Energy Management Technology

Program No: 10-481-1

Associate Degree in Applied Science

Degree Completion Time: Four Terms

In general, an academic year consists of two terms; however, degree completion time may vary based on student scheduling needs and class availability. Degree completion time may vary based on student scheduling needs and class availability.

2013-2014

Catalog No.	Class Title	Credit(s)
	Term 1	
10413110	Energy Introduction to	2.00
10481114	Intro to Energy Management (ITV)	3.00
10660105	DC Fundamentals	3.00
10804118	Intermediate Algebra with Applications	4.00
10620103	Fluid Power 1	2.00
10809112	Principles of Sustainability	3.00
	Total	**17.00**
	Term 2	
10804114	College Technical Mathematics 1B	2.00
10103115	Excel 2010 -Level 1	1.00
10103124	Intro to MS Project—Level 1	1.00
10620104	Fluid Power 2	3.00
10481106	Intro to Water Resources (ITV)	2.00
10620138	Programmable Controllers - Allen Bradley	3.00
10660110	AC Fundamentals	3.00
10801195	Written Communication	3.00
	Total	**18.00**
	Term 3	
10806154	General Physics 1	4.00
10481109	Commercial HVACR Analysis ** (@NWTC)	3.00
10481111	Energy Control Strategies ** (@NWTC)	3.00
10481-115	Lighting Fundamentals ** (@NWTC)	3.00
10620141	Industrial Controls and Motors	3.00
10620164	Electromechanical Systems	3.00
	Total	**19.00**
	Term 4	
10481107	Building Energy Simulation **	3.00
10481108	Commercial Energy Analysis **(@NWTC)	3.00
10481110	Energy Accounting ** (@NWTC)	2.00
10481113	Energy Investment Analysis **(@NWTC)	3.00
10801197	Technical Reporting	3.00
10809198	Introduction to Psychology	3.00
	Total	**17.00**
	Program Total	**71.00**

**Must travel to NWTC

Note: Program start dates vary; check with your counselor for details.

Curriculum and program acceptance requirements are subject to change.

About the Shared Programs

Northeast Wisconsin Technical College (NWTC) offers its Energy Management Technology program in cooperation with LTC. As an Energy Management Technology student, you'll:

- Semester 1 and 2—Attend all classes at LTC.
- Semester 3 and 4—Attend classes at LTC and NWTC.
- Attend two live, interactive TV classes at LTC.
- Take general studies and business classes at LTC.

For program information and course scheduling, contact the LTC academic advisor.

About the Career

Conducting energy audits and assessments, energy management technologists identify energy efficiency improvement opportunities, evaluate energy usage patterns, and recommend energy conservation measures and alternative energy solutions. If you are detail-oriented, interested in energy management strategies, and eager to work with administrative and facilities management in detailing and following through on long-term energy implementation plans, this may be the career for you.

Careers

A graduate of the program will have the potential for employment with engineering firms, public and private utilities, energy equipment companies, HVAC contractors and departments of energy in the following careers:

- Energy Auditor
- Energy Management Consultant
- Program Coordinator
- Control System Specialist

Admissions Steps

- Submit Application and $30 Processing Fee to NWTC
- Meet with Program Advisor

Requirements for Program Entry

Courses required for mastery of algebra skills. For a description of algebra skills, see the Basic Education Section of this catalog.The student will either provide proof of having completed course work in Windows, Word, and Excel or pass a proficiency test.

Program Outcomes

You will learn to:

- Evaluate the energy use patterns for commercial building and recommend energy efficiency and alternative energy solutions for high-energy consuming buildings.
- Troubleshoot, upgrade and maintain the Energy Management Systems (EMS); perform data recovery and backup duties.
- Monitor the efficiency of energy management operations, detecting, where possible, equipment failures.
- Construct energy evaluation technical reports and make presentations for potential project implementation.
- Upload and download information from remote and local networks to aid in the efficiency of energy management.
- Enhances energy management software and prepare program documentation and flow charts.
- Read and comprehend mechanical blueprints and control drawings.
- Respond to calls for heating, ventilating, air conditioning, and exterior lighting service independently; and determine whether to dispatch appropriate staff or to resolve problems remotely via the energy management system.
- Assist in the writing of specifications for additional energy management systems.
- Write technical proposals for energy projects.
- Provide training to campus users and facilities operations staff.

Approximate Costs

- $132 per credit (resident)
- $198 per credit (out-of-state resident)
- Other fees vary by program (books, supplies, materials, tools, uniforms, health-related exams, etc.)

Entrance Assessment Scores

Accuplacer	ACT
Arithmetic - 101	Mathematics - 20
Reading - 79	Reading - 18
Sentence Skills - 89	English - 18
College Level Math - 50	NA
Algebra - 55	Elem. Algebra - 20

As a requirement for program entry, an Academic Skills Assessment (Accuplacer) with appropriate benchmark scores is necessary. Program benchmarks are Reading Comprehension 55, Arithmetic 34, and Sentence Skills 60. However, we recommend a student receive the scores listed above to be successful in this program. Remediation options are available to reach recommended scores. Equivalent assessment scores are acceptable. To learn more about these assessments and program benchmark scores, please contact a counselor at (920) 498-5444 or (888) 385-6982.

Bellevue University
Capella University
Concordia University
Excelsior College
Franklin University
Herzing University
Lakeland College
Ottawa University
Silver Lakae College
University of Phoenix
Upper Iowa University
UW-Green Bay
UW-Oshkosh
UW-Stout

10-481-106 Intro to Water Resources
Water use; basic hydrology, water stressors at multiple scales; storm water, wastewater and drinking water; water quality appropriate to use; water supply and demand management as well as emerging issues. This is an interactive TV course held at LTC.
PREREQUISITES: 10-481-112, Energy Efficient Methods; 10-481-114, Intro to Energy Management

10-481-107 Building Energy Simulators
...course covers the variety of computer programs available for analyzing commercial buildings including BIM methodology, hourly simulations and an overview of current programs on the market such as eQuest. This course is held at NWTC.
PREREQUISITES: 10-481-109, Commercial HVACR Systems Analysis; 10-481-111, Energy Control Strategies; 10-481-115, Lighting Applications

10-481-108 Commercial Energy Analysis
...emphasis is on the analysis of energy use in commercial buildings including utility bill analysis, audit data, identifying energy efficiency measures, energy savings and investment calculations, audit report writing. This course is held at NWTC.
PREREQUISITES: 10-481-109, Commercial HVACR Systems Analysis; 10-481-111, Energy Control Strategies, 10-481-115, Lighting Applications

10-481-109 Commercial HVACR Analysis
...identify commercial HVAC system types and the general energy use impact of each type. Calculations of system equipment efficiencies will be used to determine EER, SEER, AFUE, COP, combination and seasonal efficiency in boilers, balance point partial efficiency, BIN analysis. This course is held at NWTC.
PREREQUISITES: 10-481-112, Energy Efficient Methods; 10-481-114, Intro to Energy Management

10-481-110 Energy Accounting
...review of energy units, data gathering for energy accounting utility rates and schedules, energy data organization, adjusted baselines, cost avoidance, load factor, data anaylsis, data presentation, use of Utility Manager software. This course is held at NWTC.
PREREQUISITES: 10-481-109, Commercial HVACR Systems Analysis; 10-481-111, Energy Control Strategies, 10-481-115, Lighting Applications

10-481-111 Energy Control Strategies
...topics include building system control theory and devices; including electric, pneumatic and digital controls, emphasis is placed on identifying and understanding control strategies related to energy using systems and methods to estimate energy savings. This course is held at NWTC.
PREREQUISITES: 10-481-112, Energy Efficient Methods; 10-481-114, Intro to Energy Management

10-481-113 Energy Investment Analysis
...emphasis on simple payback and life-cycle cost analysis, time value of money, cash flow equivalence, cost-benefit analysis, tax credits, depreciation, inflation and/or escalating fuel costs on energy investments and cost estimating. This course is held at NWTC.
PREREQUISITES: 10-481-109, Commercial HVACR Systems Analysis; 10-481-111, Energy Control Strategies, 10-481-115, Lighting Applications

10-481-114 Intro to Energy Management
...defines the need for energy management as an integral part of society at all levels. The course will present the various opportunities available to energy management students through lectures, video and guest speakers. This is an interactive TV course held at LTC.

10-481-115 Lighting Applications
...assessment of quantity and quality of light, light sources, luminaries, lighting controls, manufacturer lamp and ballast specifications, lighting power density, lighting-HVAC interactions, retrofit opportunities, cost savings analysis and light codes/regulations. Students will critically evaluate lighting systems, luminaries and associated components. Understand and perform various types of luminance calculations, including point-by-point, lumen method and computerized procedures. This course is held at NWTC.
PREREQUISITES: 10-481-112, Energy Efficient Methods; 10-481-114, Intro to Energy Management)

10-103-124 Intro to MS Project - Level 1
…is a software tool used to enter, analyze, track, and summarize information about a project. This course prepares the learner to enter and edit tasks, durations, task dependencies, and lag and lead times. The learner will use the project time scale and calendar, review project statistics, work with a network diagram, create and assign resources, and track the progress of a project. This class is offered in a self-paced format.

10-103-115 Excel 2010 - Level 1
...introduces the learner to the following basic techniques: creating, modifying and formatting worksheets; entering formulas; working with functions; sorting, filtering and editing lists; working with charts; and developing multiple-sheet workbooks. This course is offered in a self-paced format.

10-413-110 Energy Introduction to
...provides participants with an overview of electrical energy generation and distribution. Topics include electricity from the following systems: photovoltaic, wind, coal-fired, hydro, and natural gas. Career awareness for maintenance technicians and plant operators is explored.

10620103 Fluid Power 1
...prepares the learner to identify hydraulic and pneumatic component symbols; adjust a pressure relief valve; analyze the operation of a pilot operated relief valve; analyze Pascal's law; evaluate flow, velocity, work and power in industrial hydraulic and pneumatic circuits; analyze meter-in, meter-out, and bypass flow control circuits; identify basic hydraulic and pneumatic control valves; and assemble hydraulic circuits.
COREQUISITE: 10804118 Intermediate Algebra with Applications

10620104 Fluid Power 2
...enhances the learner's ability to read schematics containing fluid power component symbols; assemble systems using schematics; analyze system's operation using a schematic; evaluate the general characteristics and terms of fluids under pressure, fluid conditioning, conductors, reservoirs, accumulators, pressure control; and troubleshoot malfunctioning pressurized systems.
PREREQUISITE: 10620103 Fluid Power 1 and COREQUISITE: 10804114 College Technical Math 1B

10-620-138 Programmable Controllers - Allen Bradley
…prepares the student to understand basic PLC structure and terminology; learn to create and troubleshoot basic PLC programs using the RSLOGIX 500 software and the RSLINX communication software; become familiar with communicating wit and programming SLC-500 and Micrologix PLCs.

10-620-141 Industrial Controls and Motors
...prepares the learner to select control devices by function and operation; illustrate electrical circuits using symbols, diagrams, and abbreviations; explain the operation of magnetic solenoids; apply motor control techniques; select relay type for industrial application; apply the basic rules of line and wiring diagrams; compare the types of timers and timing circuits used in control and explain the coding systems used; explain each type of control device and how it is used in an electrical circuit. Also prepares the learner to verify DC motor operational theories; select DC and AC motor types for general applications; identify AC motor components and wiring applications; verify single-phase operational theory; identify three phase motor components and wiring applications; verify three-phase motor operational theory; identify motor starting methods for industrial applications; verify electro-mechanical motor starting principals of operation; select the motor breaking method for industrial applications; verify the operational theory of speed and acceleration methods for motors used in industrial applications; design three-phase power motor circuits for industrial applications; design control circuits for three phase power motor circuits.
COREQUISITES: 10660110 AC Fundamentals or 10660110C1 AC Fundamentals (3 cr) or 10605110 AC Fundamentals or 10605110C1 AC Fundamentals (3 cr)

10-620-164 Electromechanical Systems
...prepares the student to communicate with, tune, run and troubleshoot Allen-Bradley Ultra 3000 servos; utilize electrical control of hydraulic systems; explore PID control of motor speed; and investigate loop and closed loop control systems.
PREREQUISITES: 10620160 Hydraulics II or 10620160C1 Hydraulics II (2 cr) and 10620161 Pneumatics I or COREQUISITE: 10620162 Pneumatics or CONDITION:104821 Wind Energy Technology program requirements met

10-660-105 DC Fundamentals
...prepares the student to follow safety procedures; maintain a safe and healthy work environment; convert values to scientific and engineering notations; calculate math quantities; describe basic atomic theory; identify basic electrical terms; use established symbols standards; describe DC voltage characteristics and current sources and electrical resistance; measure and analyze electrical quantities in series and parallel circuits; and desolder/solder single lead components.
COREQUISITES: 10804118 Intermediate Algebra with Applications

10-660-110 AC Fundamentals
...prepares the student to analyze electrical circuits using phasers and AC math, analyze AC waveforms, measure and analyze AC power, analyze capacitors and inductors in DC and AC circuits, analyze AC circuits containing reactance and calculate resonance, apply the elements and properties of basic measuring circuits, and describe transformer characteristics.
PREREQUISITES: 10660105 DC Fundamentals or 10660105C1 DC Fundamentals (3 cr) or 10605105 DC Fundamentals or 10605105C1 DC Fundamentals (3 cr)

10-801-195 Written Communication
...teaches the writing process, which includes prewriting, drafting, revising, and editing. Through a variety of writing assignments, the student will analyze audience and purpose, research and organize ideas, and format and design documents based on subject matter and content. Keyboarding skills are required for this course. It also develops critical reading and thinking skills through the analysis of a variety of written documents.
PREREQUISITE:10831103 Intro to College Writing or CONDITION: Written Comm Prepared Learner (Accuplacer Writing min score of 86 or Equivalent) and COREQUISITE: 10838105 Intro Rdg & Study Skills or CONDITION: Reading Accuplacer min score of 74 or equivalent

10-801-197 Technical Reporting
...provides students with the skills to prepare and present oral and written technical reports. Types of reports may include lab and field reports, proposals, technical letters and memos, technical research reports, and case studies. Designed as an advanced communication course for students who have completed at least the prerequisite introductory writing course.
PREREQUISITE:10831103 Intro to College Wrtg or CONDITION: Written Comm Prepared Learner (Accuplacer Wrtg min score of 86 or Equivalent) and COREQUISITE: 10838105 Intro Rdg & Study Skills or CONDITION: Reading Accuplacer min score of 74 or equivalent

10-804-114 College Technical Math 1B
...is a continuation of College Technical Math 1A.Topics include: measurement systems; computational geometry; right and oblique triangle trigonometry; and trigonometric functions on the unit circle. Emphasis will be on the application of skills to technical problems. Successful completion of College Technical Mathematics 1A and College Technical Mathematics 1B is the equivalent of College Technical Mathematics 1.
PREREQUISITE: 10804196 College Tech Math 1A, or COREQUISITE:10804113 College Tech Math 1A or10804118 Intermediate Algebra with Applications

10-804-118 Intermediate Algebra with Applications
…offers the learner algebra content with applications. Topics include properties of real numbers, order of operations, algebraic solution for linear equations and inequalities, operations with polynomial and rational expressions, operations with rational exponents and radicals, algebra of inverse, logarithmic and exponential functions.
PREREQUISITES Accuplacer Math score of 100 and Accuplacer Algebra score of 55 or equivalent or 10834110 Elementary Algebra w Apps and COREQUISITE: 10838105 Intro Reading and Study Skills or CONDITION: Reading accuplacer minimum score of 74 or equivalent

10-806-112 Principles of Sustainability
...prepares students to develop sustainable literacy, analyze interconnections among physical and biological sciences and environmental systems, summarize effects of sustainability on health and well-being, analyze connections among social, economic, and environmental systems, employ energy conservation strategies to reduce use of fossil fuels, investigate alternative energy options, evaluate options to current waste disposal/recycling in the U.S., and analyze approaches used by your community.
COREQUISITE:10838105 Intro Reading and Study Skills or Accuplacer Reading score of 74 or equivalent

10-806-154 General Physics 1
...presents the applications and theory of basic physics principles. This course emphasizes problem-solving, laboratory investigation, and applications. Topics include unit conversions and analysis, vectors, translational and rotational kinematics, translational and rotational dynamics, heat and temperature, and harmonic motion and waves.
COREQUISITE:10804197 College Tech Math 1B or 10804114 College Tech Math 1B or 10804114M1 College Tech Math 1B Mod 1 and 10804114M2 College Tech Math 1B Mod 2 or 10804115 College Tech Math 1

10-809-198 Intro to Psychology
...introduces students to a survey of the multiple aspects of human behavior. It involves a survey of the theoretical foundations of human functioning in such areas as learning, motivation, emotions, personality, deviance and pathology, physiological factors, and social influences. It directs the student to an insightful understanding of the complexities of human relationships in personal, social, and vocational settings.
COREQUISITE:10838105 Intro Reading and Study Skills or Accuplacer Reading score of 74 or equivalent

Revised 9-1-12