

Program Number 10-481-3
Associate Degree in Applied Science • Four Terms

ABOUT THE PROGRAM

Energy expenses make up a part of every business' bottom line. Employers are seeking those skilled in monitoring energy consumption with the ability to detect and evaluate energy efficiency opportunities. Graduates of the Energy Management Technology associate degree program are equipped to lead business' energy management initiatives. Energy managers work within a variety of business sectors: utility companies; energy equipment companies; government agencies; and heating, ventilating, air conditioning and refrigeration contractors. Graduates may also find careers as energy auditors, energy management consultants, or energy program coordinators.

PROGRAM OUTCOMES

- Troubleshoot, upgrade and maintain the Energy Management Systems (EMS); perform data recovery and backup duties.
- Enhance 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.
- Service equipment and systems.
- Recommend building/site solutions to optimize performance.
- Evaluate building performance and energy use.
- Evaluate renewable, fossil and other energy resources in context of sustainability, environment, society and economics.

ADMISSION TO DO'S

- Work with NWTC Admissions Specialist to:
 - Submit application and \$30 fee to NWTC.
 - Complete the online Student Success Questionnaire.
- Meet with NWTC program advisor to discuss program details.
- Meet with LTC program counselor to discuss program details.

FUTURE SEMESTER ENROLLMENT STEPS

- Complete online Student Success Tutorial prior to registering for second semester.

APPROXIMATE COSTS

- \$143.45 per credit tuition (WI resident) plus \$8.61 per credit student activity fee. Material fee varies depending on course. Other fees vary by program. Visit gotoltc.edu/financial-aid/tuition-and-fees for details.

SPECIAL NOTE

This program is shared with Northeast Wisconsin Technical College (NWTC) in Green Bay. LTC students follow NWTC's admission process; however, they are able to attend courses at the LTC Cleveland campus. The remainder of the courses are held at NWTC's Green Bay campus.

CAREER & EDUCATION ADVANCEMENT OPPORTUNITIES

NWTC transfer programs are offered through collaborative agreements with four-year college and university partners. Visit nwtc.edu/academics/transfer-opportunities.

CONTACT

NWTC:
 Cindy Kothbauer, Program Advisor
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Catalog No.	Class Title	Credit(s)
Term 1		
10890101	College 101 <i>(Held at NWTC)</i>	1
10620105	DC Fundamentals	2
10804113	College Tech Math 1A	3
10806154	General Physics 1	4
10480101	Intro to Renewable Energy & Sustainability <i>(Held at NWTC)</i>	4
10481114	Intro to Energy Management <i>(Held at NWTC)</i>	3
		17
Term 2		
10103121	Excel - Level 1	1
10620110	AC Fundamentals	2
10620138	Programmable Controllers - Allen Bradley	3
10801195	Written Communication	3
10804114	College Tech Math 1B <i>(Held at NWTC)</i>	2
10196187	Project Management <i>(Held at NWTC)</i>	1
10481116	Building Automation Systems (BAS) Networking <i>(Held at NWTC)</i>	3
10605157	Power Electronics 1: Drives <i>(Held at NWTC)</i>	1
		16
Term 3		
10620164	Electromechanical Systems	2
10809172	Introduction to Diversity Studies	3
10403100	Blueprint Reading Intro <i>(Held at NWTC)</i>	1
10481109	Commercial HVACR Analysis <i>(Held at NWTC)</i>	3
10481111	Energy Control Strategies <i>(Held at NWTC)</i>	3
10481115	Lighting Fundamentals <i>(Held at NWTC)</i>	3
10620220	Pumps: Intro to Fluid Moving Devices <i>(Held at NWTC)</i>	1
		16
Term 4		
10801196	Oral/Interpersonal Communication	3
10809198	Introduction to Psychology	3
10481107	Building Energy Simulation <i>(Held at NWTC)</i>	3
10481108	Commercial Energy Analysis <i>(Held at NWTC)</i>	3
10481110	Energy Accounting <i>(Held at NWTC)</i>	2
10481113	Energy Investment Analysis <i>(Held at NWTC)</i>	3
		17
		TOTAL 66

Classes meet at LTC, unless noted to be held at NWTC.

Curriculum and Program Acceptance requirements are subject to change. Program start dates vary; check with your advisor for details. The tuition and fees are approximate based on 2022-2023 rates and are subject to change prior to the start of the academic year.

AC FUNDAMENTALS...prepares the student to analyze electrical circuits using 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

BLUEPRINT READING INTRO...develops the knowledge, skills, process, and understanding of site plans, footings and foundations, floor plans, elevations, below-grade piping, above-grade piping, isometric piping diagrams, schedules and details, electrical floor plans, lighting, ventilating, and air conditioning. Course Typically Offered: Fall

BUILDING AUTOMATION SYSTEM (BAS) NETWORKING...presents the fundamental concepts of data transmission in various media types. Topics include network fundamentals, standards, OSI model, IP protocol, network signal transmission, media, protocols, physical topologies, logical topologies, hardware, typical BAS networks, and typical BAS subnetworks.

BUILDING ENERGY SIMULATION...covers the variety of computer programs available for analyzing the energy performance of commercial buildings including BIN methodology, hourly simulations, and an overview of current programs on the market such as RETScreen and eQuest. PREREQUISITES: 10481109 Commercial HVACR Systems Analysis; 10481111 Energy Control Strategies; 10481115 Lighting Fund

COLLEGE 101...provides an overview of various renewable energy technologies and sustainable design practices and their current applications. Emphasis will be placed on policies, renewable energy production, green products, and jobs. Course Typically Offered: Fall/Spring

COLLEGE TECHNICAL MATHEMATICS 1A...prepares the student to solve linear, quadratic, and relational equations; graph; formula rearrangement; solve systems of equations; percent; proportions; and operations on polynomials. Emphasis will be on the application of skills to technical problems. PREREQUISITES: 10834110 Elementary Algebra w Apps or 10804107 College Mathematics or 31457318 Ind Mtnc Trades Math or 31420320 Machine Tool Math or math placement assessment equivalent

COLLEGE TECHNICAL MATHEMATICS 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. PREREQUISITE: 10804196 College Tech Math 1A or 10804113 College Tech Math 1A or Math placement assessment equivalent or COREQUISITE: 10804118 Intermediate Algebra w Apps

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. PREREQUISITES: 10481109 Commercial HVACR Systems Analysis, 10481111 Energy Control Strategies, 10481115 Lighting Fundamentals - See more at: <https://classcart.nwtc.edu/Classes/Details?courseId=637#sthash.CM5sAh93.dpuf>

COMMERCIAL HVACR ANALYSIS...identifies 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. PREREQUISITE: 10481114 Intro to Energy Management

DC FUNDAMENTALS...prepares the student to 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: 10804115 College Technical Math 1 or 10804113 College Tech Math 1A and 10804114 College Tech Math 1B

ELECTROMECHANICAL SYSTEMS...prepares the student to communicate with, tune, run, and troubleshoot Allen-Bradley servos; utilize electrical control of hydraulic systems, explore PID control of motor speed; and investigate open and closed loop control systems. PREREQUISITES: Fluid Power 2 and 10660110 AC Fundamentals

ENERGY ACCOUNTING...reviews energy units, data gathering for energy accounting utility rates and schedules, energy data organization, adjusted baselines, cost avoidance, load factor, data analysis, data presentation, use of utility energy accounting software. PREREQUISITES: 10481109 Commercial HVACR Systems Analysis; 10481111 Energy Control Strategies, 10481115 Lighting Fundamentals

ENERGY CONTROL STRATEGIES...includes building system control concepts and devices; such as 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. PREREQUISITE: 10481114 Intro to Energy Management. Course Typically Offered: Fall

ENERGY-INTRO RENEW & SUSTAIN...provides an overview of various renewable energy technologies and sustainable design practices and their current applications. Emphasis will be placed on policies, renewable energy production, green products, and jobs. Course Typically Offered: Fall/Spring

ENERGY INVESTMENT ANALYSIS...emphasizes 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. PREREQUISITES: 10481109 Commercial HVACR Systems Analysis, 10481111 Energy Control Strategies, 10481115 Lighting Fundamentals

EXCEL - LEVEL 1...introduces the student to spreadsheet features such as creating, saving, editing, navigating, formatting worksheets; entering formulas and functions; working with charts; and developing multiple-sheet workbooks.

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. PREREQUISITE: 10804113 College Tech Math 1A, 10804115 College Tech Math 1, or 10804118 Intermediate Algebra, or Math placement assessment equivalent

INTRO TO ENERGY MANAGEMENT...introduces the basic concepts of energy, utility systems, and utility rate structures; 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. Course Typically Offered: Fall

INTRODUCTION TO DIVERSITY STUDIES...introduces learners to the study of diversity from a local to a global environment using a holistic, interdisciplinary approach. Encourages self-exploration and prepares the learner to work in a diverse environment. In addition to an analysis of majority/minority relations in a multicultural context, the primary topics of race, ethnicity, age, gender, class, sexual orientation, disability, religion are explored. COREQUISITE: 10838105 Intro Reading and Study Skills or Reading placement assessment equivalent

INTRODUCTION 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. PREREQUISITE: Reading placement assessment equivalent or COREQUISITE: 10838105 Intro to Reading and Study Skills

LIGHTING FUNDAMENTALS...emphasizes light sources, luminaries, lighting controls, manufacturer lamp and ballast specifications, lighting power density, lighting-HVAC interactions, retrofit opportunities, cost savings analysis and lighting codes/regulations. Students will critically evaluate lighting systems, luminaries and associated components. Understand and perform various types of lighting calculations. PREREQUISITE: 10481114 Intro to Energy Mngmnt. Course Typically Offered: Fall

ORAL/INTERPERSONAL COMMUNICATION...provides students with the skills to develop speaking, verbal and nonverbal communication, and listening skills through individual speeches, group activities, and other projects. COREQUISITE: 10838105 Intro Reading and Study Skills or Reading placement assessment equivalent

POWER ELECTRONICS 1: DRIVES...the device characteristics and applications of thyristors, power transistors, and switching devices.

PROJECT MANAGEMENT...the role of project management, developing a project proposal, use of relevant software, working with project teams, sequencing tasks, charting progress, dealing with variations, budgets and resources, implementation, and assessment.

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 with programming SLC-500 PLCs. This course is highly computer based.

PUMPS: INTRO TO FLUID MOVING DEVICES...provides the opportunity for the learner to develop the knowledge, skills, and understanding of pumps, the different classifications of pumps, the inner workings, general maintenance and pumping theory.

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 Wrtg or Writing placement assessment equivalent and COREQUISITE: 10838105 Intro Rdg & Study Skills or Reading placement assessment equivalent