Architectural Engineering Technology

Prof. Orla Smyth LoPiccolo, Chair
Architecture & Construction Management Department
Orla.LoPiccolo@farmingdale.edu
934-420-2024
School of Engineering Technology

Bachelor of Science Degree

The Architectural Engineering Technology (ARC) program synthesizes the aesthetic, technical and functional elements of building design and construction. The academic thrust of the program is applied technology. The students in this program will be educated in the process of building design from concept to completion.

The purpose of the Architectural Engineering Technology program is to prepare students for careers in architectural, structural, and mechanical aspects of the design and construction of buildings. The students will be educated in the process of carrying design projects from schematics through construction. In addition to preparing students for meaningful and rewarding careers at the Bachelor’s level, the program will also prepare students for successful entry in the professional and non-professional graduate programs in architecture and other areas.

Architectural Engineering Technology (BS) Program Outcomes:

• Graduates will have broad background in one or more areas of design: architectural, construction, site and structural in addition to history, theory and technology. Graduates will assume professional positions in architectural and building construction industry.
• Graduates will be creative problem solvers in industry.
• Graduates will be effective communicators in professional setting.
• Graduates will adapt state of the art technologies to improve processes in industry.
• Graduates will pursue continuing education and professional development opportunities to function effectively as a member or leader on a technical team.

This program is accredited by the Engineering Technology Accreditation Commission of ABET, www.abet.org

Potential Employment/Employment Demand

Employment in the architectural field is strongly tied to the level of local construction, particularly new residential structure such as office buildings, shopping centers, schools and health care facilities. The boom in new construction in the region is expected to continue for a considerable time in the future. As the stock of buildings age, demand for remodeling and repair work should also grow. The needed renovations and rehabilitation of old buildings is expected to provide many job opportunities according to the Occupational Outlook Handbook. Also according to the Occupational Outlook Handbook, employment in this field will grow as fast as the average for all occupations during this period.

Student club - Architecture and Construction Technology (ACT) Club

Student Learning Outcomes: Architectural Engineering Technology
1. An ability to apply knowledge, techniques, skills, and modern tools of mathematics, science, engineering, or technology to solve broadly-defined engineering problems

2. An ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to Architectural Engineering Technology

3. An ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes

4. An ability to function effectively as a member or leader on a technical team

5. An ability to apply written, oral, and graphical communication in both technical and nontechnical environments; and an ability to identify and use appropriate technical literature

**ABET Data**

**Fall 2019 - Subject to Revision**

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liberal Arts and Sciences</td>
<td>61 credits</td>
</tr>
<tr>
<td>EGL 101 Composition I: College Writing (GE)</td>
<td>3</td>
</tr>
<tr>
<td>EGL 102 Composition II: Writing About Literature</td>
<td>3</td>
</tr>
<tr>
<td>EGL 310 Technical Writing (GE)</td>
<td>3</td>
</tr>
<tr>
<td>MTH 129 Precalculus (GE)</td>
<td>4</td>
</tr>
<tr>
<td>MTH 130 Calculus with Applications (GE)</td>
<td>4</td>
</tr>
<tr>
<td>MTH 236 Calculus II with Applications</td>
<td>3</td>
</tr>
<tr>
<td>Liberal Arts Elective</td>
<td>6</td>
</tr>
<tr>
<td>PHY 135 College Physics I (GE)</td>
<td>4</td>
</tr>
<tr>
<td>PHY 136 College Physics II</td>
<td>4</td>
</tr>
<tr>
<td>Liberal Arts Elective (upper level)</td>
<td>3</td>
</tr>
<tr>
<td>ECO 321 Engineering Economics</td>
<td>3</td>
</tr>
<tr>
<td>The Arts (GE)</td>
<td>3</td>
</tr>
<tr>
<td>Social &amp; Behavioral Science (GE)</td>
<td>3</td>
</tr>
<tr>
<td>Humanities (GE)</td>
<td>3</td>
</tr>
</tbody>
</table>
American/Other World/Western Civilization History (GE)  3
Foreign Language (GE)  3
Liberal Arts & Sciences electives (3 credits at 300 level or above)  6

Required: Architectural Engineering Technology  (64 credits)
CON 106 Statics  3
ARC 131 Introduction to Graphics  4
CON 161 Materials & Methods of Construction I  3
CON 162 Materials & Methods of Construction II  3
CON 207 Elements of Strength of Materials  3
ARC 255 Architectural Design I  4
ARC 257 Architectural Design II  4
ARC 263 Mechanical, Electrical, Plumbing & Energy Systems in Buildings  3
CON 302 Soils, Foundations & Earth Structures  3
ARC 310 Construction Design  4
CON 357 Quantity Surveying and Costing  3
ARC 350W Architectural Theory & Design Factors  3
CON 361 Governmental Building & Environ Codes & Regulations  3
ARC 362 History of Western Architecture  3
ARC 364 Site Design and Construction  3
ARC 376 Architectural Design III  4
CON 409 Structural Design  3
ARC 476 Architectural Design IV  4
ARC 486 Architectural Design V  4

Total Credits:  125

Degree Type: BS
Total Required Credits: 125

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.
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: Writing About 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

**MTH 129 Precalculus (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 with Applications (GE)**
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**
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

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

ECO 321 Engineering Economics
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.

CON 106 Statics
This is a basic course in statics. The main objective of this course is to provide the student with a basic understanding of the principles of statics. Topics such as resultant of a force, equilibrium of forces, moments, couples, analysis of simple trusses, centroids, center of gravity, moments of inertia and friction are covered in this course. Prerequisite(s): MTH 129
Corequisite(s): PHY 135

ARC 131 Introduction 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.

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 162 Materials & Methods of Construction II
A continuation of CON 161 extended to include the study of architectural properties of selected materials, methods of construction, and building components. Class work includes technical problem solving using quantitative and graphic analysis of specific building construction systems. Prerequisite(s): CON 161

CON 207 Elements of Strength of Materials
Introduces to the concepts of stress, strain, bending and shear stresses, including elasticity, shear and moment diagrams for beams, moment of inertia of unsymmetrical sections, thermal and combined stresses. Laboratory demonstration of experiments and testing equipment are included. Prerequisite(s): CON 106 or MET 201

ARC 255 Architectural Design I
Studies the principles of form, space and order that underlie architectural design. Concepts include: mass void modeling, volume and space construction, enclosing planes, circulation, organization, hierarchy, and structure. The diagram and sketch model are introduced as methods of understanding design. Concepts are explored in both three dimensional and graphic form. Note: This course includes a required laboratory designed to provide extra time for the studio experience. Prerequisite(s): ARC 131
ARC 257 Architectural Design II
Continuation of Architectural Design I. Emphasis is placed on the process by which design decisions are made and the methods of analysis in context to the existing environment. Topics include: structure, form and function, building in context, light and construction. Note: This course includes a required laboratory designed to provide extra time for the studio experience. Prerequisite(s): ARC 255

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

CON 302 Soils, Foundations & Earth Structures
This course introduces soil mechanics, foundation and earth structure to the engineering technology students. It includes soil classification, soil properties, soil stresses, earth pressures, bearing capacity, slope stability. It also discusses principles of foundation analysis and design, retaining walls, etc. Laboratory experiments to test behavior of soils included. Prerequisite(s): CON 207 Corequisite(s): CON 302L

ARC 310 Construction Design
Construction Design is a technology-based design studio emphasizing a methodological approach to the assembly of the building's envelope, materials and systems. The integration of building code requirements, life safety, sustainability, accessibility, building energy systems, structure, construction and materials are central to effectively achieving design intent. Knowledge from Materials and Method of Construction I and II, Energy in Buildings and Graphics are applied to specific drawing assignments. A residential Type V construction, and a commercial Type II or Type III construction, building project will be advanced resulting in a set of construction documents. Note: This course includes a required laboratory designed to provide extra time for the studio experience. Prerequisite(s): ARC 131, CON 106, and ARC 263

CON 357 Quantity Surveying and Costing
This course focuses on fundamentals of quantity survey and costing of residential and commercial facilities. Quantification of materials from construction drawings is covered in this course. Topics also covered range from site work, forms, concrete, metals and masonry, plumbing and electrical to wood framing and steel framing. The course also introduces fundamentals of computer assisted estimating. Prerequisite(s): CON 162

ARC 350W Architectural Theory & Design Factors
This course will examine a series of architectural theories and design factors that attempts to explain, predict or influence design decisions that result in the built environment. Topics include: historical theory, form and aesthetics; architectural technology; the urban, natural and human environment; economic, zoning and code factors; the social and behavioral implications of architecture, the design process itself and the architectural profession. This is a writing-intensive course. Prerequisite(s): ARC 257 and ARC 362 and EGL 101 with a grade of C or higher. Note: Students cannot get credit for ARC 350 and 350W; ARC 350W can be used to fulfill the writing intensive requirement. Note: Offered at the discretion of the Architectural/Construction Management Department.

CON 361 Governmental Building & Environ Codes & Regulations
This course studies the concepts in preparation of an environmental impact statement. It also reviews state and local building and land use controls. Attention will be given to governmental regulations required to obtain building permits for particular construction projects. Prerequisite(s): CON 162

ARC 362 History of Western Architecture
A study of the development of building design from the Ancient Egyptians and Greeks throughout the major historical periods to the present. Emphasis is on the evolution of the forms derived from indigenous technologies of periods surveyed.

ARC 364 Site Design and Construction
This is an advanced course in the utilization of engineering and architectural principles from concept through the construction techniques of traditional and sustainable site development. Site planning techniques, municipal land development requirements, zoning regulations, soil stabilization techniques, erosion control parameters, stormwater management practices, and site construction details are applied to a site design project. Computer-aided programs in site design and survey data management will be introduced. Prerequisite(s): ARC 310

ARC 376 Architectural Design III
Continuation of Architectural Design II. Emphasis is placed on the context and constraints of urban and natural environment. The role of aesthetics, symbols, and historical elements in the making of places, spaces and communicating meaning are explored. Emphasis is placed on master planning and residential project(s) that integrate principles of architectural design/planning, and includes elements of building systems, structural and site design, zoning and building codes, etc. on an actual site in the area. Students will present their final project to invited architects at the end of the semester. Note: This course includes a required laboratory designed to provide extra time for the studio experiences. Prerequisite(s): ARC 310

CON 409 Structural Design
This course introduces fundamentals of structural steel design with basic frame analysis. This includes design of tension members, compression members, beams, columns, and various connections. This course also teaches the basic principles of wood design, which includes formwork design and frame construction. Computer application is included. Prerequisite(s): CON 207

ARC 476 Architectural Design IV
Continuation of Architectural Design III. The role of physical and regulatory constraints in the making of places and buildings are explored. Emphasis is placed on architectural programming and non-residential project(s) that integrate principles of architectural design/planning, and includes elements of building systems, structural and site design, zoning and building codes, etc. on an actual site in the area. Students will present their final project to invited architects at the end of the semester. Note: This course includes a required laboratory designed to provide extra time for the studio experiences. Prerequisite(s): ARC 376

ARC 486 Architectural Design V
This architectural design course integrates several architectural and engineering design philosophies and methodologies into a comprehensive studio project. This course introduces very little new material; rather it is to synthesize knowledge learned in the following areas of design and analysis: architectural, structure, construction, site, energy (mechanical/electrical) and building systems and cost estimating. This multidisciplinary project uses a student design team approach. This course includes a required practicum designed to provide extra time for the studio experience. Prerequisite(s): Department Approval, Upper Division Status, recommended in the final semester, ARC 364, and ARC 476.

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.