHYS 1120	4	General Physics 2
Phys Lab	PHYS 1140	1	Experimental Physics 1
Sr Seminar	CHEN 4090	1	Chemical Engineering Undergraduate Seminar
Tech Elective	various	≈3	Technical elective course See Technical Elective section of this Guide
WRTG	WRTG 3030	3	Advanced Composition: Writing on Science and Society (H&SS credit)

Pre-Medicine Chemical and Biological Engineering Curriculum

The pre-medicine curriculum combines the requirements for the Bachelor of Science degree in Chemical and Biological Engineering with the typical requirements for admission to medical schools in the U.S.

Freshman Fall		Freshman Spring		Sophomore Fall		Sophomore Spring	
Calc 1	4	Calc 2	4	Calc 3	4	LinAlgODE	4
Chem Engrs	3	Chem 2	5	OChem 1	4	OChem 2	4
Chem Lab Engrs	2	Phys 1	4	Organic Lab 1	1	OChem Lab 2	1
Computing	3	Intro ChE	1	Phys 2	4	PChem Engr	3
Intro MCDB[1]	3	Lit Elective	3	Phys Lab	1	ChE Fluids	3
Intro MCDB Lab[1,5]	1			MatEnBal	3		
Total	16	Total	17	Total	17	Total	15
Junior Fall		**Junior Spring**		**Senior Fall**		**Senior Spring[3]**	
Thermo	3	Biokinetics	3	CBEN Lab 2	2	Design Proj	2
Appl Data	3	ChE Lab 1	2	Sr Seminar	1	Control	4
ChE Heat Tfr	3	Biochem 1	3	Design	3	Focus Tech	3
Genetics[5]	3	Separations/MT	3	Bioseparations	3	H&SS	3
Genetics Lab[5]	1	Biomaterials[3]	3	Tech Elective	4	H&SS	3
WRTG[2]	3	Lit Elective[4]	3	H&SS	3		
Total	16	Total	17	Total	16	Total	15

Total Credit Hours: 129

[1]Alternates are EBIO 1210/1230
[2]Alternates are HUEN 3100, HUEN 3200 or GEEN 3000
[3]These courses will be taught in alternating years and should be taken in the junior or senior year, as available
[4]ENGL 1500 is a common choice – there are others
[5]Counts as technical elective

FOCUS Tech
One required out of: CHEN 4801 – Pharmaceutical Biotechnology
CHEN 4838 – Tissue Engineering/Biomedical Devices
CHEN 4838 – Metabolic Engineering

Recommended Tech Electives: IPHY 3410 – Introduction to Human Anatomy
IPhy 3430 – Introduction to Human Physiology

Course Notation	Course Number	Credit Hours	Title
Intro MCDB	MCDB 1150	3	Introduction to Cellular and Molecular Biology
Intro MCDB Lab	MCDB 1151	1	Introduction to Cellular and Molecular Biology Lab