Civil Engineering Technologies

Civil engineering deals with the planning, design, construction, and maintenance of buildings, houses, roads, bridges, and public utilities. Every construction project involves civil engineers and support technicians engaged in many different capacities, including design, supervision, and inspection. Civil engineering technology harnesses the power of advanced computer technologies in the fields of visualization, measurement, and planning to deliver high quality projects. The civil engineering technician is constantly adapting the latest technological tools to solve problems that serve clients and the public at large.

The Civil Engineering Technologies Department at Cincinnati State offers three programs leading to an associate's degree:

- **The Architectural option (CETA)** focuses on the design of building systems, including lighting, HVAC, mechanical, and electrical systems. Graduates use their expertise in computer-aided drafting (CAD) to modify and finalize an architect's or engineer's detailed design plan.
- **The Construction Management option (CETC)** concentrates on understanding project documentation, building methods and materials, estimating, scheduling, and team dynamics. Graduates have the skills necessary to successfully deliver a construction project.
- **The Surveying option (CETS)** emphasizes operation of state-of-the-art surveying equipment and computer software to collect data and propose solutions in boundary resolution, subdivision design, construction layout, and control networks.

All of these programs prepare graduates to successfully pursue a bachelor's degree in a related academic area, and to enter the workforce and advance professionally through technical and management positions in industry.

Courses are scheduled to meet the needs of traditional full-time students as well as part-time students, who can earn an associate's degree while attending classes two nights per week.

The department also offers certificates for educational and professional advancement in surveying.

- **The Advanced Land Surveying Certificate (ASC)** serves as a conduit for graduates of an accredited associate's degree surveying program to earn a surveying-focused bachelor's degree at Northern Kentucky University.
- **The Land Surveying certificate (LSC)** is designed for graduates and students in bachelor's degree civil engineering programs who wish to be eligible for the professional surveyor examinations in the State of Ohio.

The Civil Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET, 415 N. Charles St., Baltimore, MD 21202-4012, phone (410) 347-7700 and has received an Ohio Board of Regents Program Excellence Award. Additionally, the Construction Management major has earned accreditation from the American Council for Construction Education (ACCE), making it the only program in the United States to hold both accreditations.

Civil Engineering Technology—Architectural Option (CETA)

The Civil Engineering Technology - Architectural Option 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.

Civil Engineering Technology—Construction Management Option (CETC)

The Civil Engineering Technology - Construction Management Option prepares graduates to coordinate and supervise the construction process from design through construction while meeting schedule, cost, and quality goals. Graduates earn an Associate of Applied Science degree, and gain thorough understanding of project documentation, building methods and materials, estimating, scheduling, and team dynamics. Graduates also are well-versed in computer-integrated construction, and the practices and methods used throughout residential, commercial, and industrial construction.

Civil Engineering Technology—Surveying Option (CETS)

A surveyor enjoys diverse responsibilities as part of his or her everyday routine. Many surveying technicians work outside collecting data, establishing control points, and determining boundary locations. Others work inside an engineering office helping with site design activities and developing plans while using the field-collected data. Graduates of the Civil Engineering Technology - Surveying Option earn an Associate of Applied Science degree. Coursework includes operating state-of-the-art surveying equipment and computer software, in conjunction with fundamentals of civil engineering and site design. Students also gain specialized knowledge of boundary resolution, subdivision design, geographic information systems (GIS), and global positioning systems (GPS).

Advanced Surveying Certificate (ASC)

The Advanced Surveying certificate at Cincinnati State, offered in cooperation with Northern Kentucky University, is for graduates of the Civil Engineering Technology—Surveying Option (CETS) or other related associate's degree programs, and serves as the third year of a bachelor's degree program at Northern Kentucky University or the University of Cincinnati. The certificate program has been approved by the State Boards of Registration in Ohio, Indiana, and Kentucky. Most courses in the certificate are offered through online education, including classes in geographic information systems (GIS), global positioning systems (GPS), and legal topics.

Students should check with their state licensing board for possible changes to specific requirements before taking any coursework. Graduates of other associate's degree programs must complete all prerequisite material in the Cincinnati State CETS program prior to acceptance into the certificate program. Prospective students must meet with the certificate advisor prior to admission to the program.

Land Surveying Certificate (LSC)

The Land Surveying Certificate is for students enrolled in or who have graduated from a bachelor's degree civil engineering program who wish to pursue Professional Surveying registration in Ohio, Kentucky, or Indiana. The certificate program offers designated courses required by the Board of Registration for Professional Engineers and Surveyors in these states to qualify for the surveying fundamentals examination. The certificate program courses are offered in the evening and may be completed in consecutive semesters.

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

Civil Engineering Technology—Architectural Option (CETA)

Semester 1		**Lec**	**Lab**	**Credits**
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 210	Lighting and Electrical Systems Design (**T**)	2	3	3
CET 215	Mechanical and HVAC Systems Design (**T**)	2	3	3

PHY 151	Physics 1: Algebra and Trigonometry-Based	3	3	4
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 220	3D Modeling: Revit MEP and Revit Structure (**T**)	2	3	3
CET 280	Civil Engineering Technology Architectural Capstone (**T**)	2	5	4
ECO 110	Principles of Macroeconomics (**G**)	3	0	3
Total Credits:		52	124	71

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

Civil Engineering Technology—Construction Management Option (CETC)

Semester 1		**Lec**	**Lab**	**Credits**
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 110	Advanced Surveying and Construction Layout (**T**)	2	3	3
CET 120	Advanced Computer Aided Design: Revit Architecture (**T**)	3	3	4
CET 135	Construction Estimating (**T**)	2	2	3
CET 225	Building Construction (**T**)	2	2	3
ENG 101	English Composition 1 (**G**)	3	0	3
Semester 3				
COMM 110	Public Speaking (**B**)	3	0	3
MAT 126	Functions and Calculus (**B**)	3	2	4
CET 291	Full-Time Cooperative Education 1: Civil Engineering Technology (**T**)	1	40	2
Semester 4				

CET 125	Statics and Strength of Materials (CET) (**T**)	3	3	4
CET 230	Construction Management (**T**)	2	2	3
CET 235	Construction Scheduling (**T**)	2	3	3
CET 240	Cost Engineering (**T**)	2	2	3
ENG 10X English Composition Elective (**G**)		3	0	3
Semester 5				
PHY 151	Physics 1: Algebra and Trigonometry-Based (**G**)	3	3	4
CET 292	Full-Time Cooperative Education 2: Civil Engineering Technology (**T**)	1	40	2
Semester 6				
CET 200	Structural Design (**T**)	3	3	4
CET 245	Building Information Models for Construction (**T**)	1	3	2
CET 285	Civil Engineering Technology Construction Management Capstone (**T**)	2	3	3
ECO 110	Principles of Macroeconomics (**G**)	3	0	3
XXX XXX Business Elective (**B**)		3	0	3
Total Credits:		57	125	77

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
Business Elective		
Any ACC, FIN, MGT, MKT		3

Civil Engineering Technology—Surveying Option (CETS)

Semester 1		**Lec**	**Lab**	**Credits**
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 110	Advanced Surveying and Construction Layout (**T**)	2	3	3

CET 120	Advanced Computer Aided Design: Revit Architecture (**T**)	3	3	4
CET 125	Statics and Strength of Materials (CET) (**T**)	3	3	4
ENG 101	English Composition 1 (**G**)	3	0	3
MAT 126	Functions and Calculus (**B**)	3	2	4
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 251	Elements of Land Surveying 1 (**T**)	3	2	4
CET 250	Route Location and Design (**T**)	3	2	4
CET 255	Land Information Modeling (**T**)	2	3	3
ECO 110	Principles of Macroeconomics (**G**)	3	0	3
ENG 10X English Composition Elective (**G**)		3	0	3
Semester 5				
CET 252	Elements of Land Surveying 2 (**T**)	3	3	4
CET 260	Control Surveying (**T**)	3	3	4
CET 292	Full-Time Cooperative Education 2: Civil Engineering Technology (**T**)	1	40	2
Semester 6				
CET 265	Subdivision Design and Drainage Control (**T**)	3	3	4
CET 290	Civil Engineering Technology Surveying Capstone (**T**)	1	6	3
COMM 110	Public Speaking (**B**)	3	0	3
Total Credits:		56	127	76

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

Advanced Surveying Certificate (ASC)

Program Prerequisites: Graduate from the Cincinnati State Civil Engineering Technologies Surveying Option, or complete comparable coursework. Meet with the certificate advisor prior to admission to the program.

Most required courses are offered via online education.

Semester 1		Lec	Lab	Credits
CET 267	Surveying Laws, Ethics, and History	4	0	4
CET 277	Survey Calculations and Statistics	4	0	4
Semester 2				
XXX XXX Science Elective		3	2	4
Semester 3				
CET 287	Geospatial Surveying	4	0	4
Total Credits:		15	2	16

Science Elective		
BIO 131	Biology 1	5
CHE 110	Fundamentals of Chemistry	4
CHE 121 & CHE 131	General Chemistry 1 and General Chemistry 1 Lab	5
EVS 120	Environmental Geology	4
LH 130	Woody Plant Materials	3
PHY 152	Physics 2: Algebra and Trigonometry-Based	4
PSC 105	Astronomy	4
PSC 110	Earth Science	4

Note: Students seeking Surveyor Registration in Indiana must complete (or have previously completed) these courses: MAT 251 (Calculus 1), and six semester hours from the following areas: Freshman Chemistry, Astronomy, Geology, or Dendrology (Woody Plants).

Land Surveying Certificate (LSC)

Program Prerequisite: Enrolled in or a graduate of a four-year Civil Engineering degree program.

This program meets the Ohio State Board of Registration for Professional Engineering and Surveyors requirements for education needed to become eligible for the registration exam for professional surveyors.

Semester 1		Lec	Lab	Credits
CET 251	Elements of Land Surveying 1	3	2	4
CET 267	Surveying Laws, Ethics, and History	4	0	4
Semester 2				
CET 252	Elements of Land Surveying 2	3	3	4
CET 260	Control Surveying	3	3	4
Semester 3				
XXX XXX Technical Elective 1		3	0	3
XXX XXX Technical Elective 2		3	0	3
Semester 4				
CET 250	Route Location and Design	3	2	4
CET 2XX Surveying Elective		4	0	4
Total Credits:		26	10	30

Electives

Technical Electives	
Students seeking registration in Indiana are required to take:	
MAT 251 & PHY 152	Calculus 1 and Physics 2: Algebra and Trigonometry-Based

Students seeking registration in Ohio or Kentucky choose technical electives based the following criteria:		
Select Civil Engineering Technology (CET) courses or other courses approved by Program Chair		
Surveying Elective		
CET 277	Survey Calculations and Statistics	4
CET 287	Geospatial Surveying	4

Faculty

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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 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 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: CET 135
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 267 Surveying Laws, Ethics, and History
4 Credits. 4 Lecture Hours. 0 Lab Hour.
A course on standards affecting surveyors in Ohio, Indiana, and Kentucky. Topics include: legislation affecting land surveyors, registration and ethical standards and legal regulations governing land surveyors, and history of the original surveys in Ohio, Indiana, and Kentucky.
Prerequisites: Admitted to Advanced Surveying Certificate program or Program Chair approval

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 Advanced Surveying Certificate program 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 Advanced Surveying Certificate program

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