

Architectural Major (CETAO)

Civil Engineering Technology—Architectural Major (CETAO)

The Civil Engineering Technology - Architectural Major prepares graduates to bridge the gap between the architect and design engineer by assisting in the design of architectural, mechanical, electrical, and lighting systems for buildings.

Architectural technicians fill support positions in various architectural and engineering firms, and provide an important interface between the architect and the project engineer.

Graduates earn an Associate of Applied Science degree. To prepare students for the current needs of the profession, the curriculum provides fundamental knowledge of building information modeling and computer aided design (CAD) using Revit Architecture and Revit MEP software for design and construction of architectural, mechanical, and lighting systems.

In addition, students gain knowledge of construction methods and principles, architectural drafting and design, and the structural design involved in building construction.

The Civil Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET, 415 North Charles Street, Baltimore, MD 21201. Phone (410) 347-7700.

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

To apply for this program at Cincinnati State, visit the Admissions (<http://www.cincinnati.edu/academics/admission>) section of the College website.

Civil Engineering Technology—Architectural Major (CETAO)

Semester		Lec	Lab	Credits
Semester 1	CET 100 Introduction to Civil Engineering Technology (B)	2	2	3
	CET 105 Introduction to Surveying (B)	2	3	3
	CET 115 Architectural Drafting and Computer Aided Design (B)	2	4	4
	MAT 125 Algebra and Trigonometry (G)	3	2	4
	FYE 1XX First Year Experience Elective (B)	1	0	1
Semester 2	CET 120 Advanced Computer Aided Design: Revit Architecture (T)	3	3	4
	CET 125 Statics and Strength of Materials (CET) (T)	3	3	4
	CET 130 Building Codes and Materials (T)	2	2	3
	ENG 101 English Composition 1 (G)	3	0	3

MAT 126	Functions and Calculus	3	2	4
Semester 3				
CET 291	Full-Time Cooperative Education 1: Civil Engineering Technology	1	40	2
COMM 110	Public Speaking	3	0	3
ENG 10X	English Composition Elective (G)	3	0	3
Semester 4				
CET 205	Architectural Design and 3D Modeling: Revit Architecture (T)	3	3	4
CET 211	Advanced Revit 1 (T)	3	3	4
PHY 151	Physics 1: Algebra and Trigonometry-Based	3	3	4
ECO 110	Principles of Macroeconomics	3	0	3
Semester 5				
CET 292	Full-Time Cooperative Education 2: Civil Engineering Technology	1	40	2
Semester 6				
CET 200	Structural Design (T)	3	3	4
CET 212	Advanced Revit 2 (T)	3	3	4
CET 280	Civil Engineering Technology Architectural Capstone (T)	2	5	4
Total Credits:		52	121	70

Electives

First Year Experience Elective

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

English Composition Elective

ENG 102	English Composition 2: Contemporary Issues	3
ENG 103	English Composition 2: Writing about Literature	3
ENG 104	English Composition 2: Technical Communication	3
ENG 105	English Composition 2: Business Communication	3

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

Civil Engineering Technologies (CETAO, CETCO, CETSO)

ACCE

- Demonstrate effective communication, both orally and in writing.
- Demonstrate the ability to estimate quantities and costs for the bidding process in a construction project.

- Demonstrate the ability to schedule a basic construction project.
- Demonstrate the ability to use current technology related to the construction process.
- Interpret construction documents (contracts, specifications, and drawings) used in managing a construction project.
- Apply basic principles of construction accounting.
- Use basic surveying techniques used in building layout.
- Discuss basic principles of ethics in the construction industry.
- Identify the fundamentals of contracts, codes, and regulations that govern a construction project.
- Recognize basic construction methods, materials, and equipment
- Recognize basic safety hazards on a construction site and standard prevention measures.
- Recognize the basic principles of structural design.
- Recognize the basic principles of mechanical, electrical, and piping systems.

ABET

- Ability to apply the knowledge, techniques, skills, and modern tools of the discipline to narrowly defined engineering technology activities.
- Ability to apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require limited application of principles but extensive practical knowledge.
- Ability to conduct standard tests and measurements, and to conduct, analyze, and interpret experiments.
- Ability to function effectively as a member of a technical team.
- Ability to identify, analyze, and solve narrowly defined engineering technology problems.
- Ability to apply written, oral, and graphical communication in both technical and non-technical environments; and ability to identify and use appropriate technical literature.
- Understanding of the need for and ability to engage in self-directed continuing professional development.
- Understanding of and commitment to address professional and ethical responsibilities, including a respect for diversity.
- Commitment to quality, timeliness, and continuous improvement.

Faculty

Program Chair

Professor Carol Morman, PE, PS, MS
carol.morman@cincinnati.edu

Co-op Coordinators

Jennifer Geiger, BS
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James (Doug) Woodruff, MBA
james.woodruff@cincinnati.edu

Advisor

Professor Elias Feghali, BS
elias.feghali@cincinnati.edu

Courses

CET 100 Introduction to Civil Engineering Technology 3 Credits. 2 Lecture Hours. 2 Lab Hours.

A course on foundation concepts in civil engineering technology. Topics include: CET program and curriculum, career preparation, licensing, ethics, diversity, and OSHA. Students use Microsoft Word, Excel, and Powerpoint to complete assignments.
Prerequisites: None

CET 105 Introduction to Surveying 3 Credits. 2 Lecture Hours. 3 Lab Hours.

A course on foundation concepts of land surveying and site planning. Topics include: angle, distance, and elevation measurement; contours; and mapping and site planning fundamentals. Students complete outdoor field exercises and manual drafting lab exercises.
Prerequisites: MAT 121 or appropriate placement test score
Ohio Transfer Assurance Guide Approved

CET 107 Construction Health and Safety 4 Credits. 4 Lecture Hours. 0 Lab Hour.

An introduction to construction safety. Topics include: risk management, safety hazards, the Code of Federal Regulations, and OSHA Construction Industry Standards outlined in Federal Code 29 CFR Part 1926. Students who complete the course successfully earn the OSHA 30-hour certificate.
Prerequisites: None

CET 110 Advanced Surveying and Construction Layout 3 Credits. 2 Lecture Hours. 3 Lab Hours.

A course in land surveying and construction layout. Topics include: traverse calculations, coordinate geometry, and field construction layout with methods of providing line and grade for varied projects. Students complete outdoor field exercises and computer lab exercises.
Prerequisites: CET 105

CET 115 Architectural Drafting and Computer Aided Design 4 Credits. 2 Lecture Hours. 4 Lab Hours.

A course on applying architectural drafting techniques and computer aided design concepts. Topics include: building codes, building materials, and fundamentals of CAD software. Students prepare residential working drawings.
Prerequisites: None

CET 117 Construction Risk Management and Insurance 4 Credits. 4 Lecture Hours. 0 Lab Hour.

A course on insurance for the construction management process. Topics include: financial risk planning, risk management, insurance markets, property insurance, contractual risks and transfer, forms of liability insurance (commercial, employers, environmental, management, and professional), and workers' compensation.
Prerequisites: None

CET 120 Advanced Computer Aided Design: Revit Architecture 4 Credits. 3 Lecture Hours. 3 Lab Hours.

A course on CAD techniques that apply building information modeling using Revit Architecture. Topics include: layouts, dimensioning, blocks, and hatching.
Prerequisites: CET 115

CET 125 Statics and Strength of Materials (CET)**4 Credits. 3 Lecture Hours. 3 Lab Hours.**

A course on applying physical principles to solve problems of equilibrium and behavior in civil engineering structures. Topics include: force resultants, equilibrium, truss analysis, direct stress, bending stress, beam behavior, and combined stress.

Prerequisites: MAT 121 or appropriate placement test score

CET 127 Environmental and Legal Issues in Construction**4 Credits. 4 Lecture Hours. 0 Lab Hour.**

A course on environmental and legal issues affecting construction safety. Topics include: stormwater pollution prevention plans, asbestos abatement, disturbance and abatement of lead-containing materials, silica exposure, EPA regulations, multi-employer worksite rules, intentional torts, safety violations, and union contracts.

Prerequisites: None

CET 130 Building Codes and Materials**3 Credits. 2 Lecture Hours. 2 Lab Hours.**

A course on building code requirements and their applications to designing and constructing building projects. Topics include: Ohio building, mechanical, electrical, and plumbing codes; and building materials used in construction such as steel, wood, masonry, and concrete.

Prerequisites: CET 115

CET 133 Home Inspection - American Society of Home Inspectors**5 Credits. 2 Lecture Hours. 6 Lab Hours.**

A course that meets requirements for the American Society of Home Inspectors (ASHI) 120-hour home inspection course. Topics include: standards and reports, exterior cladding, exterior structures, roofing and foundations, interiors, electrical systems, heating, air conditioning, and plumbing. Students participate in field inspection lab activity and take a certification exam. A comprehensive final score of 70% is required to pass the course.

Prerequisites: None

CET 135 Construction Estimating**3 Credits. 2 Lecture Hours. 2 Lab Hours.**

A course on quantifying various components of a commercial project using a complete set of working drawings and specifications. Topics include: blueprint reading, specification analysis, construction methods and materials, and proper estimating communication practices.

Prerequisites: MAT 120, or appropriate placement test score

CET 137 Construction Safety Plan Management**3 Credits. 3 Lecture Hours. 0 Lab Hour.**

A course on developing construction safety plans. Topics include: essential elements of a safety program; best practices, legal, and regulatory requirements related to safety planning; substance abuse programs; accident investigations; contractor management; and crisis management and planning.

Prerequisites: None

CET 147 Safety Training Workshops**1 Credit. 1 Lecture Hour. 0 Lab Hour.**

Students participate in construction training workshops that provide fundamental instruction in safety methods and practices. Workshops must be approved by the program chair.

Prerequisites: Program Chair consent

CET 150 Building Technology Studies: Advanced Standing**1-30 Credits. 0 Lecture Hour. 0 Lab Hour.**

Students complete courses or programs that develop expertise in skills related to the building trades.

Prerequisites: Program Chair consent

Instructor Consent Required

CET 191 Part-Time Cooperative Education 1: Civil 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

CET 192 Part-Time Cooperative Education 2: Civil 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: CET 191

CET 193 Part-Time Cooperative Education 3: Civil 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: CET 192

CET 194 Part-Time Cooperative Education 4: Civil 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: CET 193

CET 195 Part-Time Cooperative Education 5: Civil 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: CET 194

CET 196 Part-Time Cooperative Education 6: Civil 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: CET 195

CET 198 First Year Special Topics in Civil Engineering Technology**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

A course on selected topics related to Civil 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

CET 199 First Year Independent Project in Civil Engineering Technology**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

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

Prerequisites: Instructor consent

CET 200 Structural Design**4 Credits. 3 Lecture Hours. 3 Lab Hours.**

A course on methods for evaluation and design of structural steel and reinforced concrete members, using AISC and ACI requirements. Topics include: design methodologies focused on bending moment behavior, tension and compression behavior, shear behavior, and connections; and common field testing techniques for concrete.

Prerequisites: CET 125

CET 205 Architectural Design and 3D Modeling: Revit Architecture**4 Credits. 3 Lecture Hours. 3 Lab Hours.**

A course on architectural details and information required in a complete set of professional working drawings for an office or commercial building. Topics include: using CAD design software and Revit Architecture.

Prerequisites: CET 120

CET 210 Lighting and Electrical Systems Design**3 Credits. 2 Lecture Hours. 3 Lab Hours.**

A course on fundamental concepts for lighting and electrical design in commercial buildings. Topics include: creating sets of drawings in AutoCAD and Revit Architecture, and using the National Electric Code.

Prerequisites: CET 120

CET 211 Advanced Revit 1**4 Credits. 3 Lecture Hours. 3 Lab Hours.**

A course on understanding concepts of mechanical systems and preparing details of mechanical systems layouts using Revit software.

Prerequisites: CET 120

Corequisites: CET 205

CET 212 Advanced Revit 2**4 Credits. 3 Lecture Hours. 3 Lab Hours.**

A continuation of CET 211. Topics include: understanding concepts of electrical, plumbing, and fire protection systems; and preparing details of electrical, lighting, plumbing, and fire protection systems layouts using Revit software.

Prerequisites: CET 211

CET 215 Mechanical and HVAC Systems Design**3 Credits. 2 Lecture Hours. 3 Lab Hours.**

A course on fundamental concepts of mechanical and HVAC design for commercial buildings. Topics include: creating sets of design drawings using AutoCAD and Revit, and Ohio mechanical and plumbing codes.

Prerequisites: CET 120

CET 220 3D Modeling: Revit MEP and Revit Structure**3 Credits. 2 Lecture Hours. 3 Lab Hours.**

A course on applying design concepts and preparing details of mechanical and electrical systems, plumbing, and structure in buildings using Revit MEP and Revit Structure software.

Prerequisites: CET 205

CET 225 Building Construction**3 Credits. 2 Lecture Hours. 2 Lab Hours.**

A course on how buildings and structures are assembled. Topics include: methods and materials for residential, commercial, industrial, and highway construction including wood frame, masonry, pre-engineered metal, tilt-up, and high-rise construction; building codes; zoning regulations; and footing design.

Prerequisites: None

Ohio Transfer Assurance Guide Approved

Ohio Career-Technical Assurance Guide Approved

CET 230 Construction Management**3 Credits. 2 Lecture Hours. 2 Lab Hours.**

A course that examines current concerns in construction management. Topics include: project delivery systems, contract types, and using Web-based software for daily project management.

Prerequisites: CET 135

CET 235 Construction Scheduling**3 Credits. 2 Lecture Hours. 3 Lab Hours.**

A course on preparing precedence diagram CPM schedules and calculating the critical path, including start-to-start and finish-to-finish relationship types with lag. Topics include: using scheduling software, fast-tracking, reverse phase scheduling, and revising and updating schedules.

Prerequisites: CET 135

CET 240 Cost Engineering**3 Credits. 2 Lecture Hours. 2 Lab Hours.**

A course on how budgets evolve as projects move from pre-design through construction. Topics include: types of estimates employed at each phase, formulating unit prices, time value of money and true profit, cash flow, cost indices, and using estimating software.

Prerequisites: CET 135

CET 245 Building Information Models for Construction**2 Credits. 1 Lecture Hour. 3 Lab Hours.**

A course on using building modeling software for construction management tasks such as estimating, trade coordination, and scheduling. Topics include: parameter creation, quantity takeoff, estimation, interference checking, and timeline visualization.

Prerequisites: CET 120

CET 250 Route Location and Design**4 Credits. 3 Lecture Hours. 2 Lab Hours.**

A course on highway design criteria and standards. Topics include: design and layout of horizontal curves, verticals, and spirals; superelevation use; typical sections; and boundary, area, and right-of-way determination. Students complete outdoor field exercises and computer lab exercises.

Prerequisites: CET 110

CET 251 Elements of Land Surveying 1**4 Credits. 3 Lecture Hours. 2 Lab Hours.**

A course on fundamental concepts and techniques of land boundary surveying. Topics include: records research, state minimum standards, monumentation of corners, and simple plats and legal descriptions. Students must complete field exercises.

Prerequisites: CET 110

CET 252 Elements of Land Surveying 2**4 Credits. 3 Lecture Hours. 3 Lab Hours.**

A continuation of CET 251. Topics include: sequential and simultaneous boundaries, riparian and littoral boundaries, public land surveys, easements, and legal principles of property relating to surveyors.

Prerequisites: CET 251

CET 255 Land Information Modeling**3 Credits. 2 Lecture Hours. 3 Lab Hours.**

A course on concepts and techniques of land modeling. Topics include: mapping, using geographic information system software, advanced digital terrain modeling, 3D laser scanning, LIDAR, high-definition surveying, and 3D site modeling for visualization and machine-control projects.

Prerequisites: CET 110

CET 260 Control Surveying**4 Credits. 3 Lecture Hours. 3 Lab Hours.**

A course in concepts and techniques of control surveying. Topics include: basic geodesy, state plane coordinate concepts and calculations, establishing horizontal and vertical control, GPS positioning, and network adjustment. Students complete outdoor field exercises and computer lab exercises.

Prerequisites: CET 110

CET 265 Subdivision Design and Drainage Control**4 Credits. 3 Lecture Hours. 3 Lab Hours.**

A course on applying land surveying and civil engineering design principles to land development projects. Topics include: subdivision regulations, zoning regulations, lot layout, street layout, utility design, drainage, and site grading. Students create a set of subdivision drawings to meet local standards.

Prerequisites: CET 255

CET 266 Surveying History in Ohio, Kentucky, and Indiana**4 Credits. 4 Lecture Hours. 0 Lab Hour.**

A course on the history of surveying in Ohio, Indiana, and Kentucky, including the original surveys in these states.

Prerequisites: Admitted to the Advanced Surveying Certificate (ASC) or Land Surveying Certificate (LSC), or Program Chair approval

CET 267 Surveying Laws and Ethics**4 Credits. 4 Lecture Hours. 0 Lab Hour.**

A course on surveying law and professional ethics in Ohio, Indiana, and Kentucky, including legislation and regulations affecting land surveyors in these states.

Prerequisites: Admitted to the Advanced Surveying Certificate (ASC) or Land Surveying Certificate (LSC), or Program Chair approval

CET 270 OSHA 30 for Construction**2 Credits. 2 Lecture Hours. 0 Lab Hour.**

A course for workers and employers on the recognition, avoidance, abatement, and prevention of safety and health hazards in workplaces in the construction industry. Topics include: workers' rights, employer responsibilities, how to file a complaint, and other information required to receive OSHA 30 certification by the U.S. Department of Labor's Occupational Safety and Health Administration.

Prerequisites: None

CET 277 Survey Calculations and Statistics**4 Credits. 4 Lecture Hours. 0 Lab Hour.**

A course on survey calculations employing statistical concepts. Topics include: descriptive and inferential statistics, advanced coordinate geometry methods, least squares adjustment, and error theory.

Prerequisites: Admitted to the Advanced Surveying Certificate (ASC) or Land Surveying Certificate (LSC), or Program Chair approval

CET 280 Civil Engineering Technology Architectural Capstone**4 Credits. 2 Lecture Hours. 6 Lab Hours.**

Students design a one-story commercial building with complete, integrated building systems for architectural, mechanical, and electrical systems; apply multiple appropriate codes; and create sets of drawings using AutoCAD and Revit software as appropriate.

Prerequisites: CET 205 and CET 210 and CET 215

CET 285 Civil Engineering Technology Construction Management Capstone**3 Credits. 2 Lecture Hours. 3 Lab Hours.**

Students respond to a request for construction management services and complete a project that demonstrates integrated competencies in estimating, scheduling, communicating, and teamwork.

Prerequisites: CET 230 and CET 235

CET 287 Geospatial Surveying**4 Credits. 4 Lecture Hours. 0 Lab Hour.**

A course on surveying using geospatial methods. Topics include: satellite positioning, geographic information systems, remote sensing, and laser scanning.

Prerequisites: Admitted to the Advanced Surveying Certificate (ASC) or Land Surveying Certificate (LSC), or Program Chair approval

CET 290 Civil Engineering Technology Surveying Capstone**3 Credits. 1 Lecture Hour. 6 Lab Hours.**

Students complete a project that demonstrates integrated competencies in surveying and mapping, including data collection, field work, computer laboratory work, and use of conventional and GPS equipment.

Prerequisites: CET 251

CET 291 Full-Time Cooperative Education 1: Civil 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

CET 292 Full-Time Cooperative Education 2: Civil 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: CET 291

CET 293 Full-Time Cooperative Education 3: Civil 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: CET 292

CET 294 Internship 1: Civil 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: CET 100

CET 295 Internship 2: Civil 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: CET 294

CET 298 Second Year Special Topics in Civil Engineering Technology

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

A course on selected topics related to Civil 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

CET 299 Second Year Independent Project in Civil Engineering Technology

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

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

Prerequisites: Instructor Approval