Civil Technology

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School of Engineering Technology

The Civil Technology program (CIV), following the missions of both Farmingdale State College and the State University of New York, offers a comprehensive and stimulating program that fulfills the needs of students and regional employers. This program promotes student learning as well as the advancement of technology while contributing to the local economy. Fulfilling Farmingdale State College’s mission, the program produces graduates with high technical skills and knowledge are ready to enter the workforce in New York State.

Student Learning Outcomes (based on ABET requirements):

Upon completion of the program students will demonstrate:

• an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities;
• an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies;
• an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and, to apply experimental results to improve processes;
• an ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives;
• an ability to function effectively as a member or leader on a technical team;
• an ability to identify, analyze, and solve broadly-defined engineering technology problems;
• an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and, an ability to identify and use appropriate technical literature;
• an understanding of the need for and an ability to engage in self-directed continuing professional development;
• an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity;
• knowledge of the impact of engineering technology solutions in a societal and global context;
• a commitment to quality, timeliness, and continuous improvement.

Typical Employment Opportunities:

Civil Engineers
Architectural and Engineering Managers
Engineering Teachers, Postsecondary

Civil Technology (BS) Program Objectives:
• Graduates will have the technical and managerial skills necessary to enter careers in the planning, design, construction, operation or maintenance of the built environment and global infrastructure.
• Graduates will be prepared to analyze and design systems.
• Graduates will be prepared to specify project methods and materials prepared to perform cost estimates and analyses.
• Graduates will be prepared to manage technical activities in support of civil engineering projects.

Fall 2019 - Subject to Revision

Liberal Arts and Sciences (62 credits)

EGL 101 Composition I: College Writing (GE) 3
EGL 102 Composition II: Literature 3
EGL 310 Technical Writing (GE) 3
CHM 152 General Chemistry Principles I (GE) 4
ECO 321 Engineering Economics (GE) 3
MTH 129 Pre-Calculus with Applications (GE) 4
MTH 130 Calculus I OR
    MTH 150 Calculus I (GE) 4
MTH 236 Calculus II with Applications OR
    MTH 151 Calculus II (GE) 3
MTH 360 Applied Probability and Statistics 3
MTH 390 Probability Method in Operation Research 3
PHY 135 College Physics I (GE) 4
PHY 136 College Physics II (GE) 4
PHY 333 Modern Physics (GE) OR
    MTH Elective (200 Level or Higher) 3
Liberal Arts & Sciences Electives 3
The Arts (GE) 3
Social & Behavioral Science (GE) 3
Foreign Language - Level II or higher (GE) 3
Humanities (GE) 3
American/Western/Other World Civilizations (GE) 3

Required: Civil Technology (64 credits)

ARC 131 Intro to Graphics 4
ARC 263 Mechanical, Electrical, Plumbing & Energy Systems in Buildings  3
CIV 106 Statics  3
CIV 207 Elements of Strength of Materials  3
CIV 208 Dynamics  3
CIV 302 Soils, Foundations & Earth Structures  3
CIV 303 Hydraulics  3
CIV 402 Civil Engineering Materials  3
CIV 408 Structures  3
CIV 409 Structural Design  3
CIV 410 Transportation Engineering  3
CIV 411 Water and Wastewater Systems  3
CIV 412 Highway Engineering  3
CIV 414 Reinforced Concrete Design  3
CIV 496 Capstone Project  3
CON 103 Surveying  3
CON 161 Materials & Methods of Construction I  3
CON 365 Highway Design & Construction  3
CON 401W Construction Project Management & Scheduling  3
Technical Electives (300 Level or Higher)  6

Total Credits  126

Degree Type: BS
Total Required Credits: 126

Please refer to the General Education, Applied Learning, and Writing Intensive requirement sections of the College Catalog and consult with your advisor to ensure that graduation requirements are satisfied.

Notes:

Technical Electives (300 level or higher) are considered any of the following: CON 361 Government Buildings & Env Codes & Regulations; CON 399 Applied Research Topics; CON 407 Building Commissioning; IND 308 Occupational Safety; IND 309 Security and Fire Protection Systems.

Math Elective (200 level) are considered any of the following: MTH 245 Linear Algebra; MTH 250 Introduction to Graph Theory and Combinatorics; MTH 252 Calculus III; MTH 25 Differential Equations; MTH 290 Methods of Proof in Advanced Mathematics; MTH 320 Geometric Structures; MTH 322 Advanced Mathematical Analysis
Course Descriptions

**EGL 101 Composition I: College Writing (GE)**
This is the first part of a required sequence in college essay writing. Students learn to view writing as a process that involves generating ideas, formulating and developing a thesis, structuring paragraphs and essays, as well as revising and editing drafts. The focus is on the development of critical and analytical thinking. Students also learn the correct and ethical use of print and electronic sources. At least one research paper is required. A grade of C or higher is a graduation requirement. Note: Students passing a departmental diagnostic exam given on the first day of class will remain in EGL 101; all others will be placed in EGL 097. Prerequisite is any of the following: successful completion of EGL 097; an SAT essay score (taken prior to March 1, 2016) of 7 or higher; an SAT essay score (taken after March 1, 2016) of 5 or higher; on-campus placement testing.

**EGL 102 Composition II: Literature**
This is the second part of the required introductory English composition sequence. This course builds on writing skills developed in EGL 101, specifically the ability to write analytical and persuasive essays and to use research materials correctly and effectively. Students read selections from different literary genres (poetry, drama, and narrative fiction). Selections from the literature provide the basis for analytical and critical essays that explore the ways writers use works of the imagination to explore human experience. Grade of C or higher is a graduation requirement. Prerequisite(s): EGL 101

**EGL 310 Technical Writing (GE)**
A detailed study of the fundamentals of writing technical reports and other technical communications. Topics emphasized include the elements of a technical report, the interpretation of statistics and data, and the composition of letters, memos, and informal reports containing technical information. Assignments and student exercises are drawn from the student's technical area. Prerequisite(s): EGL 102 with a grade of C or higher

**CHM 152 General Chemistry Principles I (GE)**
The first part of a two semester sequence in General Chemistry Principles with laboratory. This course covers the qualitative and quantitative aspects of scientific measurement, the nature of matter, gases, liquids and solids, energy, atomic theory, properties of elements, chemical bonding, molecular structure and properties, stoichiometry, thermochemistry and solutions. Note: the laboratory course CHM 152L is a part of your grade for this course. Attendance in the laboratory course is required. Approved eye-protection and a laboratory coat are required materials. A student must pass the laboratory course to receive a passing grade in the entire course. Prerequisite(s): MP3 or MTH 116 AND Regents Chemistry or an equivalent High School Chemistry with Laboratory or CHM 124

**ECO 321 Engineering Economics (GE)**
This course will provide students with a basic understanding of the economic aspects of engineering in terms of the evaluation of engineering proposals with respect to their worth and cost. Topics include: introduction to Engineering Economics; interest and interest formulas; equivalence and equivalence calculations; evaluation of replacement alternatives and operational activities; basic fundamentals of cost accounting. Prerequisite(s): Admission to a Tech Program or approval of this Department chair.

**MTH 129 Pre-Calculus with Applications (GE)**
In this course, the topics introduced in College Algebra course will be extended. The course will provide a comprehensive study of functions, which are the basis of calculus and other higher-level mathematics courses. The students will study the properties, graphs, and some applications of polynomial, rational, inverse, exponential, logarithmic, and trigonometric functions. Note: Students completing this course may not receive credit for MTH 117. Prerequisite(s): MP3 or MTH 116

**MTH 130 Calculus I** OR
This is a calculus course for those not majoring in Mathematics, Engineering Science or Computer Science. Topics include the derivative, differentiation of algebraic, trigonometric, exponential and logarithmic functions, applications of the derivative and the definite integral. Applications are taken from technology, science, and business. Problem solving is stressed. A graphing calculator is required. Note: Students completing this course will not receive credit for MTH 150. Prerequisite(s): MP4 or MTH 117 or 129

**MTH 236 Calculus II with Applications OR**
A continuation of Calculus I with Applications. Topics include techniques of integration, applications of the definite integral, multivariable calculus, and an introduction to Differential Equations. Applications are taken from technology, science and business. Problem solving is emphasized. A graphing calculator is required. Prerequisite(s): MTH 130 or MTH 150

**MTH 360 Applied Probability and Statistics**
A calculus-based course which studies applications of probability and statistical inference. Use of appropriate computer packages forms an integral part of the course. Topics are chosen from statistical parameters, continuous and discrete random variables, probability distributions, correlation and regression analysis, design of experiments and ANOVA. Prerequisite(s): MTH 151 or MTH 236

**MTH 390 Probability Method in Operation Research**
This course is intended to focus on understanding, formulating and solving deterministic models in operations research. Maximum and Minimum Linear Programming problems will be studied graphically and theoretically. The Simplex Method, Sensitivity Analysis and Duality will be covered and an in-depth analysis of the reasoning on which these topics are based will be given. Instruction in computer software techniques will be presented to solve Linear Programming problems, using the simplex method and sensitivity analysis. Transportation Problems, Integer Programming, or Markov Chains will be covered. In order to enhance quantitative reasoning, the course emphasizes the formulation of mathematical models commonly used by operation research analysts, as well as the theoretical and computer software solutions to these models. Prerequisite(s): MTH 130 or MTH 236

**PHY 135 College Physics I (GE)**
An integrated theory/laboratory general college physics course without calculus. Topics will include fundamental concepts of units, vectors, equilibrium, velocity and acceleration in linear and rotational motion, force, energy, momentum, fluids at rest and in motion, and oscillatory motion. Laboratory problems, experiments and report writing associated with the topics studied in the theory are performed. Prerequisite(s): MTH 129 Corequisite(s): PHY 135L

**PHY 136 College Physics II (GE)**
A continuation of PHY 135. Topics will include heat, electricity, magnetism, light and optics. Prerequisite(s): PHY 135 Corequisite(s): PHY 136L

**PHY 333 Modern Physics (GE) OR**
An introduction to topics in modern physics for upper-division students. Topics included are Einstein's Special Theory of Relativity, Atomic Physics, Applied Nuclear Physics, and Solid State Physics. Prerequisite(s): PHY 136 or 144

**ARC 131 Intro to Graphics**
Introduction to architectural and construction graphics using hand drawing/drafting and Computer Aided Drafting (CAD). Hand drawing/drafting topics include: lettering, technical sketching, use of drafting instruments, the fundamentals of orthographic projection, plan, section, elevation development and pictorial drawings to develop the student’s abilities to visualize and describe objects graphically. CAD topics include software commands and drawing strategies for 2-D and 3-D CAD work, plans, sections, elevations, and details, information management, assembly of drawings and scales. Note: This course includes a required laboratory designed to provide extra time for the studio experience.
ARC 263 Mechanical, Electrical, Plumbing & Energy Systems in Buildings
An overview of mechanical, electrical and plumbing (MEP) aspects of buildings. Intended to develop students’ ability to analyze energy requirements of buildings and various methods of energy conservation and thermal efficiency. Topics covered include heat flow, system and equipment for heating and cooling. Also included are water supply and wastewater treatments for buildings. Prerequisite(s): CON 162

CIV 410 Transportation Engineering
This course focuses on the fundamentals of planning, design, and operation of various modes of transportation engineering in transportation systems. General administration, legislation, financing, studies, and evaluations of transportation projects will be addressed. The design parameters and characteristics of highway, bus, rail, air, and water transportation modes will be considered. Consolidation with a review of intelligent transportation systems and hands-on projects within various modes will also be undertaken. Prerequisite(s): CON 207

CIV 412 Highway Engineering
This course focuses on the planning, design, and construction of highway transportation facilities. Topics to be covered include highway administration and finance, traffic flow characteristics, and driver characteristics. Design of geometry, roadside, drainage, and intersections will be considered. Further, considerations of traffic control and pavements will be made. Consideration of these topics will be based on standards promulgated by AASHTO and NYSDOT. Prerequisite(s): CON 302

CON 103 Surveying
The development of skills in the use of the basic surveying instruments- tape, level, transit. Trigonometric and differential leveling and cross-sectioning. Azimuth, bearing and angle determination by repetition procedures. Angular closures. Stadia and stadia reduction of inclined sights, topographic mapping by transit stadia and plan table methods. This course will include a field laboratory assignment.

CON 161 Materials & Methods of Construction I
An introduction to the engineering properties and the uses of construction materials including soils, concrete, masonry, steel and wood. Classroom testing demonstrations of several materials are included. Conventional construction systems are studied. The student is also given an orientation to the construction industry, the associated professions, and the varieties of employment available. Note: Students cannot get credit for CON 161 and 161W; CON 161W can be used to fulfill the writing intensive requirement which is offered at the discretion of the Architectural/Construction Management Department

CON 365 Highway Design & Construction
Design criteria for roadways including arterial signalization speed considerations, visual constraints and reaction criteria. Superelevation and spiral curve criteria. Construction quantification, haul considerations and mass curve analysis. Traffic considerations, destination surveys and road saturation criteria. Intersection analysis, striping, signage and lighting. Barriers, types and design considerations. Economic analysis and environmental constraints. Appurtenant structure consideration such as drains, curbing, curb cuts and ramps. Pavement stability. Prerequisite(s): CON 303

CON 401W Construction Project Management & Scheduling
This course gives an in-depth introduction and orientation to construction project management. This includes professional construction management in practice and methods in professional construction management. Some of the areas this course will cover are: Bidding and Award, Application of Controls, Scheduling, Planning and Control of Operations and Resources, Procurement Quality Assurance, Safety and Health in Construction, Industrial Relations. Computer Applications included. This is a writing-intensive course. Note: Students cannot get credit for CON 401 and 401W; CON 401W can be used to fulfill the writing intensive requirement. Note: Offered at the discretion of the Construction/Architectural Management Department Prerequisite(s): CON 162 and EGL 101 with a grade of C or higher
Admission to Farmingdale State College - State University of New York is based on the qualifications of the applicant without regard to age, sex, marital or military status, race, color, creed, religion, national origin, disability or sexual orientation.