

# B.S. IN BIOMEDICAL ENGINEERING

## CATALOG YEAR 2015-2016

Below is the *advised sequence* of courses for this degree program and prerequisites as of 4/30/15. The official degree requirements and prerequisites can be found in the University General Catalog and the prerequisites are subject to change.

COURSE NUMBER AND TITLE	UNITS	PREREQUISITES
<b>1<sup>ST</sup> SEMESTER</b>		
MATH 122A/B <b>OR</b> MATH 125 Calculus I with Applications	5/3	Appropriate Math Placement
CHEM 151 General Chemistry I <b>OR</b> CHEM 105A/106A	4	
ENGL 101 <b>OR</b> 107 <b>OR</b> 109H First-Year Composition	3	
ENGR 102A/B Introduction to Engineering <b>OR</b> ENGR 102	3	Concurrent enrollment or completion of MATH 122B or MATH 125
Tier I General Education	3	
<b>2<sup>ND</sup> SEMESTER</b>		
MATH 129 Calculus II	3	MATH 122B or 125 with C or better
CHEM 152 General Chemistry II <b>OR</b> CHEM 105B/106B	4	CHEM 151 or CHEM 105A/106A
PHYS 141 Introductory Mechanics <b>OR</b> PHYS 161H	4	MATH 122B or MATH 125; Concurrent enrollment or completion of MATH 129
ENGL 102 <b>OR</b> 108 <b>OR</b> 109H First-Year Composition	3	ENGL 101, ENGL 107
BME 295C Challenges in Biomedical Engineering (Spring only)	1	
ECE 175 Intro Computer Programming	3	Concurrent enrollment or completion of MATH 122B or MATH 125
<b>3<sup>RD</sup> SEMESTER</b>		
ABE 284 Biosystems Thermal Engineering (fall only) <b>OR</b> AME 230 Thermodynamics (supports ME minor)	3	For ABE 284: MATH 129; PHYS 141; For AME 230: Concurrent enrollment or completion of MATH 223
BME 214 Introduction Biomechanics	3	PHYS 141; MATH 129
MATH 223 Vector Calculus	4	MATH 129 with C or better
MCB 181 R Introductory Biology I <b>AND</b> MCB 181 L Biotechnology Laboratory	3 1	
Tier I General Education	3	
<b>4<sup>TH</sup> SEMESTER</b>		
BME 210 Intermediate BME Design	3	ECE 175
MATH 254 Intro to Ordinary Differential Equations	3	MATH 129 with C or better
PHYS 241 Introductory Electricity and Magnetism <b>OR</b> PHYS 261H	4	PHYS 141 or PHYS 161H; MATH 129
PSIO 201 Human Anatomy and Physiology I	4	
Tier I General Education	3	

## BIOSENSORS TRACK

### COURSE NUMBER AND TITLE

### UNITS

**CURRENT PREREQUISITES FOR UPPER DIVISION COURSES CAN BE FOUND IN THE UA GENERAL CATALOG**

**ADVANCED STANDING IS REQUIRED FOR 3XX AND 4XX COURSES (SEE ADVISOR FOR REQUIREMENTS)**

### 5<sup>TH</sup> SEMESTER

BME 447 Sensors and Controls 3

PSIO 202 Human Anatomy and Physiology II **OR**  
ECOL 182 R/L Introductory Biology II and Laboratory 4

BME 331 Introduction to Fluid Mechanics 3

AME 301 Engineering Analysis (Fall Only) **OR**  
ABE 423 Biosystems Analysis and Design (Spring Only) **OR**  
MATH 322 Engineering Analysis **OR**  
ECE 330A Computational Techniques 3

Tier I General Education 3

### 6<sup>TH</sup> SEMESTER

BME 330 Biomedical Instrumentation (Spring Only) 4

SIE 305 Introduction to Engineering Probability and Statistics **OR**  
Math 363 Introduction to Statistical Methods 3

BME 480 Translational Biomedical Engineering (Spring only) 3

Technical Elective – See major advisor for course approval 3

Tier II General Education 3

### 7<sup>TH</sup> SEMESTER

ENGR 498A Cross-disciplinary Design 3

BME 497G Clinical Rotation (Fall Only) 1

BME 485 Nanoscience and Nanotechnology for BME (Fall only) 3

ABE 489A Fabrication Tech. for Micro-and Nano-devices (Fall only) 3

BME 486 Biomaterial-Tissue Interactions (Fall only) 3

Technical Elective – See major advisor for course approval 3

### 8<sup>TH</sup> SEMESTER

ENGR 498B Cross-disciplinary Design 3

AME 488 Micro and Nano Transducer Physics and Design (Spring only) 3

Technical Elective – See major advisor for course approval 3

Tier II General Education 3

\*Tier I and II General Education Courses must meet University general education requirements. One course must be recognized by the university as meeting the Diversity Requirement.

## BIOMECHANICS TRACK

### COURSE NUMBER AND TITLE

### UNITS

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**ADVANCED STANDING IS REQUIRED FOR 3XX AND 4XX COURSES (SEE ADVISOR FOR REQUIREMENTS)**

### 5<sup>TH</sup> SEMESTER

BME 447 Sensors and Controls (Fall only) 3

PSIO 202 Human Anatomy and Physiology II **OR**  
ECOL 182 R/L Introductory Biology II and Laboratory 4

BME 331 Introduction to Fluid Mechanics 3

AME 301 Engineering Analysis (Fall Only) 3

Tier I General Education 3

### 6<sup>TH</sup> SEMESTER

BME 330 Biomedical Instrumentation (Spring Only) 4

SIE 305 Introduction to Engineering Probability and Statistics **OR**  
Math 363 Introduction to Statistical Methods 3

AME 324A Mechanical Behavior of Engineering Materials **OR**  
MSE 331R Fundamentals of Materials for Engineers 3

BME 480 Translational Biomedical Engineering (Spring only) 3

Tier II General Education 3

### 7<sup>TH</sup> SEMESTER

ENGR 498A Cross-disciplinary Design 3

BME 497G Clinical Rotation (Fall Only) 1

BME 466 Biomechanical Engineering (Fall only) 3

AME 302 Numerical Methods 3

Technical Elective – See major advisor for course approval 3

### 8<sup>TH</sup> SEMESTER

ENGR 498B Cross-disciplinary Design 3

BME 483 Micro Biomechanics (Spring only) 3

Technical Elective – See major advisor for course approval 3

Technical Elective – See major advisor for course approval 2

Tier II General Education 3

\*Tier I and II General Education Courses must meet University general education requirements. One course must be recognized by the university as meeting the Diversity Requirement.

## BIOMATERIALS TRACK

### COURSE NUMBER AND TITLE

### UNITS

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### 5<sup>TH</sup> SEMESTER

BME 447 Sensors and Controls (Fall only) 3

PSIO 202 Human Anatomy and Physiology II **OR**  
ECOL 182 R/L Introductory Biology II and Laboratory 4

BME 331 Introduction to Fluid Mechanics 3

AME 301 Engineering Analysis (Fall Only) **OR**  
ABE 423 Biosystems Analysis and Design (Spring Only) **OR**  
MATH 322 Engineering Analysis **OR**  
ECE 330A Computational Techniques 3

Tier I General Education 3

### 6<sup>TH</sup> SEMESTER

BME 330 Biomedical Instrumentation (Spring Only) 4

SIE 305 Introduction to Engineering Probability and Statistics **OR**  
Math 363 Introduction to Statistical Methods 3

BME 480 Translational Biomedical Engineering (Spring only) 3

CHEM 241A Lectures in Organic Chemistry **AND**  
CHEM 243A Organic Chemistry Laboratory I **OR**  
BME 466 Biomechanical Engineering (Fall only) 4/3

Tier II General Education 3

### 7<sup>TH</sup> SEMESTER

ENGR 498A Cross-disciplinary Design 3

BME 497G Clinical Rotation (Fall Only) 1

BME 461 Biological and Synthetic Materials (Fall Only) 3

BME 486 Biomaterial-Tissue Interactions (Fall Only) 3

Technical Elective – See major advisor for course approval 3

### 8<sup>TH</sup> SEMESTER

ENGR 498B Cross-disciplinary Design 3

BME 481B Cell and Tissue Engineering (Spring Only) 3

Technical Elective – See major advisor for course approval 3

Technical Elective – See major advisor for course approval 2/3

Tier II General Education 3

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## PRE-HEALTH TRACK

### COURSE NUMBER AND TITLE

### UNITS

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**ADVANCED STANDING IS REQUIRED FOR 3XX AND 4XX COURSES (SEE ADVISOR FOR REQUIREMENTS)**

### 5<sup>TH</sup> SEMESTER

BME 447 Sensors and Controls (Fall only) 3

CHEM 241A Lectures in Organic Chemistry **AND**  
CHEM 243A Organic Chemistry Laboratory I 4

BME 331 Introduction to Fluid Mechanics 3

AME 301 Engineering Analysis (Fall Only) **OR**  
ABE 423 Biosystems Analysis and Design (Spring Only) **OR**  
MATH 322 Engineering Analysis **OR**  
ECE 330A Computational Techniques 3

Tier I General Education 3

### 6<sup>TH</sup> SEMESTER

BME 330 Biomedical Instrumentation (Spring Only) 4

SIE 305 Introduction to Engineering Probability and Statistics **OR**  
Math 363 Introduction to Statistical Methods 3

ECOL 182 R/L Introductory Biology II and Laboratory 4

BME 480 Translational Biomedical Engineering (Spring only) 3

BIOC 385 Metabolic Chemistry 3

### 7<sup>TH</sup> SEMESTER

ENGR 498A Cross-disciplinary Design 3

BME 497G Clinical Rotation (Fall Only) 1

BME 486 Biomaterial-Tissue Interactions (Fall Only) (Lab) 3

CHEM 241B Lectures in Organic Chemistry **AND**  
CHEM 243B Organic Chemistry Laboratory II 4

Tier II General Education 3

### 8<sup>TH</sup> SEMESTER

ENGR 498B Cross-disciplinary Design 3

BME 481B Cell and Tissue Engineering (Spring Only) 3

BME 416 Biomedical Imaging (Spring only) 3

Technical Elective – See major advisor for course approval 1

Tier II General Education 3

\*Tier I and II General Education Courses must meet University general education requirements. One course must be recognized by the university as meeting the Diversity Requirement.