

Biomedical and Health Sciences Engineering BS (124 hours) Effective 2020		
NAME	PID	Optional 2 <sup>nd</sup> Major or Minor

### FOUNDATIONS

English Comp. and Rhetoric+	Foreign Language*		Quant. Reas. (QR)	Lifetime Fitness (LFIT)
	1.	3.	MATH 231#	(1 hr.)
	2.	4.		

\* Through Level 3

### APPROACHES

Phys. and Life Sciences (PL/PX)	Social and Behavioral Sciences**	Humanities/Fine Arts
CHEM 101#+	Hist. Analysis (HS):	Vis. & Perf. Arts (VP):
CHEM 101L#+	Soc Sci./Hist. Analysis (SS/HS):	Literary Arts (LA):
BIOL 101#	Soc Sci./Hist. Analysis (SS/HS):	Phil. Reasoning (PH):
BIOL 101L#		

\*\* From at least 2 departments.

### CONNECTIONS

Communication Int. (CI)	Quant. Int. (QI) or 2 <sup>nd</sup> Quant. Reas. (QR)	Experiential Ed. (EE)	Global Issues (GL)
BIOL 101L#	MATH 232#		
US Diversity (US)	North Atlantic World (NA)	World before 1750 (WB)	Beyond the NA (BN)

### MAJOR/MINOR/ELECTIVES

Additional Requirements # (10 courses)	Core Major Requirements 18 Courses				
BIOL 101 BIOL 101L	BMME 201 or COMP 116 (3)	Must take three of the following gateway electives: BMME 315, 325, 335, 345, 355, 365, 375, 385	Select four courses from no more than two specialization areas on page two:		
CHEM 101+ CHEM 101L+	BMME 205 or 160 & 215L (4)				
CHEM 102 CHEM 102L	BMME 209 or 150 & 219L (4)				
CHEM 261	BMME 298 (2)				
PHYS 116+ or 118+	BMME 207 (4)	BMME 697 (3)			
	BMME 301 (4)	BMME 698 (3)			
PHYS 117 or 119	BMME 302 (4)	Engineering elective (≥ 300)			
	BMME 398 (2)				
MATH 231+	♦ Students must earn a C (not C-) in at least 18 hrs of major core. "Additional Requirements" do not count towards hours of "C." See "Notes on BMHE track" on reverse of worksheet				
MATH 232+	# In order to complete the BMHE major, students should complete all marked courses (incl. PL, QR, QI) prior to the beginning of Junior year. Please consider course prerequisites when planning.				
MATH 233	❖ Students cannot enroll in BMME courses until they are admitted to the program.				
MATH 383 MATH 383L	+Students must earn a C or better (C- for ENGL 105) in these pre-req courses in math and science before applying for admission to BMHE. Students may declare the BMHE major as early as their first year. However, students who wish to complete the major must apply for admission to the program. Admission to the university does not guarantee admission to the program. Students should plan to apply during their first year. Students who are not accepted to the program must select a different major. More information about this process is available on the department Website.				

Remaining courses after this term:	Hours to be deducted:	Hours Tally:	Notes:
___ Foundations	Repeated courses	Hours to date: _____	
___ Approaches	HSFL	Hours in progress _____	
___ Connections	Online courses > 24	Pending Study Abroad* _____	
___ Supplemental	Other	Subtotal _____	
___ (hrs C _____)	Professional School > 30	Hours deducted _____	
___ (hrs C _____)	Hours in subject (BA) > 45	Hours after this term _____	
___ (hrs C _____)	Total	Hours remaining to grad _____	
___ Requirements subtotal		Semesters left _____	
___ Total			
		*Pending study abroad hours may differ from hours earned.	

This tally assumes successful completion of presently enrolled courses (not AB or IN), and it does not account for all possible overlaps

## **Additional Notes on BMHE Track:**

### **Notes on Courses**

1. Pre-med students should take BIOL 252, BIOL 252L, CHEM 241, 241L, 261, 262, 262L and 430. Pre-med students may want to consider a minor in chemistry. Meet with pre-health advising to confirm the latest update to pre-requisites. It is recommended that students get additional experience outside of class by working in a research lab or in industry. BMME 395 (research) may be taken only once. Students should consult with the Director of Undergraduate Studies for information about BMME 395 requirements. Please note that BMME 395 does not count toward your graduation requirements for this major.
2. In order to apply, students must complete core math and science courses, as indicated on the form. Specifically, the following courses must be completed with a C or better. AP, IB or transfer credit will be accepted according to university policy: CHEM 101 and 101L, MATH 231, MATH 232, PHYS 116 or 118. ENGL 105 must be completed with a C- or better. Transfer credit will be accepted. Students should plan to apply during the fall, spring or summer of their first year. Rising juniors may also apply, but admission to those students will be reviewed on a limited basis if space is available.

## **Specialization Areas**

### **Biosignals and Imaging**

#### **UNC Campus**

BMME 461 (3) Introduction to Medical Imaging  
BMME 576 (3) Mathematics for Image Computing  
BMME 581 (3) Microcontroller Applications II  
MATH 528 (3) Mathematical Methods for the Physical Sciences I

#### **NC State Campus**

BME 412 (3) Biomedical Signal Processing  
ECE 455 (3) Computer Control of Robots  
ECE 456 (3) Mechatronics  
ECE 461 (3) Embedded Systems

### **Medical Microdevices**

#### **UNC Campus**

BMME 441 (3) Thermal Physics (or MAE 201, or MSE 301)  
BMME 455 (3) Biofluid Mechanics (or MAE 308, or CE 382)  
BMME 581 (3) Microcontroller Applications II

#### **NC State Campus**

BME 412 (3) Biomedical Signal Processing  
BME 418 (3) Wearable Biosensors  
BME 522 (3) Medical Instrumentation  
BME 536 (3) Digital Control Systems  
ECE 505 (3) Neural Interface Engineering  
E 304 (3) Intro to Nano Science and Technology

### **Regenerative Medicine**

#### **UNC Campus**

BMME 420 (3) Introduction to Synthetic Biology  
BMME 441 (3) Thermal Physics (or MAE 201, or MSE 301)  
BMME 455 (3) Biofluid Mechanics (or MAE 308, or CE 382)  
BMME 470 (3) Tissue Engineering  
PHYS 405 (3) Biological Physics

#### **NC State Campus**

BME 462 (3) Biomaterials Characterization  
BME 484 (3) Fundamentals of Tissue Engineering  
BIT 466 (2) & BME 483 (2) Animal Cell Culture; Tissue Engineering Technologies  
TE 463 (3) Polymer Engineering

### **Rehabilitation Engineering**

#### **UNC Campus**

BMME 405 (3) Biomechanics of Movement  
BMME 445 (3) Systems Neuroscience  
BMME 447 (3) Neural Basis of Rehabilitation Engineering  
BMME 505 (3) Skeletal Biomechanics

#### **NC State Campus**

BME 418 (3) Wearable Biosensors  
BME 425 (3) Bioelectricity  
BME 444 (3) Orthopedic Biomechanics  
BME 467 (3) Mechanics of Tissues and Implants Requirements