

June 4, 2021

Biomedical Engineering Advising Guide Graduating Years 2023 & Beyond Version 3

The degree requirements for Biomedical Engineering are detailed in the Academic Catalog which is available here: <https://catalog.union.edu/>. You can also find archived copies of the catalog at this location.

In the following pages, we have provided

- a check-sheet for the degree requirements
- a flowchart showing the prerequisite structure of the curriculum
- a course planning guide which shows when courses are offered
- a sample student schedule

Please see the catalog listings or the ECBE website for a list of upcoming courses offered.

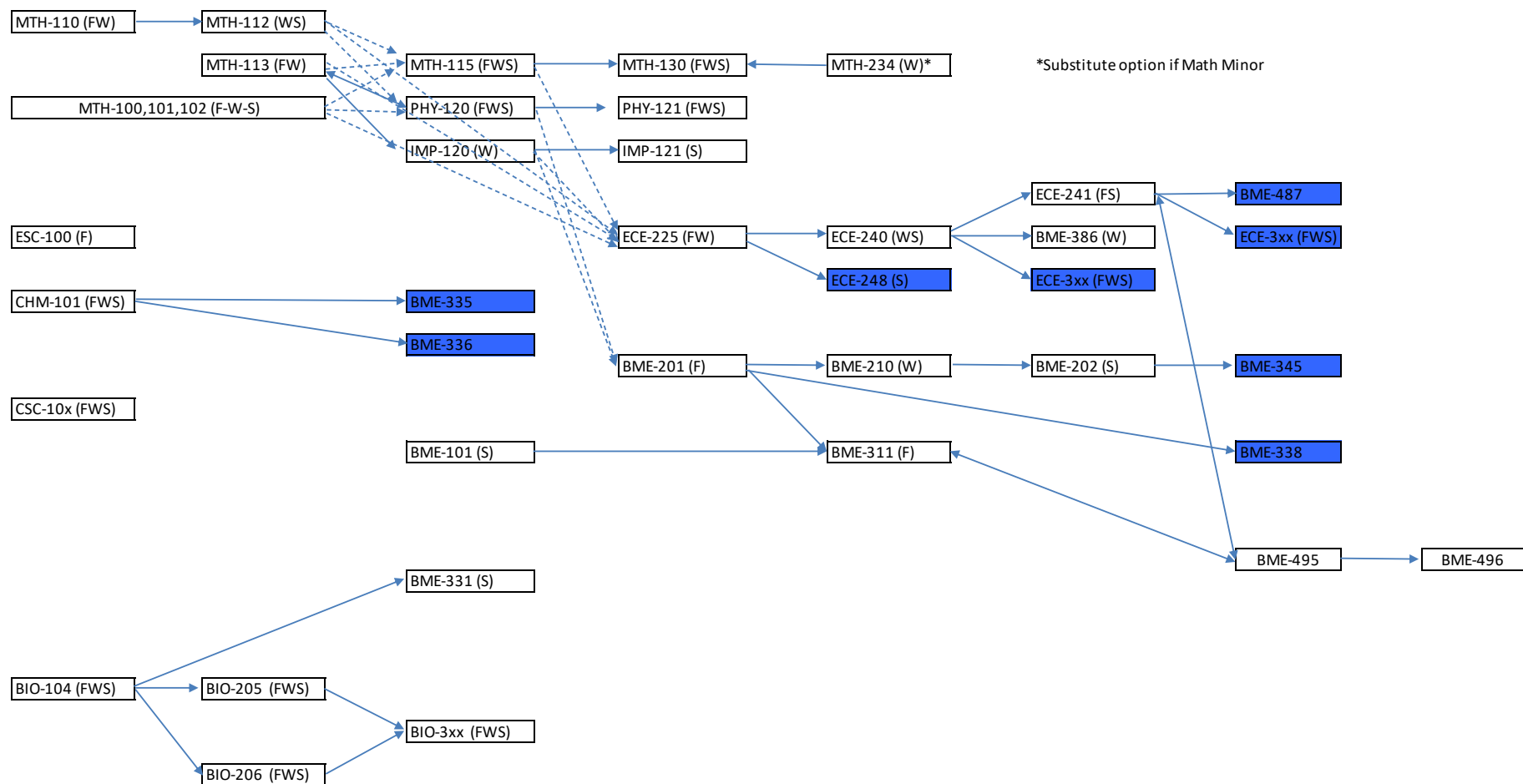
Version History

Date	Version	Changes
02/10/2020	1.0	Initial Version
02/17/2020	1.1	<ul style="list-style-type: none">• Added PHY120 as prerequisite for BME201• Changed ECE248 to blue as it is a BME elective• Corrected some terms in which courses are offered.
05/02/2020	2.0	Changed PreReq Chart -- Added BME495 & BME496 -- Added BME336
06/04/2021	3.0	Changed PreReq Chart -- Corrected BME495 Corequisites

Biomedical Engineering -- 40 Course Credits Required	
Core Math and Science	
Sequence Option One	
Course Name	Term Taken
MTH 110 - Calculus 1: Differential Calculus	
MTH 112 - Calculus 2: Integral Calculus	
MTH 115 - Calculus 3: Differential Vector Calculus and Matrix Theory	
PHY 120 - Matter in Motion	
PHY 121 - Principles of Electromagnetics	
Sequence Option Two	
Course Name	Term Taken
MTH 113 - Accelerated Single-Variable Calculus	
MTH 115 - Calculus 3: Differential Vector Calculus and Matrix Theory	
PHY 120 - Matter in Motion	
PHY 121 - Principles of Electromagnetics	
Sequence Option Three	
Course Name	Term Taken
MTH 113 - Accelerated Single-Variable Calculus	
IMP 120 - Integrated Math/Physics (2 Credits)	
IMP 121 - Integrated Math/Physics (2 Credits)	
<i>IMP121 includes material for MTH117 which is not a requirement; this will count as a free elective credit Other calculus sequences are possible depending upon a student's background.</i>	
Additional Math and Science Requirements	
Course Name	Term Taken
MTH 130 - Ordinary Differential Equations OR MTH 234 - Differential Equations	
CHM 101 - Introductory Chemistry 1 OR CHM 110H - Honors Introductory Chemistry (Covers CHM 101+102)	
Biological Science Requirements	
Course Name	Term Taken
BIO 104 - (112) Cellular Foundations of Life	
BIO 205 - Topics in Molecular Biology	
BIO 206 - Topics in Physiology	
BIO 3xx - One Biological Science elective numbered 300 or higher (*)	
<i>* BME students may take BIO 3xx courses with BIO 103 listed as a prerequisite (waived by BIO department)</i>	
Engineering and Computer Science	
Course Name	Term Taken
ESC 100 - Exploring Engineering	
CSC 10x - Introduction to Computer Science (choose a course from CSC103-109)	
Biomedical Engineering Core	
Course Name	Term Taken
BME 101 - Graphics and Image Processing for Biomedical Systems	
BME 201 - Biomechanics 1	
BME 202 - Biomechanics 2	
BME 210 - Statistical Methods in Biomedical Engineering	
BME/ECE 225 - Electric Circuits	
BME/ECE 240 - Circuits and Systems [WAC]	
BME/ECE 241 - Discrete Systems [WAC]	
BME 311 - Advanced Biomechanics	
BME 331 - Cell-Tissue-Material Interaction	
BME 386 - Introduction to Biomedical Instrumentation	

Biomedical Engineering Electives	
Four courses from BME, ECE, CSC 243 or other engineering courses subject to approval with at least three at the 300 level or higher. Students should consult with their advisors	
Course Name	Term Taken
BME/ECE	
BME/ECE (>300)	
BME/ECE (>300)	
BME/ECE (>300)	
Biomedical Capstone Design	
Course Name	Term Taken
BME 495 - Biomedical Engineering Capstone Design 1	
BME 496 - Biomedical Engineering Capstone Design 2	
Common Curriculum Courses	
A full description of Common Curriculum Requirements is available here: https://www.union.edu/files/general-education/201807/genedadvising170.pdf	
Course Name	Term Taken
SCLB, QMR, SET - these requirements are fulfilled automatically through courses in the major	
FYP - First Year Preceptorial	
SRS - Sophomore Research Seminar	
SOCS - Social Science (ANT/ECO/HST/PSC/PSY/SOC):	
HUM - Humanities (ATH/AVA/CLS/EGL/MLL/PHL):	
HUL - Humanities Literature:	
LCC - Linguistic and Cultural Competency (†):	
LCC - Linguistic and Cultural Competency (†):	
† may be fulfilled by Study Abroad OR 2 LCC courses OR a sequence of 2 courses in the same language designated as LCC (note that the first course listed in any language (e.g., FRN 100, SPN 100, LAT 101, GRK 101 etc.) does not carry LCC credit)	
Free Electives	
Course Name	Term Taken
5 Writing Across the Curriculum (WAC) Courses [Drawn from Courses Above]	
Course Name	Term Taken
BME/ECE 240 - Circuits and Systems	
BME/ECE 241 - Discrete Systems	
WAC from outside Engineering & Computer Science -	
Course Selection Guidelines: BME Electives: Some 300 level courses are not offered every year. Students should consult with their advisor so that their elective choices match their interests Senior Projects: Students interested in working with a faculty member on a two-term Senior Project should meet with potential faculty advisors during their junior year to identify a project. Interested students should meet with potential faculty advisors during their junior year to identify a project, and they should notify the BME Program Director when they have decided on a senior project. The first course (BME 497) will count as a Free Elective and the second course (BME 498) will count as a BME Elective. Electives: should be chosen in consultation with the student's advisor to meet the Common Curriculum requirements and enhance educational objectives. These elective courses can be customized to complete a double-major or minors.	
Requirements for Honors: The criteria for graduating with honors in Biomedical Engineering are: (1) a cumulative index of at least 3.3; (2) a cumulative index in major courses of at least 3.3, with an A or A- in at least three of those courses; (3) an A or A- in the capstone design course or a senior research project; (4) final six terms of courses at Union. The major courses are listed above under "Foundation and core courses for Biomedical Engineering," "Biomedical Engineering electives" and "Capstone design".	

Prerequisites for Specific Required Courses in the Biomedical Engineering Curriculum (Graduates 2023 & Beyond)



KEY:

Prerequisite

Can be a co-requisite

Choice of pre-requisites

Blue - indicates some BME elective course options

For electives (science, math, or technical), see on-line catalog for prerequisites

Union College BME Course Planning Guide Class 2023+

Freshman Year	Fall Term	Winter Term	Spring Term
Year:	ESC100+L	PHY120+L	PHY121+L
	MTH110	MTH112	MTH115
	FYP		BME101+L
	CHM101+L or BIO104+L		
Sophomore Year	Fall Term	Winter Term	Spring Term
Year:	BME201	BME210	BME202+L
	ECE225+L		
		ECE240+L	
	SRS		
	CSC103-108+L		
	CHM101+L or BIO104+L		
	BIO205		
Junior Year	Fall Term	Winter Term	Spring Term
Year:	ECE241+L		ECE241+L
		BME386+L	BME331
	MTH130		
	BIO206		
	BIO Electives (BIO 3xx)		
	BME Electives (BME/ECE/ME >300)		
Senior Year	Fall Term	Winter Term	Spring Term
Year:	BME495	BME496	
	BME311+L		
	BME Electives (BME/ECE/ME >300)		
	BIO Electives (BIO 3xx)		

Indicates offered in this term ONLY

Union College BME Sample Schedule

Your Schedule may differ substantially

Freshman Year	Fall Term	Winter Term	Spring Term
Courses: 10	ESC100+L	MTH112	MTH115
	MTH110	PHY120+L	PHY121+L
	FYP	CHM101+L	BME101+L
		SOCS	
Sophomore Year	Fall Term	Winter Term	Spring Term
Courses: 10	ECE225+L	CS10x+L	BIO205
	BIO104+L	ECE240+L	BME202
	BME201	BME210	HUL
		SRS	
Junior Year	Fall Term	Winter Term	Spring Term
Courses: 10	ELECTIVE	BME Elective	
	LCC	BME386	BME331
	LCC	BIO206	ECE241
	ELECTIVE	MTH130	
Senior Year	Fall Term	Winter Term	Spring Term
Courses: 10	BME311	BME496	BME Elective
	BME495	BME Elective	ELECTIVE
	BME Elective	ELECTIVE	
	HUM	BIO Elective	

TERM ABROAD OPTION

Indicates offered in this
term ONLY