

Electro-Mechanical Engineering Technology

Electro-Mechanical Engineering Technology prepares graduates to work in an industrial setting where automation, robotics, controls, and systems integration are used, providing a blend of electronics and mechanical systems studies. The programs offered by the department address the needs of growing industries in Ohio and the region, including manufacturing of photovoltaic electric panels, wind turbines, and fuel cells; installing and servicing photovoltaic and wind turbine systems; assisting energy efficiency companies and consultants; and using lasers and electro-optics systems in automated manufacturing and research environments.

Electro-Mechanical Engineering Technology (EMET)

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 maintaining 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.

The Electro-Mechanical Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, phone (410) 347-7700. The program has received a Program Excellence Award from the Ohio Department of Higher Education.

Electro-Mechanical Engineering Technology—Alternative Energy Major (EMETE)

Graduates of the program Electro-Mechanical Engineering Technology - Alternative Energy Major are prepared to address the needs of several related and growing industries related to energy efficiency, reduction of energy use in commercial and industrial applications, and electric drive systems found in passenger and off-highway electric vehicles. Students develop understanding of these new technologies along with foundation studies in traditional electro-mechanical engineering technology.

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

Electro-Mechanical Engineering Technology—Laser Major (EMETL)

Graduates of the Electro-Mechanical Engineering Technology - Laser Major are prepared to successfully begin careers and advance professionally in local and national industries that utilize lasers and electro-optics systems, or use industrial equipment in automated manufacturing and research environments. Students work with laser material processing systems, and operate and troubleshoot optical systems including lasers, lens systems, and fiber optics.

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

Electro-Mechanical Engineering Technology—Laser Certificate (EMETLC)

The Electro-Mechanical Engineering Technology – Laser Certificate prepares students to enter careers and advance professionally in local and national industries that utilize laser and electro-optics systems. Students work with laser material processing systems, and operate and troubleshoot optical systems including laser, lens systems, and fiber optics. Graduates of the certificate program receive OSHA 10 Electrical Safe Practices certification and are prepared for Laser Safety Officer training based on ANSI 36 standards, OSHA guidelines, and the FDA Center for Devices and Radiological Health (CDRH).

For more information, please contact the Center for Innovative Technologies at (513) 569-1743.

Electro-Mechanical Engineering Technology (EMET)

Semester 1		Lec	Lab	Credits
EMET 150	Introduction to Controls and Robotics (B)	1	2	2
CIT 105	OSHA 10 General Industry Safety (B)	1	0	1
EET 131	Circuit Analysis 1 (T)	3	2	4
PSET 110	Power Systems Computer Aided Drafting (B)	2	3	3

MAT XXX Mathematics Elective 1 (G)		3	2	4
FYE 1XX First Year Experience Elective (B)		1	0	1
Semester 2				
EMET 180	Process Instrumentation (T)	2	3	3
EET 132	Circuit Analysis 2 (T)	3	2	4
ENG 101	English Composition 1 (G)	3	0	3
MET 111	Manufacturing Processes 1 (B)	2	3	3
MAT XXX Mathematics Elective 2 (B)		3	2	4
Semester 3				
XXX XXX Cooperative Education or Transfer Elective 1 (T)		1	40	2
Semester 4				
EMET 240	Programmable Logic Controllers, Motors, Motor Controls, and Kinematics (T)	2	3	3
EMET 285	Electro-Mechanical Engineering Technology Capstone 1 (T)	0	2	1
MET 150	Statics and Strength of Materials for MET (T)	2	3	3
PHY XXX Physics Elective (G)		3	3	4
ENG 10X English Composition Elective (G)		3	0	3
Semester 5				
EMET 270	Robotics and Servomechanisms (T)	3	3	4
EMET 275	Electric Drive Mechanisms (T)	3	3	4
EMET 290	Electro-Mechanical Engineering Technology Capstone 2 (T)	1	2	2
XXX XXX Arts/Humanities Elective (G)		3	0	3
Semester 6				
XXX XXX Cooperative Education or Transfer Elective 2 (T)		1	40	2
Total Credits:		46	118	63

Electives

First Year Experience Elective

FYE 100	College Survival Skills	1
FYE 105	College Success Strategies	2
FYE 110	Community College Experience	3

Mathematics Electives

Select one of the following series:		
MAT 125 & MAT 126	Algebra and Trigonometry and Functions and Calculus	8
Or		

MAT 251 & MAT 252	Calculus 1 and Calculus 2	
Physics Elective		
PHY 151	Physics 1: Algebra and Trigonometry-Based	4
PHY 201	Physics 1: Calculus-Based	5
English Composition Elective		
ENG 102	English Composition 2: Contemporary Issues	3
ENG 104	English Composition 2: Technical Communication	3
Arts/Humanities Elective		
CULT 105	Issues in Human Diversity	3
CULT 110	Social Issues in Technology	3
PHI 110	Ethics	3
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
EET 251	Electronics	4
MET 140	Engineering Materials	3

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

Electro-Mechanical Engineering Technology—Alternative Energy Major (EMETE)

Semester 1		Lec	Lab	Credits
EMET 150	Introduction to Controls and Robotics (B)	1	2	2
CIT 105	OSHA 10 General Industry Safety (B)	1	0	1
EET 131	Circuit Analysis 1 (T)	3	2	4
PSET 110	Power Systems Computer Aided Drafting (B)	2	3	3
FYE 1XX First Year Experience Elective (B)		1	0	1
MAT XXX Mathematics Elective 1 (G)		3	2	4
Semester 2				
EMET 180	Process Instrumentation (T)	2	3	3
EET 132	Circuit Analysis 2 (T)	3	2	4
ENG 101	English Composition 1 (G)	3	0	3
MET 111	Manufacturing Processes 1 (B)	2	3	3
MAT XXX Mathematics Elective 2 (B)		3	2	4
Semester 3				
MET 150	Statics and Strength of Materials for MET (T)	2	3	3
XXX XXX Cooperative Education or Transfer Elective 1 (T)		1	40	2
Semester 4				
EMET 210	Energy Efficiency and Audits (T)	2	2	3
EMET 240	Programmable Logic Controllers, Motors, Motor Controls, and Kinematics (T)	2	3	3

EMET 285	Electro-Mechanical Engineering Technology Capstone 1 (T)	0	2	1
ENG 10X English Composition Elective (G)		3	0	3
PHY XXX Physics Elective (G)		3	2	4
Semester 5				
EMET 225	Solar and Renewable Energy (T)	2	3	3
EMET 275	Electric Drive Mechanisms (T)	3	3	4
EMET 290	Electro-Mechanical Engineering Technology Capstone 2 (T)	1	2	2
XXX XXX Arts/Humanities Elective (G)		3	0	3
Semester 6				
XXX XXX Cooperative Education or Transfer Elective 2 (T)		1	40	2
Total Credits:		47	119	65

Electives

First Year Experience Elective

FYE 100	College Survival Skills	1
FYE 105	College Success Strategies	2
FYE 110	Community College Experience	3

Mathematics Electives

Select one of the following series:

MAT 125 Algebra and Trigonometry
& MAT 126 and Functions and Calculus

Or

MAT 251 Calculus 1
& MAT 252 and Calculus 2

English Composition Elective

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

Physics Elective

PHY 151	Physics 1: Algebra and Trigonometry-Based	4
PHY 201	Physics 1: Calculus-Based	5

Arts/Humanities Elective

CULT 105	Issues in Human Diversity	3
CULT 110	Social Issues in Technology	3
PHI 110	Ethics	3

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
EET 251	Electronics	4
MET 140	Engineering Materials	3

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

Electro-Mechanical Engineering Technology—Laser Major (EMETL)

		Lec	Lab	Credits
Semester 1				
EMET 150	Introduction to Controls and Robotics (B)	1	2	2
CIT 105	OSHA 10 General Industry Safety (B)	1	0	1
EET 131	Circuit Analysis 1 (T)	3	2	4
PSET 110	Power Systems Computer Aided Drafting (B)	2	3	3
FYE 1XX First Year Experience Elective (B)		1	0	1
MAT XXX Mathematics Elective 1 (G)		3	2	4
Semester 2				
EMET 180	Process Instrumentation (T)	2	3	3
EET 132	Circuit Analysis 2 (T)	3	2	4
MET 150	Statics and Strength of Materials for MET (B)	2	3	3
MAT XXX Mathematics Elective 2 (B)		3	2	4
ENG 10X English Composition Elective (G)		3	0	3
Semester 3				
XXX XXX Cooperative Education or Transfer Elective 1 (T)		1	40	2
Semester 4				
EMET 240	Programmable Logic Controllers, Motors, Motor Controls, and Kinematics (T)	2	3	3
EMET 245	Laser 1 (T)	2	3	3
PHY XXX Physics Elective (G)		3	2	4
ENG 10X English Composition Elective (G)		3	0	3
Semester 5				
EMET 255	Optical Components, and Geometrical and Wave Optics (T)	3	3	4
EMET 265	Industrial Laser Systems (T)	3	3	4
EMET 270	Robotics and Servomechanisms (T)	3	3	4
XXX XXX Arts/Humanities Elective (G)		3	0	3
Semester 6				
XXX XXX Cooperative Education or Transfer Elective 2 (T)		1	40	2
Total Credits:		48	116	64

Electives

First Year Experience Elective

FYE 100	College Survival Skills	1
FYE 105	College Success Strategies	2

FYE 110	Community College Experience	3
Mathematics Electives		8
Select one of the following series:		
MAT 125 & MAT 126	Algebra and Trigonometry and Functions and Calculus	
Or		
MAT 251 & MAT 252	Calculus 1 and Calculus 2	
English Composition Elective		
ENG 102	English Composition 2: Contemporary Issues	3
ENG 104	English Composition 2: Technical Communication	3
Physics Elective		
PHY 151	Physics 1: Algebra and Trigonometry-Based	4
PHY 201	Physics 1: Calculus-Based	5
Arts/Humanities Elective		
CULT 105	Issues in Human Diversity	3
CULT 110	Social Issues in Technology	3
PHI 110	Ethics	3
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
EET 251	Electronics	4
MET 140	Engineering Materials	3

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

Electro-Mechanical Engineering Technology - Laser Certificate (EMETLC)

Semester 1		Lec	Lab	Credits
EMET 245	Laser Foundations and Safety	2	3	3
CIT 105	OSHA 10 General Industry Safety	1	0	1
Semester 2				
EMET 255	Optical Components, and Geometrical and Wave Optics	3	3	4
EMET 265	Industrial Laser Systems	3	3	4
Total Credits:		9	9	12

Faculty

Program Chair/Advisor

Professor Lawrence (Larry) Feist, BS
lawrence.feist@cincinnatiatstate.edu

Co-op Coordinator

Professor Sue Dolan, M.Ed.
sue.dolan@cincinnatiatstate.edu

Courses

EMET 150 Introduction to Controls and Robotics

2 Credits. 1 Lecture Hour. 2 Lab Hours.

An introduction to the operation and usage of robots in manufacturing applications. Topics include: programmable robotics, flow charting, logic controllers, motors, control language, motion, and quality assurance.

Prerequisites: AFL 085, and AFM 094 or MAT 120, or appropriate placement test scores

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 140, EET 131

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 198 First Year Special Topics in Electro-Mechanical Engineering Technology

1-9 Credits. 0 Lecture Hour. 0 Lab Hour.

A course on selected topics related to Electro-Mechanical Engineering Technology, which gives students opportunities to study information not currently covered in other courses. Grades issued are A, B, C, D, or F.

Prerequisites: Instructor Approval

EMET 199 First Year Independent Project in Electro-Mechanical Engineering Technology

1-9 Credits. 0 Lecture Hour. 0 Lab Hour.

A project related to Electro-Mechanical Engineering Technology that is completed by one or more students to meet specific educational goals. Projects must have prior approval and supervision by Electro-Mechanical Engineering Technology faculty. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: Instructor Approval

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 225 Solar and Renewable Energy

3 Credits. 2 Lecture Hours. 3 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

EMET 230 Fuel Cells and Wind Devices

3 Credits. 2 Lecture Hours. 2 Lab Hours.

A course on planning, installing, and maintaining alternative energy sources. Topics include: converting chemical energy to electricity; fuel cell components, power efficiencies, and applications; electrolysis; and wind turbine components.

Prerequisites: EMET 210

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

EMET 245 Laser Foundations and Safety

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 and MAT 121 or appropriate placement test score

EMET 250 Servomechanisms

3 Credits. 2 Lecture Hours. 3 Lab Hours.

A course on negative feedback for closed-loop servo systems. Topics include: transducers for sensing system parameters; proportional, proportional-derivative, and proportional-integral-derivative positional control systems; computer control of servo-control systems; and simple closed-loop controls.

Prerequisites: EET 132, EMET 140

EMET 255 Optical Components, and Geometrical and Wave Optics

4 Credits. 3 Lecture Hours. 3 Lab Hours.

A course on optical elements used in photonics applications. Topics include: lens, mirrors, prisms, laser modulators and Q-switches, optical power, and energy measurements.

Prerequisites: EMET 245

EMET 260 Robotics

3 Credits. 2 Lecture Hours. 2 Lab Hours.

A course on robotics and factory automation. Topics include: analyzing industrial robotics applications in automated manufacturing environments, evaluating mechanical and electrical components, programming and operating robots, choosing robots for industrial applications, and applying quality assurance techniques.

Prerequisites: EET 132, EMET 140

EMET 265 Industrial Laser Systems

4 Credits. 3 Lecture Hours. 3 Lab Hours.

A course on lasers used in industry. Topics include: types of industrial lasers; applying lasers for cutting, welding, drilling, and heat treating; and motion control.

Prerequisites: EMET 245

EMET 270 Robotics and Servomechanisms

4 Credits. 3 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

EMET 275 Electric Drive Mechanisms

4 Credits. 3 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 240

EMET 285 Electro-Mechanical Engineering Technology Capstone 1**1 Credit. 0 Lecture Hour. 2 Lab Hours.**

Students participate in a team design project. Topics include: design concepts, modeling, detail and assembly drawings, bill of materials, vendors, and costs of project design.

Prerequisites: EMET 140, EET 132

EMET 290 Electro-Mechanical Engineering Technology Capstone 2**2 Credits. 1 Lecture Hour. 2 Lab Hours.**

A continuation of EMET 285. Students participate in the manufacturing, assembly, and testing of their product design, and prepare a presentation about the complete design process.

Prerequisites: EMET 285

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

EMET 293 Full-Time Cooperative Education 3: Electro-Mechanical Engineering Technology**2 Credits. 1 Lecture Hour. 40 Lab Hours.**

Students seeking an associate's degree participate in their third 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 292

EMET 294 Internship 1: Electro-Mechanical Engineering Technology**2 Credits. 1 Lecture Hour. 40 Lab Hours.**

Students seeking an associate's degree participate in their first unpaid field learning experience related to their degree. Students must follow applicable policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: EMET 140

EMET 295 Internship 2: Electro-Mechanical Engineering Technology**2 Credits. 1 Lecture Hour. 40 Lab Hours.**

Students seeking an associate's degree participate in their second unpaid field learning experience related to their degree. Students must follow applicable policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: EMET 294

EMET 298 Second Year Special Topics in Electro-Mechanical Engineering Technology**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

A course on selected topics related to Electro-Mechanical Engineering Technology, which gives students opportunities to study information not currently covered in other courses. Grades issued are A, B, C, D, or F.

Prerequisites: Instructor Approval

EMET 299 Second Year Independent Project in Electro-Mechanical Engineering Technology**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

A project related to Electro-Mechanical Engineering Technology that is completed by one or more students to meet specific educational goals. Projects must have prior approval and supervision by Electro-Mechanical Engineering Technology faculty. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: Instructor Approval