

# B.S. in Biomedical Engineering

## Four-Year Plan

### Catalog Year 2014-2015

Below is the *advised sequence* of courses for this degree program.

The official degree requirements can be found in the University General Catalog.

Course Number and Title	Units	Prerequisites
<b>1<sup>ST</sup> SEMESTER</b>		
MATH 122A/B or MATH 125 Calculus I with Applications	5/3	Appropriate Math Placement
CHEM 151 General Chemistry I	4	
ENGL 101 First-Year Composition	3	
ENGR 102 Introduction to Engineering or ENGR 102A and ENGR102B	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	4	CHEM 151
PHYS 141 Introductory Mechanics	4	MATH 122B or MATH 125; Concurrent enrollment in MATH 129
ENGL 102 First-Year Composition	3	ENGL 101
BME 295C Challenges in Biomedical Engineering	1	
<b>3<sup>RD</sup> SEMESTER</b>		
ABE 284 Biosystems Thermal Engineering (Fall Only) or AME 230	3	MATH 129; PHYS 141
CE 214 Statics	3	PHYS 141; MATH 129
MATH 223 Vector Calculus	4	MATH 129 with C or better
MCB 181 R/L Introductory Biology I and Laboratory	4	
Tier I General Education	3	
<b>4<sup>TH</sup> SEMESTER</b>		
ABE 205 Engineering Analytic Computer Skills (Spring Only)	3	
MATH 254 Intro to Ordinary Differential Equations	3	MATH 129 with C or better
PHYS 241 Introductory Electricity and Magnetism	4	PHYS 141
PSIO 201 Human Anatomy and Physiology I	4	
Tier I General Education	3	

## Biosensors Track

Course Number and Title	Units	Prerequisites
<b>Advanced Standing is required for 3xx and 4xx courses (See advisor for requirements)</b>		
<b>5<sup>TH</sup> SEMESTER</b>		
ECE 207 Elements of Electrical Engineering	3	PHYS 241; Completion or concurrent enrollment MATH 254
PSIO 202 Human Anatomy and Physiology II or ECOL 182 R/L Introductory Biology 2 and Laboratory	4	For PSIO 202: PSIO 201
AME 331 Fluid Mechanics	3	ABE 284; PHYS 141; MATH 254
AME 301 Engineering Analysis (Fall Only)*** or ABE 423 Biosystems Analysis and Design (Spring Only)***	3	For AME 301: AME 250, AME 331, or Concurrent enrollment AME 320; For ABE 423: Adv. Stdg: Engineering
Tier I General Education	3	
<b>6<sup>TH</sup> SEMESTER</b>		
BME 330 Biomedical Instrumentation (Spring Only)	4	ECE 207; PSIO 201
SIE 305 Introduction to Engineering Probability and Statistics or Math 363	3	MATH 129
ABE 489B Bio Micro/Nanotechnology Applications	3	CHEM 152 or MSE 110
Technical Elective	3	
Tier II General Education	3	
<b>7<sup>TH</sup> SEMESTER</b>		
ENGR 498A Senior Capstone (Fall Only)	3	Senior status
BME 497G Clinical Rotation (Fall Only)	1	BME 330
ABE 447 Sensors and Controls (Fall Only)	3	CHEM 152 or MSE 110
AME 489A Fabrication Techniques for Micro-and Nanodevices	3	ECE 207 or ABE 447
ABE 486 Biomaterial-Tissue Interactions	3	CHEM 152
Technical Elective	3	
<b>8<sup>TH</sup> SEMESTER</b>		
ENGR 498B Senior Capstone (Spring Only)	3	Senior status
BME 480 Translational Biomedical Engineering (Spring Only)	3	
AME 488 Micro and Nano Transducer Physics and Design	3	ECE 207 or ABE 447; AME 250
Technical Elective	3	
Tier II General Education	3	

\*\*\*AME 301 or ABE 423 required. One semester will be filled with a Tier II Gen. Ed.

\*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

### Prerequisites

Advanced Standing is required for 3xx and 4xx courses (See advisor for requirements)

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

ECE 207 Elements of Electrical Engineering	3	PHYS 241; Completion or concurrent enrollment MATH 254
PSIO 202 Human Anatomy and Physiology II or ECOL 182 R/L Introductory Biology 2 and Laboratory	4	For PSIO 202: PSIO 201
AME 331 Fluid Mechanics	3	ABE 284; PHYS 141; MATH 254
AME 301 Engineering Analysis (Fall Only)*** or ABE 423 Biosystems Analysis and Design (Spring Only)***	3	For AME 301: AME 250, AME 331, or Concurrent enrollment AME 320; For ABE 423: Adv. Stdg: Engineering
Tier I General Education	3	

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

BME 330 Biomedical Instrumentation (Spring Only)	4	ECE 207; PSIO 201
Tier II General Education	3	
SIE 305 Introduction to Engineering Probability and Statistics or Math 363 Introduction to Statistical Methods	3	For SIE 305: MATH 129; For MATH 363: MATH 223, 254. MATH 254 concurrently
AME 466 Biomechanical Engineering	3	
Technical Elective	3	

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

ENGR 498A Senior Capstone (Fall Only)	3	Senior status
BME 497G Clinical Rotation (Fall Only)	1	BME 330
ABE 447 Sensors and Controls (Fall Only)	3	CHEM 152 or MSE 110
AME 324A Mechanical Behavior of Engineering Materials or MSE 331R Fundamentals of Materials for Engineers	3	For AME 324A: CE 214; For MSE 331R: CHEM 151 and PHYS 241
AME 302 Numerical Methods	4	AME 301; MATH 254
Technical Elective	3	

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

ENGR 498B Senior Capstone (Spring Only)	3	Senior status
BME 480 Translational Biomedical Engineering (Spring Only)	3	
AME 483 Micro Biomechanics	3	AME 230 or ABE 284; MATH 223; AME 324A
Technical Elective	2	
Tier II General Education	3	

\*\*\*AME 301 or ABE 423 required. One semester will be filled with a Tier II Gen. Ed.

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## Biomaterials Track

Course Number and Title	Units	Prerequisites
<b>Advanced Standing is required for 3xx and 4xx courses (See advisor for requirements)</b>		
<b>5<sup>TH</sup> SEMESTER</b>		
ECE 207 Elements of Electrical Engineering	3	PHYS 241; Completion or concurrent enrollment MATH 254
PSIO 202 Human Anatomy and Physiology II or ECOL 182 R/L Introductory Biology 2 and Laboratory	4	For PSIO 202: PSIO 201
AME 331 Fluid Mechanics	3	For CE 218: CE 214. For AME 331: ABE 284; PHYS 141; MATH 254
AME 301 Engineering Analysis (Fall Only)*** or ABE 423 Biosystems Analysis and Design (Spring Only)***	3	For AME 301: AME 250, AME 331, or Concurrent enrollment AME 320; For ABE 423: Adv. Stdg: Engineering
Tier I General Education	3	
<b>6<sup>TH</sup> SEMESTER</b>		
BME 330 Biomedical Instrumentation (Spring Only)	4	ECE 207; PSIO 201
Tier II General Education	3	
SIE 305 Introduction to Engineering Probability and Statistics or Math 363 Introduction to Statistical Methods	3	For SIE 305: MATH 129; For MATH 363: MATH 223, 254. MATH 254 concurrently
CHEM 241A Lectures in Organic Chemistry <u>and</u> CHEM 243A Organic Chemistry Laboratory I	4	CHEM 152
Technical Elective	3	
<b>7<sup>TH</sup> SEMESTER</b>		
ENGR 498A Senior Capstone (Fall Only)	3	Senior status
BME 497G Clinical Rotation (Fall Only)	1	BME 330
ABE 447 Sensors and Controls (Fall Only)	3	CHEM 152 or MSE 110
MSE 461 Biological and Synthetic Materials (Fall Only)	3	CHEM 151
ABE 486 Biomaterial-Tissue Interactions (Fall Only)	3	CHEM 152
Technical Elective	3	
<b>8<sup>TH</sup> SEMESTER</b>		
ENGR 498B Senior Capstone (Spring Only)	3	Senior status
BME 480 Translational Biomedical Engineering (Spring Only)	3	
ABE 481B Cell and Tissue Engineering (Spring Only)	3	MATH 254
Technical Elective	2	
Tier II General Education	3	

\*\*\*AME 301 or ABE 423 required. One semester will be filled with a Tier II Gen. Ed.

\*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.