Biomedical Engineering – Program Map: Computational Bioengineering Focus Area

Semester 1	Chem I & Lab CHEM:1110	Engr Math I MATH:1550		Intro Engr Prob Solving ENGR:1100	Rhetoric RHET:1030	Engr Success First Year ENGR:1000
Semester 2	Chem II & Lab CHEM:1120	Engr Math II MATH:1560	Engr Math III MATH:2550	Intro Engr Computing ENGR:1300	Physics I / Lab PHYS:1611	BME Forum BME:1010
Semester 3	Foundations of Biology BIOL:1411	Engr Math IV MATH:2560	Statics ENGR:2110	Elec Circuits ENGR:2120	Thermo ENGR:2130 or *Intro AI & Mach Learning ENGR:2995*	BME Prof Seminar BME:2010
Semester 4	Human Physiology HHP:3500 or BME:2260 Quantitative Physiology	Systems, Instrum, & Data Acquisition / Lab BME:2200	Bioimaging & Bioinformatics / Lab BME:2210	Comp in Engr ENGR:2730	Biostatistics BIOS:4120 or STAT:3510	
Semester 5	Cell Biology for Engr / Lab BME:2400	Intro to Software Design ECE:3330	Computational Biochemistry BME:4310	Focus Area Elective #1	Diversity & Inclusion	
Semester 6	Computational Bioinformatics BME:5335	Focus Area Elective #2	Focus Area Elective #3	Be Creative	Approved GEC course	
Semester 7	BME Senior Design I BME:4910	Biomaterials & Biomechanics / Lab BME:2500	Focus Area Elective #4	Focus Area Elective #5	Approved GEC course	
Semester 8	BME Senior Design II BME:4920	Focus Area Elective #6	Focus Area Elective #7	Physics II / Lab PHYS:1612	Approved GEC course	

Math & Science Courses
Required Engineering Courses
Focus Area Required Courses
General Education Courses
Engineering Core Courses
Biomedical Core Courses
Focus Area Elective Courses
Seminars

***If ENGR:2995 is not offered in Fall, it can be taken the following Spring. Students who want to take ENGR:2995 and not ENGR:2130 can take ENGR:2730 Computers in Engr in Semester 3 and ENGR:2995 in Semester 4.**
At least two Focus Area Electives must be from the list of Engineering Topics.

Last updated 03/20/23

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Computational Bioengineering Required Courses

ENGR:2730	Computers in Engineering	F/S	P: ENGR:1300
ECE:3330	Intro to Software Design	F/S	P: ENGR:2730
BME:4310	Computational Biochemistry	S	P: MATH:1560 or MATH:1860, CHEM:1120
BME:5335	Computational Bioinformatics	S	P: (ENGR:1300 or CS:5110), (BIOS:4120 or STAT:3510)

Computational Bioengineering Electives (Focus Area, Minor, or Certificate)

Engineering Topics (must choose two)

ECE:5450	Machine Learning	F	P: ECE:2400 or BME:2200
ECE:5330	Graph Algorithms & Combinatorial Optimization	S	P: ECE:3330
ECE:5820	Software Engineering Languages & Tools	F	P: CS:2820 or ECE:3330
+ENGR:2130	Thermodynamics	ALL	P: PHYS:1611, CHEM:1110; C: MATH:1560
+ENGR:2995	Intro to AI and Machine Learning	S	P: ENGR:1300 and sophomore standing; C: MATH:2550

Suggested Electives

ANTH:2320	Origins of Human Infectious Disease	F	
BIOL:2512	Fundamental Genetics	All	P: BIOL:1411, BIOL:1412 or PSY:2701, CHEM:1110; Recommended: CHEM:2210
BIOL:3314	Genomics	S	P: BIOL:2211 or BIOL:2512 or BIOL:2723
BIOL:4213	Bioinformatics	See MyUI	P: BIOL:2512 or BMB:3120 or MICR:3170 or BMB:3110
BME:5435	Systems Biology for BME	S	P: BME:2400, BME:2200
CHEM:5431	Statistical Thermodynamics I	S §	Recommended: CHEM:4431
CHEM:5436	Electronic Structure & Informatics Chem.	See MyUI	Recommended: CHEM:4432
CS:3330	Algorithms	All	P: CS:2210 and CS:2230 (min C-), MATH:1850 or MATH:1550 or MATH:1860 or MATH:1560
CS:5350	Design and Analysis of Algorithms	See MyUI	P: CS:3330 or CS:5340
ECE:5800	Fundamentals of Software Engineering	F/S	P: CS:2820 or ECE:3330
ECE:5995:0001	Cont. Topics in ECE: Applied Machine Learning	S	P: ECE:2400 or BME:2200
BME:5441	Numerical & Statistical Methods for Bioengr	F §	P: MATH:2560 and MATH:2550

Pre-Medicine

****BIOL:1412**	Diversity of Form & Function	All	P: BIOL:1411 w/min C-
CHEM:2210	Organic Chemistry I	All	P: CHEM:1120 w/min C-
CHEM:2220	Organic Chemistry II	All	P: CHEM:2210 w/min C-
CHEM:2410	Organic Chemistry Lab	All	P: CHEM:1120 w/min C-, CHEM:2210 w/min C-; C: CHEM:2220
BMB:3110	Biochemistry	All	See MyUI for requirements
BIOL:2512	Fundamental Genetics	All	P: BIOL:1411 w/min C-, BIOL:1412 or PSY:2701 w/min C-, CHEM:1110; Recommended: CHEM:2210

+ Computational Bioengineering students can take ENGR:2130 as an Engineering Topic if they have taken ENGR:2995 as an Engineering Core (and vice versa)

**** Pre-medicine students should check with their Pre-medicine advisor regarding the need for this course.**

§ Offered in academic years with odd fall and even spring semesters

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Note: At least two electives must be from the list of Engineering Topics. Electives not listed above may be approved via the Plan of Study form.

Please check MyUI for the most current course offerings and pre/corequisites.

See the BME Computational Bioengineering Focus Area web page for a link to a guide for courses with machine learning content.

Last updated (04/05/23)