

ELECTRO-MECHANICAL ENGINEERING TECHNOLOGY, B.S. (ALTOONA)

Begin Campus: Any Penn State Campus

End Campus: Altoona

Program Description

The Electro-Mechanical Engineering Technology (B.S. EMET) degree program provides the basic undergraduate education required for a career as an electro-mechanical engineer. The program emphasizes a breadth of knowledge in all fields of engineering technology related to typical, highly-automated manufacturing, production, or assembly plant processes. Basic coverage is provided in all major areas to technology involved in the operation and control of manufacturing and production processes, including instrumentation and monitoring methods, principles of machine design, automated control techniques, thermal and fluid sciences, computerized manufacturing systems, principles of electrical and electronic circuit operation, computer-aided drafting and design, economics of production, and statistical analysis and quality control.

The primary aim of the EMET program is to provide graduates with the knowledge and skills necessary to apply current methods and technology to the development, design, operation, and management of electro-mechanical systems, particularly in those industries where automated systems are prevalent.

The major is organized as a four-year baccalaureate program with the corresponding Penn State admission requirements. Graduates of an associate degree in either electrical or mechanical engineering technology from Penn State may re-enroll in the EMET program. The College of Engineering ENGR students may enroll through "Change of Major" procedures. Students from an engineering technology program at another institution or community college accredited by TAC of ABET may transfer into the program with advanced standing.

What is Electro-Mechanical Engineering?

The Bachelor of Science degree in Electro-Mechanical Engineering Technology responds to a growing demand for engineers with a broad range of technical skills. The program emphasizes knowledge in the field of technology related to the design, maintenance, and operation of electromechanical systems, essentially automation and robotics. These systems incorporate electronic, mechanical, instrumentation and control elements. The program provides students with hands-on experience with these elements, technical knowledge, and the soft skills needed to be successful in the field of engineering. In this curriculum, students receive early exposure to technology by scheduling technical courses in the major. A laboratory component that promotes the understanding of the subject matter through the experiential application of theory accompanies most technical courses. This program culminates with a senior capstone project in which students work together in a team to design and implement an engineering project from initial proposal through product demonstration.

You Might Like This Program If...

You are interested in math and science but prefer spending time applying your skills in a laboratory or field setting as opposed to studying the

theory behind these subjects in a classroom setting. If you like to take things apart, to see how they work, this may be for you. There is a greater emphasis on engineering applications while building an understanding of scientific theory.

Direct Admission to the Major

Incoming first-year students who meet the program admission requirements are admitted directly into the major. Admission restrictions may apply for change-of-major and/or change-of-campus students.

For more information about the admission process for this major, please send a request to the college, campus, or program contact (listed in the Contact tab).

Degree Requirements

For the Bachelor of Science degree in Electro-Mechanical Engineering Technology, a minimum of 130 credits is required:

Requirement	Credits
General Education	45
Requirements for the Major	109-116

24 of the 45 credits for General Education are included in the Requirements for the Major. This includes: 3 credits of GH courses; 9 credits of GN courses; 6 credits of GQ courses; 6 credits of GWS courses.

Requirements for the Major

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (<https://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44>).

Code	Title	Credits
Prescribed Courses		
CMPET 211	Embedded Processors and DSP	3
EDSGN 100	Cornerstone Engineering Design	3
EET 105	Electrical Systems	3
EET 275	Introduction to Programmable Logic Controls	3
EGT 114	Spatial Analysis and Computer-Aided Drafting	2
EMET 100	Computation Tools for Engineering Synthesis	1
EMET 215	Manufacturing Engineering	3
EMET 225	Applied Dynamics	2
EMET 325	Electric Drives	3
EMET 326	Mechanical Drives	3
EMET 405	Introduction to Thermal Science Systems	3
EMET 410	Automated Control Systems	4
IET 101	Manufacturing Materials, Processes, and Laboratory	3
IET 333	Engineering Economics for Technologists	2
STS/ PHILREQUIREMEN FOR THE MAJOR233	Ethics and the Design of Technology	3

Prescribed Courses: Require a grade of C or better

CMPET 117	Digital Electronics	3
CMPET 120	Digital Electronics Laboratory	1

EET 114	Electrical Circuits II	4
EET 118	Electrical Circuits Laboratory	1
EET 212W	Op Amp and Integrated Circuit Electronics	4
EMET 222	Applied Mechanics	3
EMET 230	Computerized I/O Systems	3
EMET 330	Measurement Theory and Instrumentation	3
ENGL 202C	Effective Writing: Technical Writing	3
MET 111	Mechanics for Technology: Statics	3
Additional Courses		
EMET 350	Quality Control, Inspection, and Design	2-3
or EMET 351	Quality Control, Inspection, and Design	
EMET 403 & EMET 440	Electromechanical Design Project Preparation and Electro-Mechanical Project Design	4
or EMET 441 & EMET 442	Mechatronics Project Design and Mechatronics Project Implementation	
Select 3 credits from the following:		3
CMPSC 121	Introduction to Programming Techniques	
CMPSC 131	Programming and Computation I: Fundamentals	
CMPSC 200	Programming for Engineers with MATLAB	
CMPSC 201	Programming for Engineers with C++	
Select 6-8 credits of GN courses from two of the following groups:		6-8
<i>Group 1</i>		
CHEM 110 & CHEM 111	Chemical Principles I and Experimental Chemistry I	
<i>Group 2</i>		
PHYS 150	Technical Physics I	
PHYS 211	General Physics: Mechanics	
PHYS 250	Introductory Physics I	
<i>Group 3</i>		
PHYS 151	Technical Physics II	
PHYS 212	General Physics: Electricity and Magnetism	
PHYS 251	Introductory Physics II	
<i>Additional Courses: Require a grade of C or better</i>		
MATH 83	Technical Calculus ¹	4
or MATH 140	Calculus With Analytic Geometry I	
MATH 210	Calculus with Engineering Technology Applications	3-4
or MATH 141	Calculus with Analytic Geometry II	
MATH 250	Ordinary Differential Equations ²	3
or MATH 211	Intermediate Calculus and Differential Equations with Applications	
Select 3 credits from the following:		3
CAS 100	Effective Speech	
CAS 100A	Effective Speech	
CAS 100B	Effective Speech	
Select 3-5 credits from the following:		3-5
MATH 26	Plane Trigonometry and Applications of Trigonometry	
MATH 40		
MATH 82	Technical Mathematics II ³	

Supporting Courses and Related Areas

Select 3-4 credits of science courses, in consultation with an adviser, 3-4 from the approved department list

Select 6 credits of General Technical Elective courses, in consultation 6 with an adviser, from the approved department list

¹ Students taking MATH 83 must take MATH 210 and MATH 211.

² Note that MATH 250 does not carry a C-requirement.

³ Students taking MATH 81 and MATH 82 must take MATH 83.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (<https://bulletins.psu.edu/undergraduate/general-education/baccalaureate-degree-general-education-program/>) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required and Inter-Domain courses do not meet this requirement.)

- **Quantification (GQ):** 6 credits
- **Writing and Speaking (GWS):** 9 credits

Breadth in the Knowledge Domains (Inter-Domain courses do not meet this requirement.)

- **Arts (GA):** 3 credits
- **Health and Wellness (GHW):** 3 credits
- **Humanities (GH):** 3 credits
- **Social and Behavioral Sciences (GS):** 3 credits
- **Natural Sciences (GN):** 3 credits

Integrative Studies

- **Inter-Domain Courses (Inter-Domain):** 6 credits

Exploration

- **GN**, may be completed with Inter-Domain courses: 3 credits
- **GA, GH, GN, GS, Inter-Domain courses.** This may include 3 credits of World Language course work beyond the 12th credit level or the requirements for the student's degree program, whichever is higher: 6 credits

University Degree Requirements**First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits

Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (<https://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80>)). For more information, check the Suggested Academic Plan for your intended program.

Program Educational Objectives

The educational objectives of the Electro-Mechanical Engineering Technology program are designed to prepare graduates who, within a few years after graduation, will:

1. Continue to develop and synthesize analytical skills in the specification, procurement, or integration of electromechanical systems.
2. Apply empirical skills in the safe operation, testing, or maintenance of electromechanical systems.
3. Collaborate effectively acting with the highest standards of professional integrity in project team activities through recognizing the global, societal, economical, and ethical contexts of their work.
4. Communicate persuasively ensuring a focus on technical excellence through the preparation and delivery of technical and non-technical documentation and communications.

Student Outcomes

Graduates of the Electro-Mechanical Engineering Technology program should demonstrate:

1. An ability to apply knowledge, techniques, skills, and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline.
2. An ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline.
3. An ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature.

4. An ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes.
5. An ability to function effectively as a member as well as a leader on technical teams.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee's unit of enrollment will provide each advisee with a primary academic adviser, the information needed to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (<https://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy/>)

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Suggested Academic Plan

The suggested academic plan(s) listed on this page are the plan(s) that are in effect during the 2024-25 academic year. To access previous years' suggested academic plans, please visit the archive (<https://bulletins.psu.edu/undergraduate/archive/>) to view the appropriate Undergraduate Bulletin edition.

Electro-Mechanical Engineering Technology, B.S. at Altoona Campus

The course series listed below provides **only one** of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an **Academic Requirements** or **What If** report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

First Year

Fall	Credits Spring	Credits
EDSGN 100	3 MATH 82 (GQ) [‡]	3
MATH 81 (GQ) [‡]	3 MET 111 [*]	3
General Education Course	3 CMPET 117 [*]	3
EET 105	3 CMPET 120 [*]	1
IET 101	3 ENGL 15, 30H, or ESL 15 (GWS) ^{‡†}	3
EMET 100	1 General Education Course	3
PSU 3	1	
	17	16

Second Year

Fall	Credits Spring	Credits
MATH 83 (GQ) [*]	4 MATH 210 [*]	3
EGT 114	2 General Education Course (GN)	3-4
EET 114 [*]	4 EET 212W [*]	4
EET 118 [*]	1 EMET 215	3
EMET 222 [*]	3 EET 275	3
General Education Course	3 EMET 225	2
	17	18-19

Third Year

Fall	Credits Spring	Credits
EMET 230 [*]	3 EMET 330 [*]	3
CMPET 211	3 EMET 325	3
MATH 211 [*]	3 EMET 326	3
ENGL 202C (GWS) ^{‡†}	3 CAS 100A (GWS) ^{‡†}	3
General Education Course	3 General Education Course (GN)	3-4
General Education Course (GN)	3-4 General Education Course (GHW)	3
	18-19	18-19

Fourth Year

Fall	Credits Spring	Credits
EMET 405	3 EMET 350	3
EMET 410	4 EMET 440	3
Technical Elective	3 General Education Course	3
IET 333	2 General Education Course	3
General Education Course	3 Technical Elective	3
EMET 403	1	
	16	15

Total Credits 135-138

- * Course requires a grade of C or better for the major
- ‡ Course requires a grade of C or better for General Education
- # Course is an Entrance to Major requirement
- † Course satisfies General Education and degree requirement

University Requirements and General Education Notes:

US and IL are abbreviations used to designate courses that satisfy Cultural Diversity Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

General Education includes Foundations (GWS and GQ), Knowledge Domains (GHW, GN, GA, GH, GS) and Integrative Studies (Inter-domain) requirements. N or Q (Honors) is the suffix at the end of a course number used to help identify an Inter-domain course, but the inter-domain attribute is used to fill audit requirements. Foundations courses (GWS and GQ) require a grade of 'C' or better.

College Notes:

Sequential Nature of the Program:

Courses offered during each semester of the EMET program generally build upon material taught in previous semesters. Many courses have prerequisites listed in the Undergraduate Degree Programs Bulletin. Therefore, if a student fails to take a course during the targeted semester, he/she may be unable to schedule courses in subsequent semesters as well. The end result may be a degree program that extends beyond the traditional four years.

Note 1: Math Sequence

High school graduates who test into technical mathematics: Math 81, 82, 83, 210 and 211. Additionally, Math 40 or Math 22 and Math 26 may be used to substitute for Math 81 and 82.

High school graduates who test into calculus: Math 83, 210 and 211 or Math 140, 141, and 250. Students who complete either of these sequences to fulfill the math requirements will need to complete additional technical elective credits. Please see an adviser for more information.

Note 2: Science Courses

Students are required to complete nine credits of science. **At least two** courses from the following list must be completed:

- PHYS 150 GN(3) or PHYS 211 GN(4) or PHYS 250 GN(4);
- PHYS 151 GN(3) or PHYS 212 GN(4) or PHYS 251 GN(4);
- CHEM 110 GN(3) and CHEM 111 GN(1);

Students may complete **no more than one selection** from the following. (If the student completes three selections from the first list, no additional courses are required):

- BIOL 011 GN(3) and BIOL 012 GN(1);
- BIOL 110 GN(4);
- BIOL 141 GN(3);
- CHEM 112 GN(3) and CHEM 113 GN(1);
- EGEE 101 GN(3);
- EGEE 102 GN(3);

Due to limited faculty resources, several program courses are only offered during one semester of the year. In addition, EMET courses are not traditionally offered during the summer months.

Approved technical elective courses are:

- CMPSC 201C (3) or CMPSC 121 (3);
- EMET 401 (1), EMET 402 (2), EMET 403 (1), EMET 394 (1-3), EMET 430 (3),
- ENTR 300 (3), ENTR 320 (3),
- MATH 220 (2), MATH 231 (2), STAT 200 (4)
- MGMT 301 (3), MKTG 301 (3)

Other courses may be accepted toward technical elective credits. Please check with your adviser for more information.

Career Paths

The inclusion of both electrical and mechanical coursework in the EMET program makes our students highly marketable to employers.

EMET graduates may pursue engineering work that entails design, prototyping, testing, operation, or maintenance of equipment. Others may work in the areas of research and development, quality control, inspection of procedures and processes, manufacturing, or sales and service.

These careers could be in a variety of industries including aerospace, agriculture, automotive, communications, computers, construction, energy, pharmaceuticals, plastics, or robotics to name a few.

MORE INFORMATION ABOUT POTENTIAL CAREER OPTIONS FOR GRADUATES OF THE ELECTRO-MECHANICAL ENGINEERING PROGRAM (<https://career.engr.psu.edu/>)

Opportunities for Graduate Studies

Students may choose to further their engineering education through graduate school. EMET graduates are prepared to continue their education into technical or professional Master's Degree programs. Graduate program admissions requirements vary by program and institution. Students intending to pursue this academic path are encouraged to investigate intended programs of interest early in their studies to tailor their course choices during their undergraduate studies.

Since the EMET program is ABET ETAC-accredited, EMET graduates are candidates to sit for the Fundamental of Engineering (FE) Exam, the first step in the engineering licensure process. Acceptable accreditation standards vary from state to state for professional licensure, so students must verify their state's requirements.

MORE INFORMATION ABOUT OPPORTUNITIES FOR GRADUATE STUDIES (<https://www.engr.psu.edu/graduate-programs/>)

Accreditation

The Bachelor of Science in Electro-Mechanical Engineering Technology at Penn State Altoona is accredited by the Engineering Technology Accreditation Commission of ABET, <https://www.abet.org>, under the commission's General Criteria and Program Criteria for Electromechanical Engineering Technology and Similarly Named Programs.

Professional Licensure/Certification

Many U.S. states and territories require professional licensure/certification to be employed. If you plan to pursue employment in a licensed profession after completing this program, please visit the Professional Licensure/Certification Disclosures by State (<https://opair.psu.edu/plc/dashboard/>) interactive map.

Contact

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