

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 filling support positions in architectural and engineering firms and assisting in the design of architectural, mechanical, electrical, and lighting systems for buildings.

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.

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 (<http://www.cincinnati.state.edu/academics/admission/>) section of the College website.

Civil Engineering Technology— Architectural Major (CETAO)

| Semester 1 | | Lec | Lab | Credits |
|------------|---------------------------------------------------------------------------|-----|-----|---------|
| CIT 190 | Career Preparation: Engineering and Information Technologies (B) | 1 | 0 | 1 |
| CET 115 | Architectural Drafting and Computer Aided Design (B) | 2 | 4 | 4 |
| MAT 124 | Applied Algebra and Geometry (G) | 3 | 2 | 4 |
| CET 108 | Basic Construction Safety for Employees: OSHA 10 (B) | 1 | 0 | 1 |
| CET 106 | Plan Reading for Construction Management (B) | 3 | 0 | 3 |
| FYE XXX | First Year Experience Elective (B) | 1 | 0 | 1 |
| Semester 2 | | | | |
| CET 120 | Advanced Computer Aided Design: Revit Architecture (T) | 3 | 3 | 4 |
| MAT 125 | Algebra and Trigonometry (G) | 3 | 2 | 4 |
| CET 141 | Building Construction Methods 1: Materials and Codes (B) | 3 | 0 | 3 |
| ENG 101 | English Composition 1 (G) | 3 | 0 | 3 |
| Semester 3 | | | | |

| CET 291 | Full-Time Cooperative Education 1: Civil Engineering Technology (T) | 1 | 40 | 2 |
|-----------------------|------------------------------------------------------------------------------|-----------|------------|-----------|
| PHY 151 | Physics 1: Algebra and Trigonometry-Based (G) | 3 | 3 | 4 |
| Semester 4 | | | | |
| CET 205 | Architectural Design and 3D Modeling: Revit Architecture (T) | 3 | 3 | 4 |
| CET 211 | Advanced Revit: Mechanical (T) | 2 | 3 | 3 |
| CET 212 | Advanced Revit: Electrical (T) | 2 | 3 | 3 |
| SUR 105 | Surveying Fundamentals (T) | 2 | 3 | 3 |
| Semester 5 | | | | |
| COMM 110 | Public Speaking (B) | 3 | 0 | 3 |
| CET 280 | Civil Engineering Technology Architectural Capstone (T) | 2 | 6 | 4 |
| ECO 105 | Principles of Microeconomics (G) | 3 | 0 | 3 |
| CET 246 | Structural Systems of Building Construction (T) | 2 | 2 | 3 |
| Semester 6 | | | | |
| CET 292 | Full-Time Cooperative Education 2: Civil Engineering Technology (T) | 1 | 40 | 2 |
| ENG 10X | English Composition Elective (G) | 3 | 0 | 3 |
| Total Credits: | | 50 | 114 | 65 |

Electives

First Year Experience Elective

Any course from FYE or HNR 100

English Composition Elective (2nd English course)

| | | |
|---------|-------------------------------------------------|---|
| 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 |

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

Civil Engineering Technologies (CETAO)

- Apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve well-defined engineering technology level problems appropriate to the discipline.
- Design solutions for well-defined technical problems and assist with the engineering design of systems, components, or processes appropriate to the discipline.
- Apply written, oral, and graphical communication in well-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature.
- Conduct standard tests and measurements, and to analyze, interpret and report the results.
- Function effectively as a member of a technical team.
- For the Architectural (Technology) Major: Demonstrate proficiency in AutoCad and REVIT for buildings including MEP systems.

Faculty

Program Chair

George Armstrong, PE, PS, BS
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Co-op Coordinator

James (Doug) Woodruff, MBA
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Engineering and Information Technologies Division Advising

(513) 569-1743

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, and diversity. Students also complete OSHA Construction Outreach Training, a 10-hour orientation and safety program. Students use Microsoft Word, Excel, and PowerPoint to complete assignments.
Prerequisites: None

CET 106 Plan Reading for Construction Management **3 Credits. 2 Lecture Hours. 2 Lab Hours.**

A course on fundamentals of interpreting working construction drawings for residential and commercial buildings including scales, dimensions, notes, symbols, sections, schedules, and how various drawing views relate to each other.
Prerequisites: None

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 108 Basic Construction Safety for Employees **1 Credit. 1 Lecture Hour. 0 Lab Hour.**

A course for entry-level construction workers on employee rights and employer responsibilities, and how to identify, avoid, and prevent job-related health and safety hazards on a construction site. This course satisfies U.S. Department of Labor OSHA 10 requirements.
Prerequisites: None

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 124 or appropriate placement

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 124 or appropriate placement

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 141 Building Construction Methods 1**3 Credits. 2 Lecture Hours. 3 Lab Hours.**

A course on fundamental methods, materials, and basic building codes used in modern residential and commercial construction.

Prerequisites: None

CET 142 Building Construction Methods 2**3 Credits. 3 Lecture Hours. 0 Lab Hour.**

A continuation of CET 141, with emphasis on mechanical, electrical, and plumbing systems and equipment used in modern building construction. Students participate in construction site visits.

Prerequisites: CET 141

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 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

Corequisites: CET 211, CET 212

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: Mechanical**3 Credits. 2 Lecture Hours. 3 Lab Hours.**

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

Prerequisites: CET 120

Corequisites: CET 205, CET 212

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

A course on understanding concepts of electrical power and lighting systems and preparing details of electrical power and lighting systems layouts using Revit software.

Prerequisites: CET 120

Corequisites: CET 205, 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 242 Building Construction Methods 2: Mechanical**3 Credits. 3 Lecture Hours. 0 Lab Hour.**

A continuation of CET 141, with emphasis on mechanical, electrical, and plumbing systems and equipment used in modern building construction. Students participate in construction site visits.

Prerequisites: CET 141

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 246 Structural Systems of Building Construction**3 Credits. 2 Lecture Hours. 2 Lab Hours.**

A course on fundamental structural elements of a building, including components made of steel, wood, and concrete and the soil bearing of foundations. Topics include: loads and load paths, tributary areas, reactions of beams, shear and bending stresses of simple beams and columns, bolted and welded connections, and wood fasteners.

Prerequisites: CET 141 and MAT 125

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 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 211 and CET 212

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 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