

Bachelor of Science in Bioengineering - Engineering Devices Concentration

Learn more about the Bachelor of Science in Bioengineering.

Goals, Objectives & Integration

A concentration in Engineering Devices within the Bioengineering program provides students with the skills to apply engineering principles to design and develop instruments, implants, and imaging modalities. A range of courses include topics covering biomechanics, bioinstrumentation and bioimaging.

Summary of Requirements

University Requirements

All new students are required to complete the university's General Education (GenEd) Curriculum.

All Temple students must take a minimum of two writing intensive courses for a total of at least six credits. The writing intensive course credits are counted as part of the major; they are not General Education (GenEd) or elective credits. The writing intensive courses must be completed at Temple University and students may not transfer in credits to satisfy this requirement. The specific writing intensive courses required for this major are:

Code	Title	Credit Hours
ENGR 2196 or ENGR 2996	Technical Communication Honors Technical Communication	3
ENGR 4296 or ENGR 4996	Senior Design Project II Honors Senior Design Project II	3

Department and Major Requirements

Code	Title	Credit Hours
MATH 1041 or MATH 1941	Calculus I Honors Calculus I	4
MATH 1042 or MATH 1942	Calculus II Honors Calculus II	4
MATH 2043 or MATH 2943	Calculus III Honors Calculus III	4
Select one of the following:		3
MATH 2041 or MATH 2941	Differential Equations I Honors Differential Equations I	
MATH 3041 or MATH 3941	Differential Equations I Honors Differential Equations I	
BIOL 1012	General Biology II	4
CHEM 1031 or CHEM 1951	General Chemistry I Honors General Chemical Science I	3
CHEM 1033 or CHEM 1953	General Chemistry Laboratory I Honors Chemical Science Laboratory I	1
Select one of the following:		4
PHYS 1061 or PHYS 1961	Elementary Classical Physics I Honors Elementary Classical Physics I	
PHYS 2021 or PHYS 2921	General Physics I Honors General Physics I	
Select one of the following:		4
PHYS 1062 or PHYS 1962	Elementary Classical Physics II Honors Elementary Classical Physics II	
PHYS 2022	General Physics II	

or PHYS 2922 Honors General Physics II

Required General Education Courses

Select from one of the following:		4
ENG 0802	Analytical Reading and Writing	
ENG 0812	Analytical Reading and Writing: ESL	
ENG 0902	Honors Literature/Reading/Writing	
IH 0851	Intellectual Heritage I: The Good Life	3
or IH 0951	Honors Intellectual Heritage I: The Good Life	
IH 0852	Intellectual Heritage II: The Common Good	3
or IH 0952	Honors Intellectual Heritage II: The Common Good	
GenEd 08xx or 09xx (Human Behavior)		3
GenEd 08xx or 09xx (Race and Diversity)		3
GenEd 08xx or 09xx (Global/World Society)		3
GenEd 08xx or 09xx (U.S. Society)		3
GenEd 08xx or 09xx (Arts)		3

Required Bioengineering & Engineering Courses (Common for all Pathways)

BIOE 2001	Frontiers in Bioengineering	2
BIOE 2101	Engineering Principles of Physiological Systems	3
BIOE 3001	Research Design and Methods in Bioengineering	2
BIOE 3101	Bioelectrical Engineering Lab	3
BIOE 3102	Biomaterials Lab	3
BIOE 3201	Biomedical Instrumentation	2
BIOE 4101	Biomechanics Lab	3
BIOE 4311	The Entrepreneurial Bioengineer	3
ENGR 1101	Introduction to Engineering & Engineering Technology	3
or ENGR 1901	Honors Introduction to Engineering	
ENGR 1102	Introduction to Engineering Problem Solving	3
ENGR 2196	Technical Communication	3
or ENGR 2996	Honors Technical Communication	
ENGR 3571	Classical and Statistical Thermodynamics	3
ENGR 4169	Engineering Seminar	1
ENGR 4174	Senior Design Project I for Bioengineering	2
ENGR 4296	Senior Design Project II	3
or ENGR 4996	Honors Senior Design Project II	

Required Bioengineering Electives

BIOE 2312	Mechanics for Bioengineering I	4
BIOE 3312	Mechanics for Bioengineering II	4
BIOE 3301	Biomedical Signals and Systems	3

Required Technical Electives (minimum 15 credits)

BIOE 2201	Modeling Fundamentals in Bioengineering	1.5
BIOE 2202	Programming Fundamentals in Bioengineering	1.5
BIOE 3303	Biotransport Phenomena	3
CHEM 1032	General Chemistry II	3
or CHEM 1952	Honors General Chemical Science II	
CHEM 1034	General Chemistry Laboratory II	1
or CHEM 1954	Honors Chemical Science Laboratory II	
MATH 2101	Linear Algebra	3
or ENGR 2011	Engineering Analysis & Applications	

Select from the following list: 3

BIOE 2401	Biodesign - Needs and Ideation	
BIOE 3401	Biodesign - Testing and Validation	
BIOE 3511	Interactions of Biomaterials with Living Tissues	

BIOE 3725	Cell Biology for Engineers	
BIOE 4278	Cardiac Devices	
ENGR 3553	Mechanics of Fluids	
ENGR 3117	Computer-Aided Design (CAD)	
ECE 2332	Principles of Electric Circuits	
ECE 2333	Principles of Electric Circuits Lab	
Bioengineering Capstone Course		
Select one of the following:		3
BIOE 4333	Capstone Elective: Applied Biospectroscopy	
BIOE 4431	Capstone Elective: Neuroengineering	
BIOE 4441	Capstone Elective: Biomechanics	
Free Electives		
Free elective		3
Total Credit Hours		128

Suggested Academic Plan

Please note that this is a **suggested** academic plan. Depending on your situation, your academic plan may look different.

Bachelor of Science in Bioengineering: Engineering Devices Concentration Requirements for New Students starting in the 2022-2023 Academic Year

Year 1		
Fall		Credit Hours
MATH 1041 or 1941	Calculus I	4
CHEM 1031 or 1951	General Chemistry I	3
CHEM 1033 or 1953	General Chemistry Laboratory I	1
ENGR 1101 or 1901	Introduction to Engineering & Engineering Technology	3
ENG 0802, 0812, or 0902	Analytical Reading and Writing [GW]	4
Term Credit Hours		15
Spring		
MATH 1042 or 1942	Calculus II	4
Select one of the following:		4
PHYS 1061 or 1961	Elementary Classical Physics I	
PHYS 2021 or 2921	General Physics I	
BIOE 2001	Frontiers in Bioengineering	2
CHEM 1032 or 1952	General Chemistry II	3
CHEM 1034 or 1954	General Chemistry Laboratory II	1
BIOL 1012	General Biology II	4
Term Credit Hours		18
Year 2		
Fall		
MATH 2043 or 2943	Calculus III	4
Select one of the following:		4
PHYS 1062 or 1962	Elementary Classical Physics II	
PHYS 2022 or 2922	General Physics II	
IH 0851 or 0951	Intellectual Heritage I: The Good Life [GY]	3
BIOE 3001	Research Design and Methods in Bioengineering	2
ENGR 1102	Introduction to Engineering Problem Solving	3
Term Credit Hours		16
Spring		
BIOE 3201	Biomedical Instrumentation	2
BIOE 2101	Engineering Principles of Physiological Systems	3
BIOE 3102	Biomaterials Lab	3

BIOE 2312	Mechanics for Bioengineering I	4
ENGR 3571	Classical and Statistical Thermodynamics	3
BIOE 2201	Modeling Fundamentals in Bioengineering (Proposed New Course: Modeling in BioE)	1.5
BIOE 2202	Programming Fundamentals in Bioengineering (Proposed New Course: Programming in BioE)	1.5
Term Credit Hours		18
Year 3		
Fall		
BIOE 3101	Bioelectrical Engineering Lab	3
Select one of the following:		3
ENGR 2011	Engineering Analysis & Applications	
MATH 2101	Linear Algebra	
BIOE 3312	Mechanics for Bioengineering II	4
BIOE 3303	Biotransport Phenomena	3
Select one of the following:		3
MATH 2041 or 2941	Differential Equations I	
MATH 3041 or 3941	Differential Equations I	
Term Credit Hours		16
Spring		
BIOE 3301	Biomedical Signals and Systems	3
ENGR 4169	Engineering Seminar	1
BIOE 4101	Biomechanics Lab	3
IH 0852 or 0952	Intellectual Heritage II: The Common Good [GZ]	3
GenEd Breadth Course		3
ENGR 2196 or 2996	Technical Communication [WI]	3
Term Credit Hours		16
Year 4		
Fall		
ENGR 4174	Senior Design Project I for Bioengineering	2
Bioengineering Capstone - select one of the following:		3
BIOE 4333	Capstone Elective: Applied Biospectroscopy	
BIOE 4441	Capstone Elective: Biomechanics	
BIOE 4431	Capstone Elective: Neuroengineering	
BIOE 4311	The Entrepreneurial Bioengineer	3
GenEd Breadth Course		3
GenEd Breadth Course		3
Term Credit Hours		14
Spring		
ENGR 4296 or 4996	Senior Design Project II [WI]	3
GenEd Breadth Course		3
GenEd Breadth Course		3
Free Elective		3
Technical Elective		3
Term Credit Hours		15
Total Credit Hours:		128