Mechanical Engineering Technologies

The Mechanical Engineering Technologies Department at Cincinnati State offers associate's degree programs in Mechanical Engineering Technology (MET), with majors in Design and Manufacturing Management. These degrees provide students with an education that leads to many career opportunities in the field of product design and manufacturing. Graduates may be involved in the creation of consumer products, toys, electronic equipment, medical equipment, machine tools, appliances, or automotive and aerospace applications. Students work with state-of-the-art technologies that are used worldwide in the design and manufacturing of products. Many MET graduates continue their education for a bachelor's degree after receiving their associate's degree from Cincinnati State.

A certificate program is offered in Manufacturing CNC (computer numerical control).

Mechanical Engineering Technology

Students in the Mechanical Engineering Technology program learn to use the latest technology to design and manufacture devices and systems for use in consumer products, machine tools, automotive, and aerospace industries. Graduates of the MET program are prepared to design mechanical systems, operate CAD systems, manage design projects, and perform product testing. Examples of program graduate job titles include product designer, CAD/CAM system specialist, product support manager, design engineering technician, or project engineering technician.

MET is a two-year Associate of Applied Science program that includes majors in MET-Design and MET-Manufacturing Management. The Mechanical Engineering Technology program prepares graduates to successfully enter and pursue baccalaureate degrees and to enter and advance professionally through technical and mid-management positions in local industry.

The 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.

Mechanical Engineering Technology—Design Major (METD)

Students in the Mechanical Engineering Technology—Design major learn to use the latest technology to design and manufacture devices and systems for consumer products, machine tools, and the automotive and aerospace industries. MET—Design is the traditional Mechanical Engineering Technology program. The curriculum prepares students to solve real-world problems from concept to completion using logical thinking as well as computer software, including computer-aided design (CAD) and computer-aided engineering (CAE). Graduates are well prepared to continue their education in an MET bachelor's degree program.

Mechanical Engineering Technology—Manufacturing Management Major (METM)

In the MET Manufacturing Management major, students learn the technologies and skills needed to manage a high-tech production facility. The curriculum includes hands-on manufacturing processes, state-of-the-art Computer-Aided Drafting / Computer-Aided Machining (CAD/CAM), Computer Numerical Control (CNC), and materials and quality control analysis using statistical process control (SPC). This associate's degree program prepares students for immediate employment in a production facility or for easy transition to bachelor's degree studies.

Mechanical Engineering Technology - Manufacturing CNC Certificate (METMC)

The Manufacturing CNC Certificate is designed for individuals currently employed in a manufacturing field who desire additional knowledge of computer numerical control (CNC) programming and computer-aided manufacturing processes. Most students can complete the certificate requirements in a year or less. All courses completed while earning this certificate may be applied to the Associate's degree in Mechanical Engineering Technology - Manufacturing Management major.

Mechanical Engineering Technology—Design Major (METD)

All degree-seeking students must complete a First Year Experience (FYE) course as part of the first 12 credit hours taken at Cincinnati State.

Semester 1		**Lec**	**Lab**	**Credits**
MET 100	Introduction to Mechanical Engineering Technology	1	2	2
MET 111	Manufacturing Processes 1	2	3	3
PSY 100	Applied Psychology: Human Relations	3	0	3
ENG 101	English Composition 1	3	0	3
MAT XXX Mathematics Elective 1				4
MET 131	MET Computer Aided Drafting 1	2	3	3

Semester 2				
MET 140	Engineering Materials	2	2	3
MET 150	Statics and Strength of Materials for MET	2	3	3
ENG 10X English Composition Elective				3
MAT XXX Mathematics Elective 2				4
MET 132	MET Computer Aided Drafting 2	2	3	3
Semester 3				
MET 291	Full-Time Cooperative Education 1: Mechanical Engineering Technology	1	40	2
Semester 4				
MET 240	Hydraulics and Pneumatics	2	3	3
MET 285	Mechanical Engineering Technology Capstone Project 1	2	3	3
EET 101	Electronic Fundamentals 1	2	3	3
PHY 151	Physics 1: Algebra and Trigonometry-Based	3	3	4
MET 250	Machine Design	3	3	4
Semester 5				
MET 260	Applied Thermodynamics	2	2	3
MET 270	Kinematics	2	2	3
MET 290	Mechanical Engineering Technology Capstone Project 2	2	3	3
COMM 110	Public Speaking	3	0	3
XXX XXX Humanities Elective				3
Semester 6				
MET 292	Full-Time Cooperative Education 2: Mechanical Engineering Technology	1	40	2
Total Credits:		40	118	70

Electives

Mathematics Electives		
Take one of the following series:		
MAT 125 & MAT 126	Algebra and Trigonometry and Functions and Calculus	
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
ENG 105	English Composition 2: Business Communication	3
Humanities Elective		
CULT 105	Issues in Human Diversity	3
CULT 110	Social Issues in Technology	3
PHI 110	Ethics	3

Mechanical Engineering Technology— Manufacturing Management Major (METM)

All degree-seeking students must complete a First Year Experience (FYE) course as part of the first 12 credit hours taken at Cincinnati State.

Semester 1		**Lec**	**Lab**	**Credits**
MET 100	Introduction to Mechanical Engineering Technology	1	2	2
MET 111	Manufacturing Processes 1	2	3	3
PSY 100	Applied Psychology: Human Relations	3	0	3
ENG 101	English Composition 1	3	0	3
MAT XXX Mathematics Elective 1				4
MET 131	MET Computer Aided Drafting 1	2	3	3
Semester 2				
MET 132	MET Computer Aided Drafting 2	2	3	3
MET 140	Engineering Materials	2	2	3
MET 150	Statics and Strength of Materials for MET	2	3	3
MAT XXX Mathematics Elective 2				4
MET 112	Manufacturing Processes 2	3	2	4
Semester 3				
MET 291	Full-Time Cooperative Education 1: Mechanical Engineering Technology	1	40	2
Semester 4				
MET 113	Manufacturing Processes 3	3	2	4
MET 285	Mechanical Engineering Technology Capstone Project 1	2	3	3
EET 101	Electronic Fundamentals 1	2	3	3
ENG 10X English Composition Elective				3
MET 240	Hydraulics and Pneumatics	2	3	3
Semester 5				
MET 230	Quality Control and Six Sigma	3	2	4
MET 290	Mechanical Engineering Technology Capstone Project 2	2	3	3
PHY 151	Physics 1: Algebra and Trigonometry-Based	3	3	4
COMM 110	Public Speaking	3	0	3
XXX XXX Humanities Elective				3
Semester 6				
MET 292	Full-Time Cooperative Education 2: Mechanical Engineering Technology	1	40	2
Total Credits:		42	117	72

Electives

Mathematics Electives

Take one of the following series:		
MAT 125 & MAT 126	Algebra and Trigonometry and Functions and Calculus	
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
ENG 105	English Composition 2: Business Communication	3
Humanities Elective		
CULT 105	Issues in Human Diversity	3
CULT 110	Social Issues in Technology	3
PHI 110	Ethics	3

Mechanical Engineering Technology - Manufacturing CNC Certificate (METMC)

First Year

Semester 1		**Lec**	**Lab**	**Credits**
MAT 121	Technical Algebra and Geometry with Statistics	2	2	3
MET 111	Manufacturing Processes 1	2	3	3
MET 131	MET Computer Aided Drafting 1	2	3	3
Semester 2				
MET 112	Manufacturing Processes 2	3	2	4
MET 113	Manufacturing Processes 3	3	2	4
MET 132	MET Computer Aided Drafting 2	2	3	3
Total Credits:		14	15	20

Courses

MET 100 Introduction to Mechanical Engineering Technology
2 Credits. 1 Lecture Hour. 2 Lab Hours.
An orientation to the Mechanical Engineering Technology program and the profession. Topics include: computers and software used in the profession, career opportunities, professional skills, and preparation for cooperative education.
Prerequisites: AFL 085 and MAT 120, or appropriate placement test scores

MET 111 Manufacturing Processes 1
3 Credits. 2 Lecture Hours. 3 Lab Hours.
An introduction to machining and fabrication. Topics include: measuring techniques, manual and computer numerical controlled metal removal processes, machine operations, and materials considerations.
Prerequisites: AFL 085 and MAT 120, or appropriate placement test scores

MET 112 Manufacturing Processes 2
4 Credits. 3 Lecture Hours. 2 Lab Hours.
A continuation of MET 111. Topics include: CNC programming of complex parts on two-axis mills and lathes, and CNC control.
Prerequisites: MET 111 and MAT 121 or MAT 125

MET 113 Manufacturing Processes 3
4 Credits. 3 Lecture Hours. 2 Lab Hours.
A continuation of MET 112. Topics include: CAM simulation, machining processes, prototyping techniques, and using CAD/CAM software to create programs for producing components on CNC machines.
Prerequisites: MET 112

MET 131 MET Computer Aided Drafting 1
3 Credits. 2 Lecture Hours. 3 Lab Hours.
An introduction to mechanical drafting and computer aided drafting. Topics include: geometric construction, orthographic projection, dimensioning, section views, and auxiliary views.
Prerequisites: AFL 085 and MAT 120, or appropriate placement test scores

MET 132 MET Computer Aided Drafting 2
3 Credits. 2 Lecture Hours. 3 Lab Hours.
A continuation of MET 131. Topics include: 3D modeling, geometric dimensioning and tolerancing, and creating assembly models.
Prerequisites: MET 131

MET 140 Engineering Materials
3 Credits. 2 Lecture Hours. 2 Lab Hours.
A course on the materials used in designing and manufacturing machinery and products. Topics include: steel and non-ferrous metals, polymers, ceramics, and composites. Students use the materials testing laboratory to study physical and mechanical properties of materials.
Prerequisites: MET 111 and MAT 121 or MAT 125

MET 150 Statics and Strength of Materials for MET
3 Credits. 2 Lecture Hours. 3 Lab Hours.
A course on analyzing forces that occur within machine and structural elements subjected to various types of loads. Topics include: vector panalysis, free body diagrams, individual stresses, and combined stresses.
Prerequisites: MAT 121 or MAT 125

MET 191 Part-Time Cooperative Education 1: 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: MET 100

MET 192 Part-Time Cooperative Education 2: 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: MET 191

MET 193 Part-Time Cooperative Education 3: 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: MET 192

MET 194 Part-Time Cooperative Education 4: 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: MET 193

MET 195 Part-Time Cooperative Education 5: 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: MET 194

MET 196 Part-Time Cooperative Education 6: 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: MET 195

MET 198 First Year Special Topics in Mechanical Engineering Technology
1-9 Credits. 0 Lecture Hour. 0 Lab Hour.
A course on selected topics related to 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

MET 199 First Year Independent Project in Mechanical Engineering Technology
1-9 Credits. 0 Lecture Hour. 0 Lab Hour.
A project related to Mechanical Engineering Technology that is completed by one or more students to meet specific educational goals. Projects must have prior approval and supervision by Mechanical Engineering Technology faculty. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: Instructor Approval

MET 230 Quality Control and Six Sigma
4 Credits. 3 Lecture Hours. 2 Lab Hours.
A course on modern quality methods used in manufacturing. Topics include: data collection, statistical process control, continuous improvement, and the reduction of product defects through the six-sigma process.
Prerequisites: MET 150

MET 240 Hydraulics and Pneumatics
3 Credits. 2 Lecture Hours. 3 Lab Hours.
A course on applied fluid power systems. Topics include: fluid transport, power systems components and circuits, relay logic, and ladder diagrams. Students design, build, and operate hydraulic and pneumatic circuits in the laboratory.
Prerequisites: MET 150

MET 250 Machine Design
4 Credits. 3 Lecture Hours. 3 Lab Hours.
A course on applying the principles of engineering mechanics and strength of materials to the analysis and selection of mechanical components. Topics include: combined stresses, failure theories, shaft components, shaft design, and fasteners.
Prerequisites: MET 150

MET 260 Applied Thermodynamics
3 Credits. 2 Lecture Hours. 2 Lab Hours.
A course in the engineering study of energy. Topics include: first and second laws of thermodynamics, general energy equation, Mollier diagrams, ideal cycles, steam generation and turbines, and refrigeration.
Prerequisites: MET 150, and (MAT 121 or MAT 125)

MET 270 Kinematics
3 Credits. 2 Lecture Hours. 2 Lab Hours.
A course on analyzing mechanisms. Topics include: linear and angular displacement, velocity, acceleration, mass moment of inertia, and dynamic balance. Students use computer simulation software to analyze machine motions and forces.
Prerequisites: MET 150 and PHY 151

MET 285 Mechanical Engineering Technology Capstone Project 1
3 Credits. 2 Lecture Hours. 3 Lab Hours.
Students participate in a team design project. Topics include: feasibility study, design concepts, detail and assembly drawings, bill of materials, commercial and fabricated parts, vendors, costs, and manufacturing.
Prerequisites: MET 111, MET 132, MET 140, MET 150

MET 290 Mechanical Engineering Technology Capstone Project 2
3 Credits. 2 Lecture Hours. 3 Lab Hours.
A continuation of MET 285. Students manufacture, assemble, and test the product designed in MET 285, and prepare a presentation on the complete design process.
Prerequisites: MET 285

MET 291 Full-Time Cooperative Education 1: 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: MET 100

MET 292 Full-Time Cooperative Education 2: 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: MET 291

MET 293 Full-Time Cooperative Education 3: 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: MET 292

MET 294 Internship 1: 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: MET 100

MET 295 Internship 2: 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: MET 294

MET 298 Second Year Special Topics in Mechanical Engineering Technology
1-9 Credits. 0 Lecture Hour. 0 Lab Hour.
A course on selected topics related to 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

MET 299 Second Year Independent Project in Mechanical Engineering Technology
1-9 Credits. 0 Lecture Hour. 0 Lab Hour.
A project related to Mechanical Engineering Technology that is completed by one or more students to meet specific educational goals. Projects must have prior approval and supervision by Mechanical Engineering Technology faculty. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: Instructor Approval