

BIOENGINEERING

Bachelors of Science-Bioengineering

Program Description

Bioengineering uses principles and methods from engineering and the physical sciences to solve problems in biology and medicine. A B.S.E. in bioengineering provides students with a broad-based education in engineering and the life and natural sciences, preparing them to apply their skills in an ethical, sustainable and environmentally responsible manner to make contributions that address societal and individual needs.

The objective of the bioengineering program is to prepare students:

- For productive employment, graduate study, or professional programs, especially in human and animal medicine, biotechnology and related biology-based engineering fields.
- Who will ethically and responsibly contribute to society, drawing from an integrated, multidisciplinary bioengineering education, focusing on sustainability and environmentalism.
- Who continue to develop technical knowledge, awareness and leadership abilities to address domestic or global issues in human health.

Career Opportunities

Biomedical engineers are employed in industry, hospitals and research facilities affiliated with educational and medical institutions, education and governmental regulatory agencies. They often serve a coordinating or interfacing function, using their background in both the engineering and medical fields. In industry, they may create designs where an in-depth understanding of living systems and technology is essential. They may be involved in performance testing of new or proposed products. Government positions often involve product testing and safety, as well as establishing safety standards for devices. In the hospital, the biomedical engineer may provide advice on the selection and use of medical equipment and supervise performance testing and maintenance of the selected equipment. Biomedical engineers may also build customized devices for special health care or research needs.

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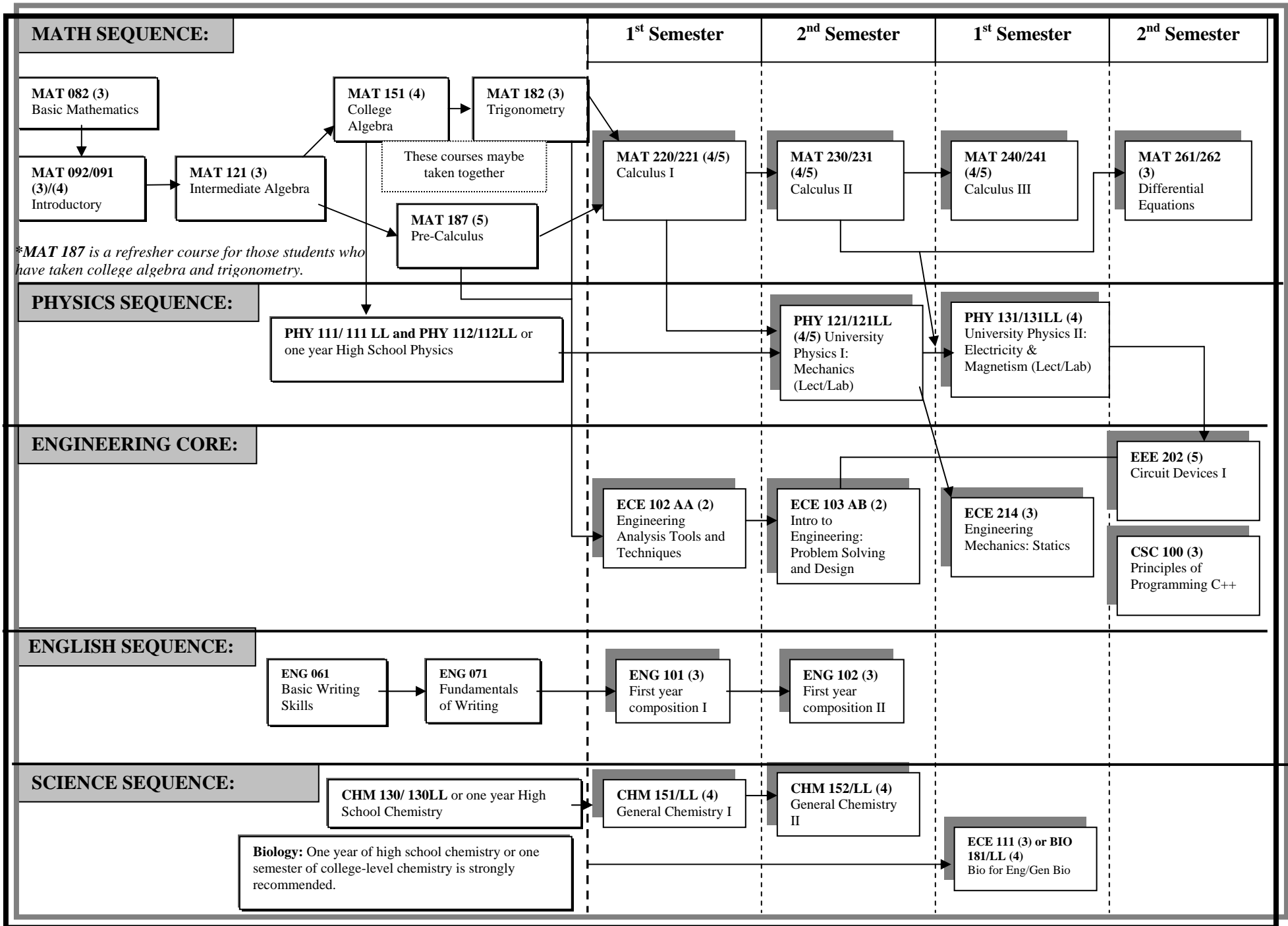
Arizona State University Contact

[Harrington Bioengineering Program](#)

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Prerequisite Courses

Required Courses



Bioengineering Recommended Study Plan

Year 1		Year 2	
First Semester	Second Semester	Third Semester	Fourth Semester
ECE102 AA (2) Engineering Analysis 1	ECE 103 AB (2) Problem Solving & Design	ECE111 (3) Biology Requirement OR BIO 181+Lab (3) <i>BME 111 (3)</i>	CHM 231 (3) Elem. Organic Chemistry CHM231/235(3/1)
ECE102 (2) AND ECE103 (2)= BME 100 (2)			EEE 202 (4) Circuits 1 <u>pre-co: PHY131, MAT261</u> EEE 202 (4)
MAT 220 (4) Calc 1 <u>Mat 187 or MAT182</u> MAT 265 (3)	MAT 230 (4) Calc 2 <u>MAT 220</u> MAT 266 (3)	MAT 240 (4) Calc 3 <u>MAT 220</u> MAT267 (4)	MAT 261 (3) Differential Equation <u>MAT230</u> MAT275 (3)
ENG 101 (3) First Year Composition 1 ENG 101 (3)	ENG102 (3) First Year Composition 2 ENG102 (3)	ECE 214 (4) Mechanics <u>PHY121, pre-co MAT240</u> ECE214 (4)	CSC 100 (3) CSC 100 (3)
CHM 151/LL (4) General Chemistry 1 <u>HS algebra and HS chemistry</u>	CHM 152/LL (4) General Chemistry 2 <u>CHM 151/LL</u>	PHY 131 (4) University Physics 2 <u>PHY 121, MAT 230</u> PHY131 (4)	HU/SB (3)
CHM151 (4)+CHM152(4)=CHM 114 or CHM 116 (4)			HU/SB (3)
HU/SB (3) ECN111/112 recommended	PHY 121 (4) University Physics 1 <u>MAT 220</u> PHY 121 (4)		HU/SB (3)
16	17	15	16

Underlined = Pre-req *Italic*= ASU Equivalence

According to ASU Bio Engineering advisement sheet:
Humanities & Social Sciences (HU/SB) (15 hrs minimum) (Required: 1 course upper division; 2 courses from the same dept; 2 depts. or more Represented; plus a minimum of two courses that satisfy three awareness areas: Cultural (C), Global (G), and Historical (H). Double counting is permissible between HU or SB and the awareness areas and also within the awareness areas.)

Course Subject and Title (courses in bold/shading are critical)	Hrs.	Upper Division	Completed ATP: <input type="checkbox"/> Yes <input type="checkbox"/> No		Completed AGEC: <input type="checkbox"/> Yes <input type="checkbox"/> No
			Transfer Course/Grade	Minimum Grade if Required	Additional Critical Requirement Notes
TERM ONE: 0-15 CREDIT HOURS					
ASU 101-FSE: The ASU Experience	1	<input type="checkbox"/>			<ul style="list-style-type: none"> Complete MAT 265 with a minimum grade of "C" Complete 2 of: BME 111& 112 OR BIO 188; CHM 114 or 116, each with a minimum grade of "C"; BME 100 An SAT, ACT, Accuplacer, or TOEFL score determines placement into first-year composition courses ASU Math Placement Exam score determines placement in Mathematics course * CHM 113 is a prerequisite and does not apply towards degree credit ** If ENG 105 a 3 hr applicable elective must also be taken prior to graduation. See Advisor.
BME 100: Introduction to Bioengineering OR BME 111/112: Engineering Perspectives on Biological Systems/Laboratory or BIO 188: General Biology II (SQ)	2 or 4	<input type="checkbox"/>		Grade of C in BME 111/112	
CHM 114: General Chemistry for Engineers (SQ) OR CHM 116: General Chemistry II *	4	<input type="checkbox"/>		Grade of C	
MAT 265: Calculus for Engineers I (MA)	3	<input type="checkbox"/>		Grade of C	
ENG 101 or 102: First-Year Composition OR ENG 105: Advanced First-Year Composition** OR ENG 107 or 108: English for Foreign Students	3	<input type="checkbox"/>		Grade of C	
TERM TWO: 16-30 CREDIT HOURS					
BME 100: Introduction to Bioengineering OR BME 111/112: Engineering Perspectives on Biological Systems/Laboratory or BIO 188: General Biology II (SQ)	2 or 4	<input type="checkbox"/>		Grade of C in BME 111/112	<ul style="list-style-type: none"> Complete ASU101-FSE Complete BME 100 Complete BME 111& 112 with a minimum grade of "C" or BIO 188 Complete CHM 114 or 116 with a minimum grade of "C" Complete MAT 266 with a minimum grade of "C" Complete PHY 121/122
MAT 266: Calculus for Engineers II	3	<input type="checkbox"/>		Grade of C	
PHY 121/122: University Physics I/Laboratory I (SQ)	3/1	<input type="checkbox"/>			
ENG 101 or 102: First-Year Composition OR ENG 105: Advanced First-Year Composition** OR ENG 107 or 108: English for Foreign Students	3	<input type="checkbox"/>		Grade of C	
TERM THREE: 31-45 CREDIT HOURS					
BME 235: Physiology for Engineers	4	<input type="checkbox"/>		Grade of C	<ul style="list-style-type: none"> Complete MAT 267; PHY 131, 132, each with a minimum grade of "C" Complete First-Year Composition requirement: ENG 101 & 102 or ENG 107 & 108 or ENG 105
MAT 267: Calculus for Engineers III	3	<input type="checkbox"/>		Grade of C	
PHY 131/132: University Physics Electricity and Magnetism II/Laboratory II (SQ)	3/1	<input type="checkbox"/>		Grade of C	
CHM 231/235: Elementary Organic Chemistry/Laboratory or CHM 233/237: General Organic Chemistry I/Laboratory I	3/1	<input type="checkbox"/>			
CSE 100: Principles of Programming with C++ (CS)	3	<input type="checkbox"/>			
TERM FOUR: 46-60 CREDIT HOURS					
BME 200: Conservation Principles of Bioengineering	3	<input type="checkbox"/>		Grade of C	<ul style="list-style-type: none"> Complete BME 200, 235 each with a minimum grade of "C"
EEE 202: Circuits I	4	<input type="checkbox"/>		Grade of C	
MAE 212: Engineering Mechanics	4	<input type="checkbox"/>		Grade of C	
MAT 275: Modern Differential Equations (MA)	3	<input type="checkbox"/>		Grade of C	
Humanities, Fine Arts & Design (HU) AND Cultural Diversity in the US (C), Global Awareness (G) or Historical Awareness (H)	3	<input type="checkbox"/>			
TERM FIVE: 61-75 CREDIT HOURS					
# BME 318: Biomaterials	4	<input checked="" type="checkbox"/>			# Designates Major Course: A minimum cumulative GPA of 2.0 required.
# BME 350: Signals and Systems for Bioengineering	3	<input checked="" type="checkbox"/>			
# CHM 341: Elementary Physical Chemistry	3	<input checked="" type="checkbox"/>		Grade of C	
# MAT 343: Applied Linear Algebra	3	<input checked="" type="checkbox"/>			
# IEE 380: Probability and Statistics for Engineering Problem Solving (CS)	3	<input checked="" type="checkbox"/>			
TERM SIX: 76-90 CREDIT HOURS					
# BME 300: Bioengineering Product Design	3	<input checked="" type="checkbox"/>		Grade of C	# Designates Major Course: A minimum cumulative GPA of 2.0 required.
# BME 331: Bioengineering Transport Phenomena	3	<input checked="" type="checkbox"/>			
# BME 370: Microcomputer Applications in Bioengineering	4	<input checked="" type="checkbox"/>			
Humanities, Fine Arts & Design (HU) AND Cultural Diversity in the US (C), Global Awareness (G) or Historical Awareness (H)	3	<input type="checkbox"/>			
Social & Behavioral Science (SB) AND Cultural Diversity in the US (C), Global Awareness (G) or Historical Awareness (H)	3	<input type="checkbox"/>			
TERM SEVEN: 91-105 CREDIT HOURS					
# BME 413: Biomedical Instrumentation(BME 413 & 423 = L)	3	<input checked="" type="checkbox"/>			# Designates Major Course: A minimum cumulative GPA of 2.0 required.
# BME 417: Biomedical Engineering Capstone Design I (L)	4	<input checked="" type="checkbox"/>		Grade of C	
# BME 423: Biomedical Instrumentation Laboratory	1	<input checked="" type="checkbox"/>			
# BME 434: Applications of Bioengineering OR # BME 416: Biomechanics OR # BME 419: Biocontrol Systems	3	<input checked="" type="checkbox"/>			
Social & Behavioral Science (SB) AND Cultural Diversity in the US (C), Global Awareness (G) or Historical Awareness (H)	3	<input type="checkbox"/>			

Course Subject and Title <i>(courses in bold/shading are critical)</i>	Hrs.	Upper Division	Transfer Course/Grade	Minimum Grade if Required	Additional Critical Requirement Notes
TERM EIGHT: 106-120 CREDIT HOURS					
# BME 490: Biomedical Engineering Capstone Design II	4	<input checked="" type="checkbox"/>			# Designates Major Course: A minimum cumulative GPA of 2.0 required.
# Technical Elective	3	<input checked="" type="checkbox"/>			
# Technical Elective	2	<input checked="" type="checkbox"/>			
UD Humanities, Fine Arts & Design (HU) OR Social & Behavioral Science (SB) AND Cultural Diversity in the US (C), Global Awareness (G) or Historical Awareness (H)	3	<input checked="" type="checkbox"/>			

Graduation Requirements Summary:

Total Hours Regular Curriculum (120)	Total UD Hrs (45 min)	Total Hrs at ASU (30 min)	Cumulative GPA (2.00 minimum)	Major GPA (2.00 minimum GPA)	Hrs Resident Credit for Academic Recognition (56 min)	Total Comm. College Hrs. (64 Max)

General University Requirements: Legend

- General Studies Core Requirements:
 - Literacy and Critical Inquiry (L)
 - Mathematical Studies (MA)
 - Computer/Statistics/Quantitative applications (CS)
 - Humanities, Fine Arts, and Design (HU)
 - Social and Behavioral Sciences (SB)
 - Natural Science-Quantitative (SQ)
 - Natural Science-General (SG)
- General Studies Awareness Requirements
 - Cultural Diversity in the US (C)
 - Global Awareness (G)
 - Historical Awareness (H)
- First-Year Composition

Additional Notes: