Mechanical Engineering Technology

Dr. Hazem Tawfik, Chair
Mechanical Engineering Technology Dept.

Associate in Applied Science Degree

This program is taught in well-equipped laboratories, utilizing the latest high speed PC computers to write analysis and design programs, construct drawings, and machine space age materials for commercial and industrial applications.

The mechanical engineering technology field is rich with opportunities for students with a broad range of interests, motivations and abilities. Graduates are well prepared for positions in four areas: Manufacturing & Production – including tool design, process specification, computerized numerical (CNC), quality control, and materials handling; Mechanical Design – including computer aided design and drafting (CADD), design specification and manufacturability. Thermal Sciences – including fluid flow and thermal efficiency analysis; and Material Science – including material specification, corrosion, corrosion control and failure analysis. Graduates are employed as technicians in companies which manufacture equipment used in hospitals, dental offices, computers, automobiles, aircraft, ships, buildings, highways, electronics, heating and air conditioning, prosthetics, physical therapy and bar coding. The power generation industry and heating, ventilating and air conditioning industries also employ our graduates as technicians.

All theory and laboratory courses are based on studies made of graduates in industry, advice from our Industrial Advisory Committee and accreditation requirement of the Engineering Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (ETAC/ABET). Graduates are automatically accepted into our Bachelor programs in Manufacturing Engineering Technology, Facility Management Technology or Mechanical Engineering Technology.

Typical Employment Opportunities

Tool Designer Cad Operator
CNC Programmer
Quality Control Specialist
Materials Technician
NC Programmer
Test Technician
Computer Aided Designer
HVAC Technician
Utility Co. Technician

Mechanical Engineering Technology (AAS) Program Outcomes:

• Graduates will have the knowledge and skills to enter careers in the design, installation, manufacturing, testing, operating, evaluation, technical sales, or maintenance of mechanical systems.
• Graduates will develop and maintain the knowledge and skills needed to identify, formulate and solve problems throughout their careers and will be able to enter the B.S. degree programs in Mechanical and Manufacturing Engineering Technology.
• Graduates will exhibit an understanding of the necessity for personal integrity, ethical behavior, cultural awareness and lifelong learning.

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tr>
<td><strong>Liberal Arts and Sciences</strong></td>
<td>(31 credits)</td>
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<tr>
<td>EGL 101 Composition I: College Writing (GE)</td>
<td>3</td>
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<tr>
<td>EGL 102 Composition II: Writing About Literature</td>
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<tr>
<td>Basic Communication (GE)</td>
<td>3</td>
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<tr>
<td>Social and Behavioral Science (GE)</td>
<td>6</td>
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<tr>
<td>MTH 129 Precalculus with Applications (GE)</td>
<td>4</td>
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<td>MTH 130 Calculus I with Applications (GE)</td>
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<tr>
<td>PHY 135 College Physics I (GE)</td>
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<tr>
<td>PHY 136 College Physics II (GE)</td>
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<tr>
<td><strong>Required: Mechanical Engineering Technology</strong></td>
<td>(36 credits)</td>
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<td>MET 104 Computer Aided Drafting and Design (CADD)</td>
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<tr>
<td>MET 109 Computer Programming and Applications</td>
<td>2</td>
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<td>MET 117 Manufacturing Processes</td>
<td>2</td>
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<tr>
<td>MET 127 Advanced Manufacturing Processes</td>
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<tr>
<td>MET 201 Statics</td>
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<td>MET 205W Material Science</td>
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<td>MET 206 Strength of Materials</td>
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<td>MET 207 Tool Design</td>
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<td>MET 212 Applied Fluid Mechanics</td>
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<td>MET 230 Electrical Principles</td>
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<td>MET 251 Numerical Control</td>
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<td>MET 252 Quality Control</td>
<td>3</td>
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<tr>
<td>Technical Elective*</td>
<td>3</td>
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<tr>
<td><strong>Total Credits:</strong></td>
<td><strong>67</strong></td>
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*Technical Elective must be selected from MET and IND courses.

Part-Time Program

A minimum of 67 credits is required.

Degree Type: AAS
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. With a grade of C or higher is a graduation requirement. Prerequisite(s): Successful completion of EGL 097, or an SAT/ACT essay score of 7 or higher, or on-campus placement testing. Credits: 3

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 Credits: 3

MTH 129 Precalculus with Applications (GE)
This is a precalculus course with applications from various disciplines including technology, science, and business. Topics include families of functions, mechanics of functions, exponential and logarithmic functions, trigonometric functions and complex numbers. The emphasis is on applications and problem solving. A graphing calculator is required. Note: Students completing this course may not receive credit for MTH 117. Prerequisite(s): MP3 or MTH 116 Credits: 4

MTH 130 Calculus I 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 Credits: 4

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 Credits: 4

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 Credits: 4

MET 104 Computer Aided Drafting and Design (CADD)
This course introduces computer aided drafting and design (CADD) in 2D drafting and 3D solid modeling. Students will learn traditional drafting techniques, such as orthographic projection, dimensioning, and tolerancing, and apply their drafting skill though 2D CAD software. Students will also learn 3D solid modeling based on parametric constraints, dimensions and features such as extrude, revolve, sweep, loft, hole, fillet and shell. In addition, the course teaches students how to create
assemblies and 2D engineering drawings from the existing 3D solids. Laboratory exercises will be assigned to the students for hands-on experience with the related topics. This course is equivalent to the combination of GPH103, GPH104, and MET211. Corequisite(s): MET 104L Credits: 3

**MET 109 Computer Programming and Applications**
This is an introductory course in a computer programming language. Programs are specifically written to be used in the areas of statics, strength of materials, machine design, heat transfer, and fluid mechanics. Applications of the theoretical concepts are covered in the required laboratory. Corequisite(s): MET 109L Credits: 2

**MET 117 Manufacturing Processes**
The main purpose of this course is to introduce the mechanical engineering technology student to the principles and operation of mechanical equipment such as lathes, drill press, milling machines and measuring instruments. Several manufacturing processes such as welding, powder metallurgy, sheet metal forming, extrusion, etc. are also covered. Individual laboratory projects will be assigned to each student to reinforce the topics covered in the theory. Corequisite(s): MET 117L Credits: 2

**MET 127 Advanced Manufacturing Processes**
This course is a continuation of MET 117. Topics emphasize the theory and operation of manual and numerically controlled milling machines and machining centers. Additional topics covered are the gear shaper, indexing head, point-to-point drilling and milling, and three axis measurement. Laboratory projects will be assigned to reinforce the topics covered in theory. Prerequisite(s): MET 117 Corequisite(s): MET 127L Credits: 2

**MET 201 Statics**
This is a basic course in statics. The main objective of this course is to provide 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. Applications of the theoretical concepts are covered in the required laboratory. Note: Students completing this course cannot receive credit for CON 106. Prerequisite(s): MTH 130 and PHY 135 Corequisite(s): MET 201L Credits: 3

**MET 205W Material Science**
This is a theory and laboratory course designed to give students a basic understanding of crystal structures, effects of cold work and annealing on metal structures and properties, phase diagrams, heat treatment of steel, corrosion of materials, failure analysis of ferrous and non-ferrous alloys, ceramics, plastics and composite materials. Laboratory experiments are associated with the topics covered in the theory. Students will write technical reports throughout the semester as well as final presentations to help them communicate effectively in specific writing related to their fields. This is a writing-intensive course. Prerequisite(s): EGL 101 with a grade of C or higher Corequisite(s): MET 205L Credits: 3 Note: Students cannot get credit for MET 205 and 205W; MET 205W can be used to fulfill the writing intensive requirement. Note: Offered at the discretion of the Automotive & Mechanical Engineering Technology Department

**MET 206 Strength of Materials**
This is a basic course in Strength of Materials. The main objective of this course is to introduce the concepts of stress, strain, torsion, bending and shear stresses. It also covers shear moment diagrams, deformations and modes of failure, Mohr's Circle; also included are topics in thermal and combined stresses. Laboratory demonstration of experiments and testing equipment are emphasized. Prerequisite(s): MET 201 or CON 106 Corequisite(s): MET 206L Credits: 3

**MET 207 Tool Design**
This course covers the fundamentals of tool design, with main focus on the principles of jigs and fixtures design. Topics covered include: General tool design, economics of tool design, materials used for tooling, work holding principles, jig design,
fixture design, die design and operation, power presses, metal cutting, forming and drawing. Students will be using Computer Aided Design (CAD) software packages in designing different jigs and fixtures. Applications of the theoretical concepts and hands-on 3D CAD modeling are covered in the required laboratory. Prerequisite(s): MET104, MET127 Corequisite(s): MET 207L Credits: 3

MET 212 Applied Fluid Mechanics
The objective of this course is to represent the basic principles of fluid mechanics and the application of those principles to practical, applied problems. Primary emphasis is on the topics of fluid statics, flow of fluids in piping systems, flow measurement, and forces developed by fluids in motion. The course is directed to anyone in a technical field where the ability to apply the principles of fluid mechanics is desirable. Prerequisite(s): MTH 130 Corequisite(s): PHY 136 Credits: 3

MET 230 Electrical Principles
This hands-on and theory course introduces electrical principles to Mechanical and Manufacturing Engineering Technology and Facility Management Technology students. Emphasis will be on power systems that utilize alternating current. Course topics include resistive and R-L-C series and parallel circuits, instrumentation, single and three-phase circuits that contain motors, transformers, starters and low voltage controls, and an overview of electronic applications to mechanical systems. Electrical logic (ladder) diagrams will be stressed throughout the semester. Laboratory assignments will reinforce the topics covered by theory through relevant experiments performed by the student and will include the writing of laboratory reports. Prerequisite(s): MTH 130 and PHY 136 Corequisite(s): MET 230L Credits: 3

MET 251 Numerical Control
In this course, the fundamental skills and knowledge of the IBM System/360 APT Numerical Control programming language are developed. Students will be required to write and run APT programs on the Department's numerical control system. Students will also process programs to produce EIA-NC code suitable for machine control. Prerequisite(s): MET 104, MET 127 and MTH 129 Credits: 3

MET 252 Quality Control
This course covers different aspects of dimensional metrology principles, calibrations, and practices. Common measurement tools and methods used in the industry will be introduced. Topics covered include: Gage Blocks, Fixed Gages, Height Gages, Plug Gages, Dial Gages, Angle Measurements, Pneumatic Gages, Surface Metrology, Optical Metrology, Load Cells Calibration, Introduction to GD&T, and Gage R&R Analysis. Laboratory exercises covered include: Gage Blocks Stacking and Calibration, Dial Gages & Plug Gages in Inspection, Micrometer Calibration, Transducers & Load Cell Calibration, Surface Roughness measurements and analysis, Angle measurements using Sign Bar, Gear Inspection, Air Gage Inspection, Inspection of Flatness, Straightness, Perpendicularity. Prerequisite(s): MET 104, MET 127 Corequisite(s): MET 252L Credits: 3

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.