Construction Technology

Professor Anthony Cioffi, P.E., Chair
Voorhees 434
718.260.5575
email: tcioffi@citytech.cuny.edu

PROGRAMS:

Civil Engineering Technology/AAS
Construction Management Technology/AAS
Construction Management/Cert

FACULTY:

Professor: Cioffi
Assoc Profs: Meyer, Stegmaier
Sr CLT: Santiago

Associate in Applied Science in CIVIL ENGINEERING TECHNOLOGY

The curriculum in civil engineering technology is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC/ABET 111 Market Place, Suite 1050, Baltimore, MD 21202-4012) as an engineering technology program. The program prepares students for positions as engineering technicians in a broad range of public works projects, including structures, transportation facilities, water supply, waste water treatment, geotechnical, as well as construction inspection, material testing and surveying. Included in the curriculum are courses in the theory of structures, hydraulics, surveying, soils, materials testing and training for American Concrete Institute certification as Field Inspector (Level 1) of Fresh Concrete. Computer applications are incorporated into all technical courses. Graduates of this program find immediate employment with consulting engineering firms, testing laboratories, industrial organizations, governmental agencies involved with providing public works services and safeguarding our environment. Occupational titles include junior engineer, engineering technician, surveyor, construction inspector and CADD operator.

Recent graduates of this program have been employed in entry-level construction management positions as well.

Government-related agencies and organizations which regularly employ these graduates include: The Dormitory Authority of the State of New York, The Port Authority of New York and New Jersey and The New York City Department of Transportation. Recent employers of the graduates of this program include numerous general contractors, engineering consulting firms and construction management firms such as Arnell Construction Co, Slattery Construction Co, Chas. Sells, Consulting Engineers, Delta Contracting, BMI Construction, Slattery Construction Co, Future Tech Consultants and Forest City Ratner Corp, DMJM+Harris and STV Inc.

Applicants are urged to complete at least two years of academic mathematics in high school to avoid delaying their progress in this curriculum.

Bachelor of Technology in Facilities Management

Students who have successfully completed the requirements for this degree are eligible for transfer into the Bachelor of Technology in Facilities Management program. See pages 9, 32 for a complete description.

REQUIRED COURSES IN THE MAJOR		Credits
CMCE 1152/CV 152	Surveying	3
CMCE 1252/CV 252	Route Surveying	3
CMCE 1255/CV 255	Computer Applications in Civil Engineering Technology	3
CMCE 2351/CV 351	Hydraulics	3
CMCE 2352/CV 352	Soil Mechanics (Laboratory)	3
CMCE2452/CV 452	Civil Engineering Drawing (CAD)	2
CMCE 2454/CV 454	Applied Hydraulics: Water Supply and Sewerage Treatment	2
CMCE 2455/CV 455	Materials and Methods of Construction	2
CMCE 1104/CT 104	Statics and Strength of Materials I	2
CMCE 1110/CT 110	Construction Drawings	2
CMCE 1204/CT 204	Statics and Strength of Materials II	3
CMCE 2315/CT 315*	Elements of Structural Design-Steel	3
CMCE 2306/CT 306	Materials Testing Laboratory	2
CMCE 2415/CT 415*	Elements of Structural Design-Concrete	3
	Subtotal	**36**
OTHER REQUIRED COURSES		
MAT 1375/MA 375[1]	Mathematical Analysis	4
MAT 1475/MA 475	Calculus I	4
PHYS 1433/SC 433	Physics 1.2	4
PHYS 1434/SC 434	Physics 2.2	4
ENG 1101/EG 101	English Composition I	3
BS/SS[2]	Behavioral Science/Social Science	3
LAP[2]	Literature/Aesthetics/Philosophy	3
COMM[2]	ENG 1121/EG 121 or ENG 1133/EG 133	3
	Subtotal	**28**
TOTAL CREDITS REQUIRED FOR THE DEGREE		**64**

[1] Students without the requisite math background to enter MAT 1375/MA 375 will be required to take MAT 1175/MA 175 and/or MAT 1275/MA 275 in preparation. This will increase the number of required credits for the degree by up to eight (8).

[2] See page 34 for detailed explanation of core required courses and categories.

** See the course descriptions for an important message regarding these courses.*

Associate in Applied Science in CIVIL ENGINEERING TECHNOLOGY

Curriculum by Semester

The College will grant an associate in applied science degree (AAS) with a major in civil engineering technology upon satisfactory completion of the required 64 credits listed.

FIRST SEMESTER		**Credits**
CMCE 1152/CV 152	Surveying	3
CMCE 1104/CT 104	Statics and Strength of Materials I	2
CMCE 1110/CT 110	Construction Drawings	2
MAT 1375/MA 375[2]	Mathematical Analysis	4
PHYS 1433/SC 433	Physics 1.2	4
ENG 1101/EG 101	English Composition I	3
	Subtotal	**18**
SECOND SEMESTER		
CMCE 1252/CV 252	Route Surveying	3
CMCE 1255/CV 255	Computer Applications in Civil Engineering Technology	3
CMCE 1204/CT 204	Statics and Strength of Materials II	3
MAT 1475/MA 475	Calculus I	4
PHYS 1434/SC 434	Physics 2.2	4
	Subtotal	**17**
THIRD SEMESTER		
CMCE 2351/CV 351	Hydraulics	3
CMCE 2352/CV 352	Soil Mechanics (Laboratory)	3
CMCE 2315/CT 315*	Elements of Structural Design-Steel	3
LAP[1]	Literature/Aesthetics/Philosophy	3
COMM[1]	ENG 1121/EG 121 or ENG 1133/EG 133	3
	Subtotal	**15**
FOURTH SEMESTER		
CMCE 2452/CV 452	Civil Engineering Drawing (CAD)	2
CMCE 2454/CV 454	Applied Hydraulics/Water Supply and Sewerage Treatment	2
CMCE 2455/CV 455	Materials and Methods of Construction	2
CMCE 2415/CT 415*	Elements of Structural Design-Concrete	3
CMCE 2306/CT 306	Materials Testing Laboratory	2
BS/SS[1]	Behavioral Science/Social Science	3
	Subtotal	**14**
TOTAL CREDITS REQUIRED FOR THE DEGREE		**64**

[1] See page 34 for detailed explanation of core required courses and categories.

[2] Or higher-level mathematics course. Students without the requisite background for MAT 1375/MA 375 will be required to take MAT 1275/MA 275 in preparation. This will increase the number of credits required for the degree by four (4).

** See the course descriptions for an important message regarding these courses.*

Associate in Applied Science in CONSTRUCTION MANAGEMENT TECHNOLOGY

The Construction Management Technology program is the only one of its kind in the CUNY system. It prepares students for careers as managers and technicians in the field of construction. All facets of the construction process are studied, including construction materials, methods, management and mechanical systems as well as all elements of design. Both the public and private sectors are studied from the time the project is conceptualized until it is turned over to an owner. The program combines an emphasis on construction management with components of engineering technology.

This degree includes within its core of construction management courses important components of both mathematics and physics to give the entry-level construction manager a variety of technical skills, including an understanding of basic structural analysis and design. Additional technical skills are developed as they relate to building layout (surveying) and materials testing, including training for The American Concrete Institute certification as Field Inspector (Level 1) of Fresh Concrete. The students learn to interpret and read construction drawings through a hands-on approach. All technical courses incorporate computers. There is a separate course in computer-aided drawing. Graduates are prepared for immediate employment in every phase of building technology. Occupational titles include: assistant construction superintendent, assistant estimator, assistant project manager, surveyor, construction inspector, reinforced concrete detailer, structural drafter, structural steel detailer and CAD operator.

Recent employers of the graduates of this program include numerous general contractors and construction management firms such as Builders Group, Delta Contracting, Cole Construction, Arnell Construction Co, Slattery Construction Co, BMI Construction and Forest City Ratner Corp, Urbahn Architects. Government-related agencies and organizations which regularly employ these graduates include The Dormitory Authority of the State of New York, The Port Authority of New York and New Jersey and The New York City Departments of Transportation.

Applicants are urged to complete at least one year of academic mathematics in high school to avoid delaying their progress in this curriculum.

Bachelor of Technology in Facilities Management

Students who have successfully completed the requirements for this degree are eligible for transfer into the Bachelor of Technology in Facilities Management Program. See pages 9, 32 for a complete description.

REQUIRED COURSES IN THE MAJOR		Credits
CMCE 1104/CT 104	Statics and Strength of Materials I	2
CMCE 1110/CT 110	Construction Drawings	2
CMCE 1114/CT 114	Methods and Materials of Construction I	3
CMCE 1204/CT 204	Statics and Strength of Materials II	3
CMCE 1220/CT 220	Construction Management I	3
CMCE 1224/CT 224	Methods and Materials of Construction II	2
CMCE 2315/CT 315*	Elements of Structural Design-Steel	3
CMCE 2452/CV 452	Civil Engineering Drawings/CAD	2
CMCE 2320/CT 320	Construction Management II	3
CMCE 2306/CT 306	Materials Testing Laboratory	2
CMCE 2412/CT 412	Construction Estimating	2
CMCE 2415/CT 415*	Elements of Structural Design-Concrete	3
CMCE 2419/CT 419	Building Service Systems	2
CMCE 2420/CT 420	Construction Management III	2
CMCE 1152/CV 152	Surveying	3
CMCE 1255/CV 255	Computer Applications in Civil Engineering Technology	3
	Subtotal	**40**
CMCE 2900/CT 900	Construction Management Internship (Optional)	3

OTHER REQUIRED COURSES		
MAT 1275/MA 275[2]	Intro to Mathematical Analysis	4
MAT 1375/MA 375	Mathematical Analysis	4
PHYS 1433/SC 433	Physics 1.2	4
ENG 1101/EG 101	English Composition I	3
BS/SS[1]	Behavioral Science/Social Science	3
LAP[1]	Literature/Aesthetics/Philosophy	3
COMM[1]	Communications	3
	Subtotal	**24**
TOTAL CREDITS REQUIRED FOR THE DEGREE		**64**

[1] See page 34 for detailed explanation of core required courses and categories.

[2] Or higher-level math course. Students without the requisite background for MAT 1275/MA 275 will be required to take MAT 1175/MA 175 in preparation. This will increase the number of credits required for the degree by four (4).

** See the course descriptions for an important message regarding these courses.*

Associate in Applied Science in CONSTRUCTION MANAGEMENT TECHNOLOGY

Curriculum by Semester

The College will grant an associate in applied science degree (AAS) with a major in construction management technology upon satisfactory completion of the required 64 credits listed.

FIRST SEMESTER		Credits
CMCE 1104/CT 104	Statics and Strength of Materials I	2
CMCE 1110/CT 110	Construction Drawings	2
CMCE 1114/CT 114	Methods and Materials of Construction I	3
CMCE 1152/CV 152	Surveying	3
MAT 1275/MA 275[1]	Intro to Mathematical Analysis	4
ENG 1101/EG 101	English Composition I	3
	Subtotal	**17**

SECOND SEMESTER		
CMCE 1204/CT 204	Statics and Strength of Materials II	3
CMCE 1220/CT 220	Construction Management I	3
CMCE 1224/CT 224	Methods and Materials of Construction II	2
CMCE 1255/CV 255	Computer Applications in Civil Engineering Technology	3
PHYS 1433/SC 433	Physics 1.2	4
	Subtotal	**15**

THIRD SEMESTER		
CMCE 2306/CT 306	Materials Testing Laboratory	2
CMCE 2315/CT 315*	Elements of Structural Design-Steel	3
CMCE 2452/CV 452	Structural Drawings (CAD)	2
CMCE 2320/CT 320	Construction Management II	3
LAP[2]	Literature/Aesthetics/Philosophy	3
COMM[2]	ENG 1121/EG 121 or ENG 1133/EG 133	3
	Subtotal	**16**

FOURTH SEMESTER		
CMCE 2412/CT 412	Construction Estimating	2
CMCE 2415/CT 415*	Elements of Structural Design-Concrete	3
CMCE 2419/CV 419	Building Service Systems	2
CMCE 2420/CT 420	Construction Management III	2
MAT 1375/MA 375	Mathematical Analysis	4
BS/SS[2]	Behavioral Science/Social Science	3
	Subtotal	**16**
TOTAL CREDITS REQUIRED FOR THE DEGREE		**64**

[1] Or higher level math course. Students without the requisite background for MAT 1275/MA 275 will be required to take MAT 1175/MA 175 in preparation. This will increase the number of credits required for the degree by four (4).

[2] See page 34 for detailed explanation of core required courses and categories.

** See the course descriptions for an important messgae regarding these courses*

Certificate in CONSTRUCTION MANAGEMENT

The Department of Construction Technology offers an 18-credit certificate in construction management.

The certificate has been designed to enhance the opportunities for those already employed in the construction industry without any formal academic or technical background in construction management, as well as to appeal to those seeking entry-level opportunities in the field. It is ideal for construction management personnel and their employees, for small contractors and for individuals wishing to pursue their own small contracting businesses. It serves those individuals seeking just a few courses, rather than a full degree program, on such topics as estimating, plan reading, reading and interpreting specifications, etc.

All courses are the same credit bearing courses as those offered in the AAS degree programs within the department, and may be used ultimately toward the AAS degree in construction management technology as well as the bachelor's degree (construction management option of the bachelor of facilities management). Course prerequisites may require evaluation of a candidate's experience by a representative of the department.

REQUIRED COURSES IN THE MAJOR		Credits
CMCE 1110/CT 110	Construction Drawings	2
CMCE 1114/CT 114	Materials and Methods of Construction I	3
CMCE 1224/CT 224	Materials and Methods of Construction II	2
CMCE 1220/CT 220	Construction Management I	3
CMCE 2320/CT 320	Construction Management II	3
CMCE 2412/CT 412	Construction Estimating	2
CMCE 1255/CV 255	Computer Applications in Civil Engineering Technology	3
TOTAL CREDITS REQUIRED FOR THE CERTIFICATE		**18**

COURSES:

CMCE 1104/CT 104
Statics and Strength of Materials I
2 cl hrs, 2 cr
This course provides an introduction to the basic theory necessary for structural analysis and design. It emphasizes the use of standard charts and tables in conjunction with a calculator, for the solution of elementary statics and strength of materials problems. The concepts of force, stress, strain and equilibrium are explored in depth. Student projects include the use of desktop computer programs.
Pre- or corequisite: MAT 1175/MA 175

CMCE 1110/CT 110
Construction Drawings
1 cl hr, 2 lab hrs, 2 cr
This course will introduce the student to the basic drafting techniques that are required in the construction field. Students will learn the proper use of drafting equipment. In addition, through actual drawings, the student will develop an understanding of architectural working drawings relating to wood frame residential buildings and commercial buildings and their use in construction projects. Topics will include drafting techniques and equipment, lettering, line work, geometric constructions, site plans, foundation drawings, floor plans, electrical, plumbing and heating/air conditioning plans.
Prerequisite: None

CMCE 1114/CT 114
Materials and Methods of Construction I
2 cl hr, 3 lab hrs, 3 cr
This course introduces the student to wood and masonry construction and the study of modern building techniques. The student applies the theory through the construction of a scaled detailed project of a residential dwelling. In addition, the student will be introduced to the basic principles of construction management.
Prerequisite: None

CMCE 1204/CT 204
Statics and Strength of Materials II
3 cl hr, 3 cr
This course is a continuation of CT 104, and provides additional theory necessary for structural analysis and design. Engineering concepts for shear and bending moment diagrams, section properties, beam analysis and truss analysis are explored in depth. Student projects include the use of a desktop computer for the solution of beam analysis, section properties, and trusses.
Prerequisite: CMCE 1104/CT 104

CMCE 1220/CT 220
Construction Management I
3 cl hrs, 3 cr
This course introduces the student to the basic practice of construction management in the erection and construction of a building project. The course is designed to give the student a thorough understanding of the construction process and the elements that comprise this process leading to a successful completion. Topics covered will include the discussion of the design and construction process, types of contracts, responsibilities of participating parties, zoning and building codes, specifications and drawings, construction bidding and award of contracts, law and labor relations, risk allocation and liability sharing.
Prerequisites: CMCE 1110/CT 110, CMCE 1114/CT 114, certification in reading and writing

CMCE 1224/CT 224
Materials and Methods of Construction II
1 cl hr, 2 lab hrs, 3 cr
This course provides the student with an understanding of the fundamentals of the three major categories of any building construction project namely the foundation, substructure and superstructure. Current methods and materials of construction are emphasized. Topics will include cast-in-place and precast concrete frame construction, masonry stone construction, steel frame construction, glass and glazing and curtain wall construction systems.
Prerequisites: CMCE 1110/CT 110, CMCE 1114/CT 114, certification in reading and writing

CMCE 2306/CT 306
Materials Testing Laboratory
1 cl hr, 2 lab hrs, 2 cr
This course will explore the mechanical properties of steel, timber and concrete through laboratory testing. Standard tension, compression, shear, torsion, ductility and bending tests are performed in accordance with ASTM standards. Principles of field inspection of fresh concrete are covered as well. Students are given the opportunity to earn certification by the American Concrete Institute as "Field Inspectors, Level 1, of Fresh Concrete."
Pre- or corequisites: CMCE 2315/CT 315 or CMCE 2415/CT 415, certification in reading and writing

CMCE 2315/CT 315
Elements of Structural Design–Steel
3 cl hrs, 3 cr
This course provides a working knowledge of the basic concepts encountered in the analysis and design of structural steel elements. The American Institute of Steel Construction (AISC) specifications for the design, fabrication and erection of structural steel for buildings are studied particularly as they apply to the design of beams, columns and connections. Analysis methods and procedures are developed for solving practical problems encountered in civil engineering. Students will learn to use the charts, tables, design aids and specifications available for simple structural design, which are contained in the "AISC Steel Handbook." Student projects include the use of desktop computers.
Prerequisite: CMCE 1204/CT 204; Note: Students should not register for both CMCE 2315/CT315 and CMCE 2415/CT415 simultaneously without departmental approval.

CMCE 2320/CT 320
Construction Management II
3 cl hrs, 3 cr
This course introduces the student to site organization and management techniques that are required in construction project management. Students will gain a thorough understanding of all aspects of field supervision and contract administration. Topics will include field office setup, record keeping, reports, meeting minutes, change orders, measurement and payment, quality control, claims and disputes.
Prerequisites: CMCE 1110/CT 110, CMCE 1114/CT 114, CMCE 1220/CT 220

CMCE 2412/CT 412
Construction Estimating
1 cl hr, 3 lab hrs, 2 cr
This course prepares the student to estimate the cost of various types of construction. A detailed material takeoff is made from typical construction documents. Pricing, including the cost of labor, material, equipment, subcontracts, overhead, contingencies and profit is discussed. Annually updated costs from Means' "Building Construction Cost Data" are used in preparing the cost estimate. Commercial computer software is used in this class.
Prerequisites: CMCE 1220/CT 220, CMCE 1224/CT 224

CMCE 2415/CT 415
Elements of Structural Design–Concrete
3 cl hrs, 3 cr
This course provides a working knowledge of the basic concepts encountered in the analysis and design of reinforced concrete elements. The Building Code Requirements for Reinforced Concrete (ACI latest edition) is studied as it applies to the design and analysis of concrete beams, slabs, columns and footings for buildings. Analysis methods and procedures are developed for solving practical problems encountered in civil engineering. Students will learn to use tables and select design aids for simple structural designs. Basic detailing and inspection criteria are also introduced. Student projects include the use of desktop computers.
Prerequisite: CMCE 1204/CT 204; Note: Students should not register for both CT315 and CT415 simultaneously without departmental approval.

CMCE 2419/CT 419
Building Service Systems
2 cl hrs, 2 cr (spring only)
Analysis of plumbing, heating, ventilating, air conditioning and electrical equipment appropriate for residential and commercial-industrial buildings are explored. Modern methods and current equipment are emphasized.
Prerequisite: PHYS 1433/SC 433

CMCE 2420/CT 420
Construction Management III
1 cl hr, 2 lab hrs, 2 cr (spring only)
This course teaches current practices in preparing project schedules, including bar charts and Critical Path Method (CPM). Emphasis will be placed on using industry standard computer scheduling software.
Prerequisite: CMCE 2320/CT 320

CMCE 2900/CT 900
Construction Management Internship (optional)
3 cr, see Department Chair

CMCE 1152/CV 152
Surveying
1 cl hr, 4 lab hrs, 3 cr
This course enables students to perform actual surveying work using traditional surveying equipment. Fundamental theory of plane surveying, surveying procedures including measurements of distances, elevations and direction are studied. Principles and use of field equipment, including tapes, levels, transits, theodolites and electronic distance meters (EDM), field and office work, including traverses, topographic surveys and mapping, construction surveys, earthwork computations, stadia, note-keeping and office calculations. Computer applications for traverse computations will be covered as well as an introduction to CAD.
Pre- or corequisites: MAT 1275/MA 275, CMCE 1110/CT 110

CMCE 1252/CV 252
Route Surveying
1 cl hr, 4 lab hrs, 3 cr
Theory and practice of route surveying, including horizontal curves, vertical curves, spirals, earthwork, profiles and mapping are covered in this course. Advanced surveying projects in field and office, including computer applications are covered.
Prerequisite: CMCE 1152/CV 152

CMCE 1255/CV 255
Computer Applications in Civil Engineering Technology
2 cl hrs, 2 lab hrs, 3 cr
This course provides a working knowledge of computers and their application in the fields of Construction and Civil Engineering. Topics include microcomputer systems and attendant hardware, computer terminology, disk operating system (DOS and Windows), word processing programs such as Word, spreadsheets such as Excel and presentation software such as Powerpoint. Visual basic is also introduced in this course. The student will learn how to use these tools to manage construction projects, prepare estimates, work proposals and to present oral presentations. Each topic assignment is based on a specific construction management or civil engineering topic.
Pre- or corequisites: MAT 1275/MA 275, CMCE 1104/CT 104, certification in reading and writing

CMCE 2351/CV 351
Hydraulics
3 cl hrs, 3 cr (fall only)
Fundamentals of hydraulics for civil engineering technicians including properties of fluids, fluid statics, manometers, forces on submerged plane and curved surfaces, buoyancy, principles of fluid flow, flow measurements, nozzles, Venturi meters, head losses. Use of a desktop computer, including commercial and non-commercial software as well as standard nomographs for solving hydraulic problems.
Pre- or corequisites: MAT 1375/MA 375, PHYS 1433/SC 433

CMCE 2352/CV 352
Soil Mechanics (Laboratory)
2 cl hrs 3 lab hrs, 3 cr
This course combines soil theory, field practice and lab procedures. The student will learn the origin and nature of soils, soil classifications, sampling, soil properties, strength characteristics, soil water relationships, settlement and consolidation concepts, lateral earth pressure and subsurface stresses. Methods and procedures are developed for solving practical soil mechanics type problems encountered in civil engineering projects. Laboratory tests, related calculations and computer applications are all incorporated into this course.
Pre- or corequisites: CMCE 1204/CT 204, MAT 1375/MA 375, PHYS 1433/SC 433

CMCE 2452/CV 452
Civil Engineering Drawing (AUTOCAD)
1 cl hr, 3 lab hrs, 2 cr
This course provides the students with a working knowledge of Computer-Aided Drafting. Through the use of structural drawings for steel, wood and concrete, students build on their basic knowledge of both civil engineering and construction drawing principles and standards. Methods and procedures are developed for solving practical drafting problems encountered in construction projects using Computer-Aided Drafting methods. Students will learn the sequence of commands and/or steps required to start, create, save and plot CAD drawings. Improved skills are also developed in the reading and interpretation of typical working drawings from civil engineering and construction projects
Prerequisites: CMCE 1110/CT 110, CMCE 1252/CV 252; pre- or corequisite: CMCE 2315/CT 315 or CMCE 2415/CT 415

CMCE 2454/CV 454
Applied Hydraulics: Water Supply and Sewerage Treatment
2 cl hrs, 2 cr (spring only)
The student will learn the principles of water supply and sewerage collection and treatment, with an emphasis on NYC's water supply and sewerage treatment systems. Storm water and sewerage design concepts and theory will be explored as well aselementary hydrology including surface and aquifer systems. Considerations of pipe flow, minor losses, series vs. parallel pipe systems, pumping systems as well as open channel flow will be covered.
Prerequisites: CMCE 2351/CV 351, MAT 1375/MA 375

CMCE 2455/CV 455
Materials and Methods of Construction
2 cl hrs, 2 cr
Construction materials and methods used in building construction of all public works facilities. Also covered are office and field practices involved in such projects. Current materials, methods and practices of construction using NYC Building and Zoning codes, as well as A.A.S.H.T.O. codes as reference are covered. Introduction to the basic principles of construction management, including the design and construction process, scheduling and contracts.
Prerequisite: CMCE 1252/CV 252