LTC LAKESHORE TECHNICAL COLLEGE

ENERGY MANAGEMENT TECHNOLOGY

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

ABOUT THE PROGRAM

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.

PROGRAM OUTCOMES

- Evaluate the energy use patterns for commercial buildings 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.

PROGRAM ADMISSIONS STEPS

- Work with Career Coach to:
  - Submit application and $30 fee to NWTC.
  - Complete an assessment for placement (Accuplacer or ACT).
- Meet with NWTC program advisor to discuss program details.

APPROXIMATE COSTS

- $140 per credit (resident)
- $205 per credit (out-of-state resident)
- Other fees vary by program (books, supplies, materials, tools, uniforms, health-related exams, etc.) 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 49 credits at the LTC Cleveland campus. This includes 34 credits in Terms 1 and 2, and 15 credits in Terms 3 and 4. The remainder of the courses noted with ** are held at NWTC's Green Bay campus.

CAREER & EDUCATION ADVANCEMENT OPPORTUNITIES

LTC credits transfer to over 30 universities. For more information visit gotoltc.edu/future-students/transfer.

CONTACT

NWTC:
Cindy Kothbauer, Program Advisor
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LTC:
LTC Career Coach
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Catalog No.	Class Title	Credit(s)
	Term 1	
10480101	Energy-Intro Renew & Sustain (ITV)	4
10481114	Intro to Energy Management (ITV)	3
10660105	DC Fundamentals	2
10804115	College Tech Math 1	5
10620103	Fluid Power 1	2
10801195	Written Communication	3
		19
	Term 2	
10103131	Excel 2013 -Level 1	1
10103124	Intro to MS Project—Level 1	1
10620104	Fluid Power 2	3
10481106	Intro to Water Resources (ITV)	2
10620141	Industrial Controls and Motors	3
10660110	AC Fundamentals	2
10620138	Programmable Controllers - Allen Bradley	3
10804116	College Tech Math 2 **	4
		19
	Term 3	
10403100	Blueprint Reading Intro**	1
10481109	Commercial HVACR Analysis **	3
10481111	Energy Control Strategies **	3
10481115	Lighting Applications **	3
10620164	Electromechanical Systems	2
10809172	Introduction to Diversity Studies	3
10806154	General Physics 1	4
		19
	Term 4	
10481107	Building Energy Simulators **	3
10481108	Commercial Energy Analysis **	3
10481110	Energy Accounting **	2
10481113	Energy Investment Analysis **	3
10801197	Technical Reporting	3
10809198	Introduction to Psychology	3
		17
		TOTAL 74

**=Classes held at NWTC (all other classes are held at LTC)

Curriculum and Program Acceptance requirements are subject to change. Program start dates vary; check with your advisor for details.

The Hire in HIGHER EDUCATION

2016-17

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, applythe elements and properties of basic measuring circuits, and describe transformer characteristics. PREREQUISITES: 10660105 DC Fundamentals

BLUE PRINT READING INTRO...develop the knowledge skills process and understanding of site plans, footings and foundations, floor plans, elevations, below-grade piping, above-grade piping, above-grade piping, isometric piping diagrams, schedules and details.

BUILDING ENERGY SIMULATION...course 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: 10-481-109, Commercial HVACR Systems Analysis; 10-481-111, Energy Control Strategies; 10-481-115, Lighting Fundamentals)

COLLEGE TECHNICAL MATH 1...prepares student to solve linear, quadratic, & rational equations; graphing; formula rearrangement; solve systems of equations; percent; proportions; measurement systems; computational geometry; right and oblique triangle trigonometry; trigonometric functions on the unit circle; and operations on polynomials. Emphasis on application of skills to technical problems. Course is the equivalent of successful completion of College Tech Math 1a & 1b. PREREQ: 10834110 Elementary Algebra w Apps or 31457318 Ind Mtnc Trades Math or 31420320 Machine Tool Math or equiv.

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: 10-481-109, Commercial HVACR Systems Analysis; 10-481-111, Energy Control Strategies, 10-481-115, Lighting Fundamentals)

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. (Prerequisites: 10-481-114, 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 or 10804118 Intermediate Algebra w Applications & 10624105 or 10624105HS Health Physics Calculations & Statistics

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...review of 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: 10-481-109, Commercial HVACR Systems Analysis; 10-481-111, Energy Control Strategies, 10-481-115, Lighting Fundamentals)

ENERGY CONTROL STRATEGIES...topics include building system control concepts 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. (Prerequisite: 10-481-114, Intro to Energy Mngnt)

ENERGY INTRODUCTION TO...an overview of various renewable energy technologies and sustainable design practices and their current applications. Emphasis will be placed on policies, renewable energy production, and green products.

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. (Prerequisites: 10-481-109, Commercial HVACR Systems Analysis; 10-481-111, Energy Control Strategies, 10-481-115, Lighting Applications)

EXCEL 2013 - LEVEL 1...introduces the student to creating, modifying and formatting worksheets; entering formulas and functions; working with charts; and developing multiple-sheet workbooks. This course is offered in a self-paced format.

FLUID POWER 1...prepares learner to identify hydraulic & 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 & pneumatic circuits; analyze meter-in, meter-out, and bypass flow control circuits; identify basic hydraulic and pneumatic control valves; and assemble hydraulic circuits. COREQ: 10804115 College Tech Math 1 or 10804113 College Tech Math 1A & 10804114 College Tech Math 1B

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 or 10620155 Industrial Maintenance Hydraulics and Pneumatics

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 & 10804114M2 College Tech Math 1B Mod 2 or 10804115 College Tech Math 1 or 10624105 Hlth Phys Calc & Stats and 10804118 Interm Algebra

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 and apply motor control techniques and introduces thestudent to three-phase power motor circuits for industrial applications. COREQUISITES: 10660110 AC Fundamentals

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 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.

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.

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. COREQUISITE: 10838105 Intro Reading and Study Skills or equivalent

INTRO TO WATER RESOURCES...properties of water, basic hydrology, water quality; water consumption standards related to energy; stormwater, wastewater and drinking water; water supply and demand management as well as emerging issues. (Prerequisites: 10-481-114, Intro to Energy Management)

LIGHTING FUNDAMENTALS...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: 10-481-114, Intro to Energy Management

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 and Micrologix PLCs. This course is highly computer based.

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. PREREQUISITE: 10831103 Intro to College Wrtg or equivalent and COREQUISITE: 10838105 Intro Rdg & Study Skills or equivalent

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 equivalent and COREQUISITE: 10838105 Intro Rdg & Study Skills or equivalent