

# Bachelor of Science in Electrical Engineering - Bioelectrical Engineering Concentration

Learn more about the Bachelor of Science in Electrical Engineering.

The objective of the Bioelectrical Engineering concentration is to prepare students for careers in the emerging areas of biomedical signal and image processing, assistive devices for the impaired, and bioelectronics. The Bioelectrical Engineering concentration utilizes courses in Biology, and Mammalian Anatomy and Physiology from the Department of Kinesiology at Temple University as part of the curriculum.

## Summary of Degree 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

### College Requirements

The degree of Bachelor of Science in Electrical Engineering with a concentration in Bioelectrical Engineering may be conferred upon satisfactory completion of a minimum of 128 semester hours of credit with a minimum GPA of 2.0 overall and in the major. Students must also score a minimum grade of C- in each of the following courses before they can take other junior and senior level courses:

Code	Title	Credit Hours
ECE 2342	Circuits and Electronics I	5
ECE 2612	Digital Circuit Design	3
ECE 3516 or ECE 3916	Signals and Systems Honors Signals and Systems	5

### Program Requirements

Code	Title	Credit Hours
<b>Required Math &amp; Basic Science Courses</b>		
MATH 1041 or MATH 1941	Calculus I Honors Calculus I	4
MATH 1042 or MATH 1942	Calculus II Honors Calculus II	4
MATH 2041 or MATH 2941	Differential Equations I Honors Differential Equations I	3
ECE 3522	Stochastic Processes in Signals and Systems	3
ENGR 2011	Engineering Analysis & Applications	3
ENGR 2013	Engineering Analysis and Applications Lab	1
PHYS 1061 or PHYS 1961	Elementary Classical Physics I Honors Elementary Classical Physics I	4
PHYS 1062 or PHYS 1962	Elementary Classical Physics II Honors Elementary Classical Physics II	4
CHEM 1035	Chemistry for Engineers	3

CHEM 1033 or CHEM 1953	General Chemistry Laboratory I Honors Chemical Science Laboratory I	1
BIOL 1012	General Biology II	4
<b>Required General Education Courses</b>		
Select one of the following:		
ENG 0802	Analytical Reading and Writing	4
ENG 0812	Analytical Reading and Writing: ESL	
ENG 0902	Honors Literature/Reading/Writing	
IH 0851 or IH 0951	Intellectual Heritage I: The Good Life Honors Intellectual Heritage I: The Good Life	3
IH 0852 or IH 0952	Intellectual Heritage II: The Common Good Honors Intellectual Heritage II: The Common Good	3
GenEd 08xx or 09xx (U.S. Society)		3
GenEd 08xx or 09xx (Global/World Society)		3
GenEd 08xx or 09xx (Human Behavior)		3
GenEd 08xx or 09xx (The Arts)		3
GenEd 08xx or 09xx (Race and Diversity)		3
<b>Required Electrical and Bioelectrical Engineering Courses</b>		
ECE 1111	Engineering Computation I	4
ECE 2342	Circuits and Electronics I	5
ECE 2352	Circuits and Electronics II	5
ECE 2612	Digital Circuit Design	3
ECE 2613	Digital Circuit Design Laboratory	1
ECE 3612 or ECE 3914	Processor Systems Honors Microprocessor Systems	3
ECE 3613 or ECE 3915	Processor Systems Laboratory Honors Microprocessor Systems Lab	1
ECE 3516 or ECE 3916	Signals and Systems Honors Signals and Systems	5
ECE 3712	Introduction to Electromagnetic Fields and Waves	3
ECE 3822	Engineering Computation II	3
ECE 4522	Digital Signal Processing	3
KINS 1223	Human Anatomy and Physiology I	4
KINS 1224	Human Anatomy and Physiology II	4
<b>Required Engineering Courses</b>		
ENGR 1101 or ENGR 1901	Introduction to Engineering & Engineering Technology Honors Introduction to Engineering	3
ENGR 1102	Introduction to Engineering Problem Solving	3
ENGR 2196 or ENGR 2996	Technical Communication (WI) Honors Technical Communication	3
ECE 4176	Senior Design Project I: ECE	3
ENGR 4296 or ENGR 4996	Senior Design Project II (WI) Honors Senior Design Project II	3
<b>Required Electives</b>		
ECE Technical Elective		4
Math, Science, or Engineering Elective		3
Free Elective		3
<b>Total Credit Hours</b>		<b>128</b>

## Suggested Academic Plan

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

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### Requirements for New Students starting in the 2022-2023 Academic Year

Year 1		
Fall		Credit Hours
MATH 1041 or 1941	Calculus I	4
PHYS 1061 or 1961	Elementary Classical Physics I	4
ENGR 1101 or 1901	Introduction to Engineering & Engineering Technology	3
ENG 0802, 0812, or 0902	Analytical Reading and Writing [GW]	4
<b>Term Credit Hours</b>		<b>15</b>
Spring		
MATH 1042 or 1942	Calculus II	4
PHYS 1062 or 1962	Elementary Classical Physics II	4
CHEM 1035	Chemistry for Engineers	3
CHEM 1033 or 1953	General Chemistry Laboratory I	1
ENGR 1102	Introduction to Engineering Problem Solving	3
<b>Term Credit Hours</b>		<b>15</b>
Year 2		
Fall		Credit Hours
ENGR 2011	Engineering Analysis & Applications	3
ENGR 2013	Engineering Analysis and Applications Lab	1
ECE 1111	Engineering Computation I	4
ECE 2342	Circuits and Electronics I	5
IH 0851 or 0951	Intellectual Heritage I: The Good Life [GY]	3
<b>Term Credit Hours</b>		<b>16</b>
Spring		
MATH 2041 or 2941	Differential Equations I	3
ECE 2612	Digital Circuit Design	3
ECE 2613	Digital Circuit Design Laboratory	1
ECE 2352	Circuits and Electronics II	5
IH 0852 or 0952	Intellectual Heritage II: The Common Good [GZ]	3
<b>Term Credit Hours</b>		<b>15</b>
Year 3		
Fall		Credit Hours
ECE 3612 or 3914	Processor Systems	3
ECE 3613 or 3915	Processor Systems Laboratory	1
ECE 3516 or 3916	Signals and Systems	5
ENGR 2196 or 2996	Technical Communication [WI]	3
GenEd Breadth Course		3
GenEd Breadth Course		3
<b>Term Credit Hours</b>		<b>18</b>
Spring		
ECE 3522	Stochastic Processes in Signals and Systems	3
ECE 3712	Introduction to Electromagnetic Fields and Waves	3
ECE 3822	Engineering Computation II	3
BIOL 1012	General Biology II	4
GenEd Breadth Course		3
<b>Term Credit Hours</b>		<b>16</b>
Year 4		
Fall		Credit Hours
ECE 4176	Senior Design Project I: ECE	3
ECE 4522	Digital Signal Processing	3

KINS 1223	Human Anatomy and Physiology I	4
ECE Technical Elective		4
GenEd Breadth Course		3
<b>Term Credit Hours</b>		<b>17</b>
<b>Spring</b>		
ENGR 4296 or 4996	Senior Design Project II [WI]	3
KINS 1224	Human Anatomy and Physiology II	4
Math, Science, or Engineering Elective		3
GenEd Breadth Course		3
Free Elective		3
<b>Term Credit Hours</b>		<b>16</b>
<b>Total Credit Hours:</b>		<b>128</b>

## ECE Technical Electives

Code	Title	Credit Hours
ECE 3412	Classical Control Systems	3
ECE 3413	Classical Control Laboratory	1
ECE 3432	Robotic Control using Raspberry Pi Microcontroller	3
ECE 3622	Embedded System Design	3
ECE 3623	Embedded System Design Laboratory	1
ECE 3722	Electromagnetic Wave Propagation	3
ECE 3723	Electromagnetic Wave Propagation Laboratory	1
ECE 3732	Electromechanical Energy Systems	3
ECE 3733	Electromechanical Energy Systems Laboratory	1
ECE 3824	Engineering Computation III	3
ECE 4110	Special Topics	1 to 4
ECE 4312	Microelectronics II	3
ECE 4322	VLSI Systems Design	3
ECE 4412	Modern Control Theory	3
ECE 4422	Digital Control Systems	3
ECE 4512	Digital Communication Systems	3
ECE 4513	Digital Communication Systems Laboratory	1
ECE 4527	Introduction to Machine Learning and Pattern Recognition	3
ECE 4532	Data and Computer Communication	3
ECE 4542	Telecommunications Engineering	3
ECE 4612	Advanced Processor Systems	3
ECE 4712	Power System Analysis	3
ECE 4722	Power Electronics	3

## Math, Science, or Engineering Electives

Code	Title	Credit Hours
Any MATH course 2000-level or above		3
Any course 2000-level or above from the College of Science & Technology		3
Any course 2000-level or above from the College of Engineering		3