Electro-Mechanical Engineering Technology (EMET)

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The Electro-Mechanical Engineering Technology program at Cincinnati State is the largest of its kind in Ohio. The program combines electronics engineering technology and mechanical engineering technology, so students develop skills that are highly valued by industrial firms, including a focus on industrial automation. Students gain competencies in controlling systems, linking software and hardware to maintain systems, and improving machines and systems.

Graduates earn an Associate of Applied Science degree and are also prepared to pursue a bachelor's degree in fields such as electronics engineering, electrical engineering, or electro-mechanical engineering.

For more information, please contact the Engineering and Information Technologies Division at (513) 569-1743.

To apply for this program at Cincinnati State, visit the Admissions section of the College website.

Electro-Mechanical Engineering Technology (EMET)

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Lec</th>
<th>Lab</th>
<th>Credits</th>
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Electives

First Year Experience Elective

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Mathematics Electives

Select one of the following series:

- MAT 125 & MAT 126 Algebra and Trigonometry & Functions and Calculus
- MAT 251 & MAT 252 Calculus 1 & Calculus 2

Physics Elective

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English Composition Elective
ENG 102  English Composition 2: Contemporary Issues  3
ENG 104  English Composition 2: Technical Communication  3

Arts/Humanities or Social/Behavioral Science Elective
Any ECO, GEO, HST, LBR, LIT, PHI

Cooperative Education or Transfer Electives *

EMET 291  Full-Time Cooperative Education 1: Electro-Mechanical Engineering Technology  2
EMET 292  Full-Time Cooperative Education 2: Electro-Mechanical Engineering Technology  2
EET 121  Digital Systems 1  3
ESET 251  Electronics  4
MET 140  Engineering Materials  3
CIT 250  Engineering Community  2

* Program Chair approval is required for students planning to take a Transfer Elective course rather than participate in cooperative education.

Some courses are offered in alternative versions identified with a letter after the course number-- for example, ENG 101 and ENG 101A.

• This curriculum displays only course numbers without the added letter.
• The alternative version, when available, meets the requirements of the course version without the added letter.

The letters G, B, and T (displayed after course titles or elective descriptions) identify types of courses required by the Ohio Department of Higher Education as part of an associate's degree curriculum.

G = General Education course in this curriculum
B = Basic Skills course in this curriculum
T = Technical course in this curriculum

Electro-Mechanical Engineering Technologies (EMET, EMETE, EMETL)

• Demonstrate ability to communicate as an individual, as well as function effectively on teams by applying oral and written skills.
• Demonstrate knowledge of the importance of quality, timeliness, and continuous improvement.
• Demonstrate appropriate mastery of circuit analysis.
• Demonstrate appropriate mastery of CAD.
• Demonstrate ability to identify, analyze, and creatively solve technical and design problems.
• Demonstrate ability to apply fundamental knowledge to conduct experiments, analyze data, interpret data, and apply results to improve processes.
• Demonstrate appropriate mastery of programmable controllers and motor control systems.
• Demonstrate appropriate mastery of programming robots.
• Complete and pass an OSHA 10 General Industry course.

Faculty
Program Chair/Advisor
Lawrence (Larry) Feist, BS
lawrence.feist@cincinnatistate.edu

Co-op Coordinator
Sue Dolan, MEd
sue.dolan@cincinnatistate.edu

Advisors
Wendy Steinberg, MS
wendy.steinberg@cincinnatistate.edu
Carole Womeldorf, PhD
carole.womeldorf@cincinnatistate.edu

Courses

EMET 110 Computer Aided Design for Electro-Mechanical Systems
3 Credits. 2 Lecture Hours. 3 Lab Hours.
A course on fundamentals of computer-aided drafting (CAD) and design for electro-mechanical systems, including techniques for generating accurate engineering drawings and 3D models.
Prerequisites: MAT 096 or MAT 124, or appropriate placement

EMET 115 Residential Lighting
3 Credits. 2 Lecture Hours. 2 Lab Hours.
A course on fundamentals of residential lighting. Topics include: safe use of tooling and ladders, removing and installing lamps, identifying commonly-used light fixtures and bulb types, and technician professional demeanor.
Prerequisites: ENG 085, and MAT 096 or MAT 124, or appropriate placements

EMET 120 Residential Weatherization
3 Credits. 2 Lecture Hours. 2 Lab Hours.
A course on fundamental concepts related to the building "envelope," or the structure and shell of a house. Topics include: insulation, windows and doors, HVAC systems, energy use of lighting and appliances, and weatherization terminology.
Prerequisites: ENG 085, and MAT 096 or MAT 124, or appropriate placements

EMET 125 Commercial Lighting
3 Credits. 2 Lecture Hours. 2 Lab Hours.
A course on fundamentals of commercial lighting. Topics include: safe use of tooling, ladders, and lifts; removing and installing lamps for existing light fixtures (but not replacing the light fixture or ballast); auditing lamps; identifying light fixtures; removing fixture covers; and replacing lamps.
Prerequisites: ENG 085, and MAT 096 or MAT 124, or appropriate placements

EMET 141 Programmable Logic Controllers
3 Credits. 2 Lecture Hours. 3 Lab Hours.
A course on fundamentals of using programmable logic controllers (PLC). Topics include: PLC applications, ladder logic programming, processor selection and configuration, digital and analog input and output wiring, and human-machine interface (HMI) concepts.
Prerequisites: EET 131 and EMET 150 and MAT 125 or appropriate placement (minimum grade C for all)
EMET 150 Introduction to Controls and Robotics  
2 Credits. 1 Lecture Hour. 2 Lab Hours.  
A course on operation and use of robots in manufacturing applications.  
Topics include: programmable robotics, flow charting, logic controllers,  
motors, control language, motion, and quality assurance.  
Prerequisites: ENG 085, and MAT 096 or MAT 124, or appropriate  
placements.

EMET 180 Process Instrumentation  
3 Credits. 2 Lecture Hours. 3 Lab Hours.  
A course on process instrumentation theory and applications.  
Topics include: principles and practices of measurement and control of  
temperature, pressure, flow, level, and analytical quantities; and data  
acquisition for process instruments and controls.  
Prerequisites: EMET 150 and EET 131 (minimum grade C for both)

EMET 191 Part-Time Cooperative Education 1: Electro-Mechanical  
Engineering Technology  
1 Credit. 1 Lecture Hour. 20 Lab Hours.  
Students seeking an associate's degree participate in their first part-  
time field learning experience related to their degree. Students are  
expected to register for academic courses during the same semester.  
Students must follow cooperative education policies and procedures to  
earn credit. Grades issued are Satisfactory or Unsatisfactory.  
Prerequisites: None

EMET 192 Part-Time Cooperative Education 2: Electro-Mechanical  
Engineering Technology  
1 Credit. 1 Lecture Hour. 20 Lab Hours.  
Students seeking an associate's degree participate in their second  
part-time field learning experience related to their degree. Students are  
expected to register for academic courses during the same semester.  
Students must follow cooperative education policies and procedures to  
earn credit. Grades issued are Satisfactory or Unsatisfactory.  
Prerequisites: EMET 191

EMET 193 Part-Time Cooperative Education 3: Electro-Mechanical  
Engineering Technology  
1 Credit. 1 Lecture Hour. 20 Lab Hours.  
Students seeking an associate's degree participate in their third part-  
time field learning experience related to their degree. Students are  
expected to register for academic courses during the same semester.  
Students must follow cooperative education policies and procedures to  
earn credit. Grades issued are Satisfactory or Unsatisfactory.  
Prerequisites: EMET 192

EMET 194 Part-Time Cooperative Education 4: Electro-Mechanical  
Engineering Technology  
1 Credit. 1 Lecture Hour. 20 Lab Hours.  
Students seeking an associate's degree participate in their fourth part-  
time field learning experience related to their degree. Students are  
expected to register for academic courses during the same semester.  
Students must follow cooperative education policies and procedures to  
earn credit. Grades issued are Satisfactory or Unsatisfactory.  
Prerequisites: EMET 193

EMET 195 Part-Time Cooperative Education 5: Electro-Mechanical  
Engineering Technology  
1 Credit. 1 Lecture Hour. 20 Lab Hours.  
Students seeking an associate's degree participate in their fifth part-  
time field learning experience related to their degree. Students are  
expected to register for academic courses during the same semester.  
Students must follow cooperative education policies and procedures to  
earn credit. Grades issued are Satisfactory or Unsatisfactory.  
Prerequisites: EMET 194

EMET 196 Part-Time Cooperative Education 6: Electro-Mechanical  
Engineering Technology  
1 Credit. 1 Lecture Hour. 20 Lab Hours.  
Students seeking an associate's degree participate in their sixth part-  
time field learning experience related to their degree. Students are  
expected to register for academic courses during the same semester.  
Students must follow cooperative education policies and procedures to  
earn credit. Grades issued are Satisfactory or Unsatisfactory.  
Prerequisites: EMET 195

EMET 210 Energy Efficiency and Audits  
3 Credits. 2 Lecture Hours. 2 Lab Hours.  
A course on concepts related to energy consumption. Topics include:  
conducting energy audits for residential, commercial, and industrial  
locations; conserving energy; reducing energy consumption; and  
applying renewable energies.  
Prerequisites: None

EMET 215 Fuel Cells and Wind Devices  
3 Credits. 2 Lecture Hours. 2 Lab Hours.  
A course on planning, installing, and maintaining solar and renewable  
energy devices. Topics include: photovoltaic electrical systems, solar  
thermal systems, fuel cell technology, and wind turbine technology.  
Prerequisites: EMET 210 (minimum grade C)

EMET 240 Programmable Logic Controllers, Motors, Motor  
Controls, and Kinematics  
3 Credits. 2 Lecture Hours. 3 Lab Hours.  
A course on programmable logic controllers, motors, and variable  
speed drives and mechanisms. Topics include: operating,  
troubleshooting, and controlling circuits; calculating speed, torque,  
horsepower, and efficiency; and machine kinematics.  
Prerequisites: EET 132 (minimum grade C)

EMET 241 Building Automation 1  
3 Credits. 2 Lecture Hours. 3 Lab Hours.  
A course on fundamentals of building automation systems and  
commercial HVAC/R systems. Topics include: system components,  
building automation and control theory, psychrometrics, air and water  
systems, boilers, chillers, lighting, thermostats, pumps, PLC, and motor  
controls.  
Prerequisites: EET 132  
Corequisites: EMET 240  
Instructor Consent Required

EMET 242 Building Automation 2  
4 Credits. 3 Lecture Hours. 3 Lab Hours.  
A continuation of EMET 241. Topics include: control methods, HVAC  
scheduling, alarm categories and data logs, control of building  
HVAC mechanical systems, network fundamentals, OSI model, IP  
protocol, network signal transmission and protocols, and controller  
programming.  
Prerequisites: EMET 241
EMET 245 Laser 1
3 Credits. 2 Lecture Hours. 3 Lab Hours.
A course on the operational theory and safe use of lasers. Topics include: properties of laser light, elements of the laser, laser classifications, structure of the eye, and hazards associated with laser light.
Prerequisites: EMET 150 (minimum grade C) and MAT 124 (minimum grade C) or appropriate placement

EMET 246 Laser 2
3 Credits. 2 Lecture Hours. 3 Lab Hours.
A continuation of EMET 245, covering optical elements and types of industrial lasers used in photonics applications. Topics include: lenses, mirrors, prisms, laser modulators and Q-switches, optical power, energy measurements, and applying lasers for advanced manufacturing.
Prerequisites: EMET 245 (minimum grade C)

EMET 252 Motors, Motor Controls, and Variable Drives
3 Credits. 2 Lecture Hours. 3 Lab Hours.
A course on DC and AC motors and motor control circuits and devices including the Variable Frequency Drive (VFD). Topics include: brushed and brushless motors and generators, Pulse Width Modulation (PWM), variable speed drives, speed/torque/power characteristics, industrial control circuits, electrical safety, and troubleshooting.
Prerequisites: EET 132 and EMET 141 and EMET 150 (minimum grade C for all)

EMET 270 Robotics and Servomechanisms
3 Credits. 2 Lecture Hours. 3 Lab Hours.
A course on theory and applications of robotics and servomechanisms. Topics include: analyzing industrial robotics applications in automated manufacturing environments; programming and operating robots; transducers; proportional, proportional-integral, and proportional-integral-derivative positional control systems; and closed-loop controls.
Prerequisites: EET 132 (minimum grade C)

EMET 275 Electric Drive Mechanisms
3 Credits. 2 Lecture Hours. 3 Lab Hours.
A course on electric drive systems used in electric vehicles and stationary power systems. Topics include: power and energy measurement, energy storage, battery monitoring, motor drives, control electronics and instrumentation, power transmission, and electrical safety devices.
Prerequisites: EMET 180 and EMET 252 (minimum grade C for both)

EMET 291 Full-Time Cooperative Education 1: Electro-Mechanical Engineering Technology
2 Credits. 1 Lecture Hour. 40 Lab Hours.
Students seeking an associate's degree participate in their first full-time field learning experience related to their degree. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: None

EMET 292 Full-Time Cooperative Education 2: Electro-Mechanical Engineering Technology
2 Credits. 1 Lecture Hour. 40 Lab Hours.
Students seeking an associate's degree participate in their second full-time field learning experience related to their degree. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: EMET 291