Industrial Technology - Facility Management Technology

Dr. Hazem Tawfik, Co-Chair
Hazem.Tawfik@farmingdale.edu
Dr. Jeff Hung, Co-Chair
Jeff.Hung@farmingdale.edu

Mechanical Engineering Technology Department
631-420-2046
School of Engineering Technology

Bachelor of Science Degree

This is a four-year program offered by the Mechanical Engineering Technology Department. Students may matriculate on a full-time or part-time basis. The Bachelor of Science program in Facility Management Technology is designed to serve the growing need for technically competent facility managers, and to meet the transfer and continuing education needs of associate degree graduates (or transferring students from a related field of study).

Typical Employment Opportunities:

- Plant Engineer
- Facilities Maintenance Manager
- Facility Manager
- Commissioner of Public Works
- Director of Physical Plant
- Superintendent of Building & Grounds
- Director of Facility Management
- Vice President of Facilities Engineering

Facility Management Technology (BS) Program Outcomes:

- Graduates will have the knowledge and skills and will assume leadership positions in maintenance and operation of buildings and grounds, management of structural and electrical maintenance, energy management, personnel management, budgeting and space planning.
- Graduates will be able to apply the latest technologies of heating, ventilation and cooling systems, security and fire protection systems, occupational and environmental health and safety to the solution of facility maintenance, operation and management problems.
- Graduates will exhibit an understanding of the necessity for personal integrity, ethical behavior, cultural awareness and lifelong learning.

The Facility Management Technology Program has an Advisory Committee of professional societies representing the facility management field in the metropolitan area. This committee, through periodic meetings with the faculty, provides the guidance required in maintaining a relevant and viable program.
Fall 2018- Subject to Revision

Liberal Arts and Sciences  (60 credits)
EGL 101 Composition I: College Writing (GE)  3
EGL 102 Composition II: Writing About Literature  3
The Arts (GE)  3
Basic Communication (GE)  3
Foreign Language (GE)  3
Social and Behavioral Science (GE)  3
American/Other World/Western Civilization History (GE)  3
Humanities (GE)  3
Natural Science*  8
PHY 135 College Physics I (GE)  4
PHY 136 College Physics II (GE)  4
MTH 110 Statistics (GE)  3
MTH 129 Precalculus w Applications  4
MTH 130 Calculus w Applications  4
Liberal Arts and Sciences Electives  9
* For Natural Science Elective, at least one chemistry course.

Please refer to the General Education and Writing-Intensive Requirement Sections of the College catalog and consult with your advisor to ensure that graduation requirements are satisfied.

Required: Industrial Technology Common Core  (9 credits)
BUS 101 Accounting  3
BUS 102 Accounting II  3
BUS 300 Operations Management  3
Facility Management Technology  (56 credits)
IND 308 Occupational Safety  3
IND 309 Security and Fire Protection Systems  3
IND 310 Industrial Hygiene  3
IND 315 Facilities Planning  3
IND 402 Facility Maintenance Management 3
IND 405 Heating Ventilating, & Air Conditioning Systems 3
IND 406 Energy Management 3
MET 104 Computer Aided Drafting and Design (CADD) 3
MET 109 Computer Programming and Applications 2
MET 205W Material Science 3
MET 212 Applied Fluid Mechanics 3
MET 230 Electrical Principles 3
MET 307 Electromechanical Control Systems 3
MET 314 Applied Thermodynamics 3
Technical Electives 15
(AET, BCS, BUS, CON, EET, HOR, IND, MET courses)

Total Credits: 125

Degree Type: BS
Total Required Credits: 125

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. 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

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

MTH 110 Statistics (GE)
Basic concepts of probability and statistical inference. Included are the binomial, normal, and chi-square distributions. Practical applications are examined. Computer assignments using Minitab form an integral part of the course. Prerequisite(s): MP2 or MTH 015 Credits: 3

MTH 129 Precalculus w Applications
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 Credits: 4

MTH 130 Calculus w Applications
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

BUS 101 Accounting
Fundamental accounting concepts and principles are covered through an understanding of the following topics: accounting as an information system; analyzing a transaction; the accounting cycle; accounting for both service enterprises and merchandising businesses; deferrals and accruals; reversing entries; systems design; accounting for cash, receivables, temporary investments and inventory; payroll accounting. Students apply concepts to the preparation of special journals, subsidiary ledgers, worksheets and financial statements. Credits: 3

BUS 102 Accounting II
Continued development of the principles and concepts introduced in Accounting I. The following topics are included: emphasis on further understanding of generally accepted accounting principles; plant assets; intangible assets; determination of depreciation, depletion and amortization; accounting for partnerships and corporations; long term liabilities; investments in bonds and stock; statement of cash flows; managerial accounting; accounting for manufacturing operations; budgeting and standard costs systems. Prerequisite(s): BUS 101 with a grade of C or higher Credits: 3

BUS 300 Operations Management
This course undertakes an examination of the role of operations within manufacturing and service organizations. Emphasis is placed upon recognizing operational opportunities and tradeoffs, and employing quantitative and qualitative tools and decision support systems to assist strategic and operational decision-making. The general functions of operations management as applied to the transformation process are covered. Some of the important topics include but not limited to Forecasting, Statistical Quality Control, Inventory Management, Linear Programming, and Transportation Models. Note: Students who have previously completed IND 301 cannot receive credit for BUS 300. Prerequisite(s): BUS 240 or MTH 110 Credits: 3

IND 308 Occupational Safety
This course introduces the fundamentals of occupational safety and examines potential accidents, which may occur in the modern work environment that employs complex materials, processes and technologies. We will review the history and safety legislation of the regulatory agency OSHA. Acquiring and analyzing hazard information, organizing and setting up occupational safety programs, accident causes, and their control and accident record keeping will be addressed. Credits: 3

**IND 309 Security and Fire Protection Systems**
Assessing a facility’s need for and recommending as well as managing the design, procurement, installation, and operation of access intrusion detection, closed circuit television (CCTV), security lighting, fire alarms, and fire suppression systems; establishing policies, procedures, and practices for systems operations and maintenance, monitoring and evaluating systems performances; researching and assessing technical developments in the security and fire protection fields. Credits: 3

**IND 310 Industrial Hygiene**
This course introduces students to the fundamentals of industrial hygiene as well as to a recognition of health hazards in the facility environment. This course includes analysis of solvents, particulates, industrial dermatoses, industrial noises, ionizing and nonionizing radiation, temperature extremes, biological hazards, and indoor air quality issues. A study of methods with which to evaluate exposures to hazardous substances; a detailed analysis of control programs; and an examination of environmental protection acts and amendments are also included. Credits: 3

**IND 315 Facilities Planning**
This course is designed to introduce a comprehensive overview of the concepts and techniques to generate facility plans. The course includes the determination of the requirements for people, equipment, space, and material in the facility along with the evaluation, selection, preparation, presentation, implementation and maintenance of the facility plans. An overview of the components of a building structure, its envelope and related items are also discussed. Credits: 3

**IND 402 Facility Maintenance Management**
This objective of this course is to present a comprehensive overview of the management, administration and control of a facilities maintenance department, including an overview of business and financial issues work order systems; prioritizing, planning and scheduling of maintenance, construction, custodial and grounds keeping work; the contract cycle and components. Prerequisite(s): BUS 300 Credits: 3

**IND 405 Heating Ventilating, & Air Conditioning Systems**
This course covers design aspects of heating, ventilation and air conditioning systems, hydronic systems for commercial and residential applications. Design and selection of heating and cooling system components, boilers, air handling units, refrigeration systems, hydronic system components, terminal equipment, fans, pumps, compressed air properties and indoor air quality are also covered. Students are required to prepare term projects on heating and cooling load calculations for commercial and residential buildings. Prerequisite(s): MET 212, MET 230 and MET 314 Credits: 3

**IND 406 Energy Management**
This course covers a comprehensive study of various forms of energy generated from fossil fuels, alternative and renewable energy sources and their management. This course also covers life cycle cost of each type of energy system, energy conservation programs, smart building, load management, miscellaneous methods to increase the energy efficiency of a building, utility rate structures, reduction of energy demand and rebates. In addition, energy conservation will be covered with respect to its effect on indoor air quality and other environmental issues. Prerequisite(s): MET 212, MET 230 and MET 314 Credits: 3

**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 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 Note: Students cannot get credit for MET 205 and 205W; MET 205W can be used to fulfill the writing intensive requirement, which is offered at the discretion of the Automotive & Mechanical Engineering Technology Department. 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, 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 307 Electromechanical Control Systems
This course covers the fundamentals and physical principles of electro-pneumatic and hydraulic control circuits. Pneumatic and hydraulic components such as directional control valves, flow control valves, and pressure control valves will be covered. The course also covers programmable logic controller (PLC) using Allen-Bradley MicroLogix controller. Students will be designing and troubleshooting PLC controlled hydraulic and electro-pneumatic circuits in the laboratory. Automation Studio software will be used in designing and simulation of control circuits. Prerequisite: MET 230 Corequisite: MET 307L Credits: 3

MET 314 Applied Thermodynamics
This course lays the groundwork for the student's future studies in the area of thermal design, encompassing the fields of power, heating, air conditioning and refrigeration. Topics covered include basics such as the first and second laws of thermodynamics, equations of state for gases and vapors, and psychometrics. Building on this foundation, thermodynamic processes and cycles will be introduced, including the Carnot, and Vapor Compression refrigeration cycles. Thermal
equipment such as boilers, turbines, evaporators, condensers, compressors and heat exchangers will be analyzed.
Prerequisite(s): PHY 136 and MTH 130 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.