Electrical Engineering BSEE with Bioelectrical Engineering Concentration

Overview

The **Bachelor of Science in Electrical Engineering** is offered by the Department of Electrical and Computer Engineering. The program prepares students for careers as practicing engineers in areas such as digital systems, embedded processor applications, digital communications, control systems, sensor networks, biomedical signal processing, microelectronics, computer security and power networks. These careers are in applications, development, research, and design of electric and electronic systems and devices. Electrical Engineers are involved in the design and development of telecommunications networks, cellular telephones, computer and other microprocessor-based devices, consumer electronics, control systems for space vehicles and robots, and in many aspects of the power and automotive industries.

Electrical Engineering students may complete one or more **optional concentrations** in

- Bioelectrical Engineering,
- Computer Engineering, and/or
- Cooperative Education Program.

Bioelectrical Engineering Concentration

The **concentration in Bioelectrical Engineering** prepares 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.

Campus Location: Main

Program Code: EN-ECE-BSEE

Accreditation

The Electrical Engineering (BS) program is accredited by the Engineering Accreditation Commission of ABET, https://www.abet.org, under the General Criteria and Program Criteria for Electrical, Computer, Communications, Telecommunication(s) and Similarly Named Engineering Programs. ABET is a non-profit and non-governmental accrediting agency for academic programs in the disciplines of applied science, computing, engineering, and engineering technology recognized by the Council for Higher Education Accreditation (CHEA).

+1 Bachelor to Master's Accelerated Degree Program

High-achieving undergraduates can earn both a bachelor's degree and a master's degree within five years. Students apply for this program in sophomore year, and four graduate-level courses are taken in place of undergraduate requirements during junior and senior years. After the bachelor's degree is earned, one graduate-level course is taken in the summer followed by full-time study in the subsequent Fall and Spring semesters to complete the master's degree study. The following accelerated program is available:

- Bachelor of Science in Electrical Engineering and Master of Science in Electrical Engineering

Contact Information

Li Bai, PhD, Chair
Engineering Building, Room 712
215-204-6616
lbai@temple.edu

Brian Thomson, PhD, Undergraduate Coordinator
Engineering Building, Room 727A
215-204-8737
brian.thomson@temple.edu

Learn more about the Bachelor of Science in Electrical Engineering.

These requirements are for students who matriculated in academic year 2023-2024. Students who matriculated prior to fall 2023 should refer to the Archives *to view the requirements for their Bulletin year.*

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	Technical Communication	3
or ENGR 2996	Honors Technical Communication	
ENGR 4296	Capstone Senior Design Project	3
or ENGR 4996	Honors Capstone Senior Design Project	

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	Signals and Systems	5
or ECE 3916	Honors Signals and Systems	

Program Requirements

Code	Title	Credit Hours
Required Math & Basic Science Courses		
MATH 1041	Calculus I	4
or MATH 1941	Honors Calculus I	
MATH 1042	Calculus II	4
or MATH 1942	Honors Calculus II	
MATH 2041	Differential Equations I	3
or MATH 2941	Honors Differential Equations I	
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	Elementary Classical Physics I	4
or PHYS 1961	Honors Elementary Classical Physics I	
PHYS 1062	Elementary Classical Physics II	4
or PHYS 1962	Honors Elementary Classical Physics II	
CHEM 1035	Chemistry for Engineers	3
CHEM 1033	General Chemistry Laboratory I	1
or CHEM 1953	Honors Chemical Science Laboratory I	
BIOL 1012	General Biology II	4
Required General Education Courses		
Select one of the following:		4
ENG 0802	Analytical Reading and Writing	
ENG 0812	Analytical Reading and Writing: ESL	
ENG 0902	Honors Writing About Literature	
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 (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
Required Electrical and Bioelectrical Engineering Courses		
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	Processor Systems	3
or ECE 3914	Honors Microprocessor Systems	
ECE 3613	Processor Systems Laboratory	1
or ECE 3915	Honors Microprocessor Systems Lab	
ECE 3516	Signals and Systems	5
or ECE 3916	Honors Signals and Systems	
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
Required Engineering Courses		
ENGR 1001	College of Engineering First Year Seminar	1
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 (WI)	3
or ENGR 2996	Honors Technical Communication	
ECE 4176	Senior Design Project I: ECE	3
ENGR 4296	Capstone Senior Design Project (WI)	3
or ENGR 4996	Honors Capstone Senior Design Project	
Required Electives		
ECE Technical Elective		4
Math, Science, or Engineering Elective		3
Free Elective		2
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 Electrical Engineering with Concentration in Bioelectrical Engineering

Suggested Plan for New Students Starting in the 2023-2024 Academic Year

Year 1		
Fall		**Credit Hours**
MATH 1041	Calculus I	4
or MATH 1941	or Honors Calculus I	
PHYS 1061	Elementary Classical Physics I	4
or PHYS 1961	or Honors Elementary Classical Physics I	

ENGR 1101 or ENGR 1901	Introduction to Engineering & Engineering Technology or Honors Introduction to Engineering	3
ENGR 1001	College of Engineering First Year Seminar	1
ENG 0802 or ENG 0812 or ENG 0902	Analytical Reading and Writing or Analytical Reading and Writing: ESL or Honors Writing About Literature	4
	Credit Hours	**16**
Spring		
MATH 1042 or MATH 1942	Calculus II or Honors Calculus II	4
PHYS 1062 or PHYS 1962	Elementary Classical Physics II or Honors Elementary Classical Physics II	4
CHEM 1035	Chemistry for Engineers	3
CHEM 1033 or CHEM 1953	General Chemistry Laboratory I or Honors Chemical Science Laboratory I	1
ENGR 1102	Introduction to Engineering Problem Solving	3
	Credit Hours	**15**
Year 2		
Fall		
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 IH 0951	Intellectual Heritage I: The Good Life or Honors Intellectual Heritage I: The Good Life	3
	Credit Hours	**16**
Spring		
MATH 2041 or MATH 2941	Differential Equations I or Honors 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 IH 0952	Intellectual Heritage II: The Common Good or Honors Intellectual Heritage II: The Common Good	3
	Credit Hours	**15**
Year 3		
Fall		
ECE 3612 or ECE 3914	Processor Systems or Honors Microprocessor Systems	3
ECE 3613 or ECE 3915	Processor Systems Laboratory or Honors Microprocessor Systems Lab	1
ECE 3516 or ECE 3916	Signals and Systems or Honors Signals and Systems	5
ENGR 2196 or ENGR 2996	Technical Communication or Honors Technical Communication	3
GenEd Breadth Course		3
GenEd Breadth Course		3
	Credit Hours	**18**
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
	Credit Hours	**16**
Year 4		
Fall		
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
	Credit Hours	**17**
Spring		
ENGR 4296 or ENGR 4996	Capstone Senior Design Project or Honors Capstone Senior Design Project	3
KINS 1224	Human Anatomy and Physiology II	4
Math, Science, or Engineering Elective		3
GenEd Breadth Course		3
Free Elective		2
	Credit Hours	**15**
	Total Credit Hours	**128**

ECE Technical Electives

Code	Title	Credit Hours
ECE 3412	Classical Control Systems	3
ECE 3413	Classical Control Laboratory	1
ECE 3432	Robotic Control using Robotic Operating System (ROS)	3
ECE 3614	Printed Circuit Board Design	3
ECE 3622	Embedded System Design	3
ECE 3623	Embedded System Design 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
ECE 4822	Engineering Computation IV	3

Math, Science, or Engineering Electives

Code	Title	Credit Hours
Any course 2000-level or above from the College of Science and Technology (CST), excluding MATH 2101, MATH 2103, CIS 3715, CIS 4526.		3
Any course 2000-level or above from the College of Engineering.		3