

ENERGY EFFICIENCY TECHNICIAN



Program Code 10-481-1

Expected Program Costs: \$11,600

Median Annual Salary: \$35,000

OVERVIEW

This program prepares technicians to evaluate the energy use patterns for residential and light-commercial buildings and recommend energy efficiency and alternative energy solutions for high-energy consuming buildings.

The Energy Efficiency Technician program is offered at the Wisconsin Rapids campus.

PROGRAM OUTCOMES

Employers will expect you, as an Energy Efficiency Technician graduate, to be able to:

- Evaluate the energy use patterns for residential and light commercial buildings
- Perform building shell analyses
- Conduct energy audits
- Recommend energy efficiency solutions
- Construct energy evaluation technical reports and make presentations for potential project implementation
- Install energy efficiency upgrades

CAREER OPPORTUNITIES

Air Sealer & Insulator
Crew Leader
Energy Auditor
Energy Management Consultant
Energy Rater/Evaluator
Engineering Technician
Home Performance Consultant
Sales Representative
Weatherization Auditor
Weatherization Quality Inspector

POTENTIAL FOR ADVANCEMENT

Industrial/Commercial Customer Service Representative
Project Engineer
Project Manager

Potential advancement generally requires further education or training.

ADMISSIONS PROCEDURES

To apply to the Energy Efficiency Technician program, please submit the following documents to the MSTC Admissions Office:

1. Complete an MSTC application form and return it with the \$30 non-refundable application fee.
2. Complete the Accuplacer or ACT test. Minimum scores required:
 - Reading-Accuplacer score of 55
 - Sentence Skills-Accuplacer score of 60
 - Math-Accuplacer score of 34
 - ACT equivalents for above scores are acceptable.

If a student does not meet the required test scores, they may retest or complete an identified structured course(s) in the Academic Support Center.

- Written Communication, courses in mathematics and some science courses have placement requirements. Please refer to the course description section in the back of the catalog, listed under General Education, for course specific information.
3. Submit an official copy of all academic transcripts, including high school, college or university and HSED/GED.

PROGRAM COURSE DESCRIPTION

10001148 // 3 credits

People, Resources and the Sustainability

This course explores the relationship between the human population and natural resources over time, and the effect this relationship has on the biosphere. Global resources, environmental concerns, and the human dimensions of resource management are explored from biological and socioeconomic perspectives.

10103106 // 3 credits

Microsoft Office-Introduction

Develops introductory skills in the Microsoft Office Suite (Word, Excel, Access, PowerPoint, and Outlook) while reinforcing the students' knowledge of computer concepts, Windows Explorer and Internet usage through demonstrations and lab exercises. Students should possess basic keyboarding, mouse and Windows XP skills. Students may develop these skills in Academic Support Center computer training prior to enrolling or while concurrently enrolled in the Microsoft Office-Introduction course.

Mid-State Technical College

Admissions

500 32nd Street North

Wisconsin Rapids, WI 54494

10103124 // 1 credit

Excel-Intermediate

Develop skill to write and debug macros, create custom menus, perform database functions and develop graphs.
Prerequisite: Microsoft Office-Introduction 10103106 or Excel-Beginning 10103123

10480100 // 2 credits

Alternative Energy Overview

In this course, students will investigate the need for renewable energy systems and emerging careers in renewable energy. Students will examine the basic design, function, cost, and other considerations associated with various "green" energy systems, including solar photovoltaic, solar thermal, wind, geothermal and biomass. Students will also explore the production and use of alternative transportation fuels.

10480190 // 2 credits

Renewable Energy Internship

Student internships provide an opportunity for career success through supervised on-the-job learning experiences.

Through an internship, students will apply subject knowledge learned in the program to the workplace under the direction of an experienced technician.

Prerequisite: Completion of 50% of program credits

10480195 // 2 credits

Renewable Energy/Energy Conservation-Special Topics

Selected hands-on project in renewable energy/energy conservation requiring students to apply subject knowledge learned in the program.

Prerequisite: Completion of 50% of program credits

10481100 // 2 credits

Intro to Energy Efficiency & Management

Students in this course will be introduced to the principles of energy management and the energy efficiency industry. Students will learn about the history of energy production and costs, the dynamics of worldwide energy consumption and growth including environmental and financial impacts and consequences. Building energy flows will be described and analyzed. Students will be introduced to the use of building diagnostic tools commonly employed in the industry to identify opportunities for improving energy efficiency. Building design features will be examined for efficiency/management improvements or upgrades.

Prerequisite: Admission to Energy Efficiency Technician 104811, Renewable Electricity Technician 104822, Renewable Energy Specialist 104823, or Renewable Thermal Energy Technician 104831 Program

10481109 // 2 credits

Building Envelope Analysis I

Students will learn the tools and techniques used in the analysis of building shell integrity, with the first module to focus on blower door testing to quantify building envelope air leakage and infiltration rates. These concepts and skills will be taught through extensive lab-hours working directly with the tools of the trade.

Corequisites: Intro to Energy Efficiency & Management 10481100; Construction Fundamentals 10482107; and College Mathematics 10804107

CURRICULUM

Term (17 credits)

10103106	Microsoft Office-Introduction	3
10481100	Intro to Energy Efficiency & Management	2
10481109	Building Envelope Analysis I	2
10482107	Construction Fundamentals	2
10483100	Intro to Renewable Thermal Systems	3
10483122	Ventilation & Cooling Systems	2
10804107	College Mathematics	3

Term (17-18 credits)

10103124	Excel-Intermediate	1
10480100	Alternative Energy Overview	2
10481110	Building Envelope Analysis II	2
10483115	Heat Load Estimation	2
10483120	Heating & Plumbing Systems	2
10605105	Electrical Circuits I	3
	-or-	
10605108	Intro to Electronics	2
10801195	Written Communication	3
10801196	Oral/Interpersonal Communication	3
10801198	Speech	3

Term (2 credits)

10480190	Renewable Energy Internship	3
10480195	Renewable Energy/Energy Conservation-Special Topics	2

Term (16 credits)

10001148	People, Resources and the Sustainability	3
10481111	Building Envelope Analysis III	2
10481130	Building Energy Modeling	4
10482100	Intro to Renewable Electricity	2
10623106	Intro to AutoCAD	2
10809143	Microeconomics	3
10809144	Macroeconomics	3

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CURRICULUM

Continued from the previous page

Term	(16 credits)
10481140 Intro to Commercial Energy Management	3
10481150 Energy Analysis Capstone	3
10809122 Intro to American Government	3
10809172 Race, Ethnic & Diversity Studies -or-	3
10809196 Intro to Sociology	3
10809198 Intro to Psychology	3
Elective	1

Total Credits 68-69

Please Note:

- The Energy Efficiency Technician program has an August start date. We advise you to meet with an academic advisor or counselor to successfully plan your academic schedule.
- This curriculum sequence is only for student planning. Actual student schedules will vary depending on course availability.
- Degree completion time may vary based on student scheduling and course availability.
- For General Education course descriptions (800 level), see section marked under Course Descriptions.

10481110 // 2 credits

Building Envelope Analysis II

Students will learn the tools and techniques used in the analysis of building shell integrity, focused on how to use an infrared camera to detect insulation, air and water problems in a building, complemented by blower door testing. These concepts and skills will be taught through extensive lab-hours working directly with the tools of the trade. This module will also require students to investigate building ductwork through the use of duct blowers, pressure pan testing, evaluating standards for duct tightness, and identifying the implications of duct leakage on building performance.

Prerequisite: Building Envelope Analysis I 10481109

10481111 // 2 credits

Building Envelope Analysis III

Students will learn the tools and techniques used in the analysis of building shell integrity, with a focus upon combustion safety testing, gas leakage testing, complemented again by the use of the thermal imaging camera. These concepts and skills will be taught through extensive lab-hours working directly with the tools of the trade over the program schedule. Students will develop skills doing assessments related to thermal and moisture problems in buildings in order to maintain healthy indoor air quality. Course will include air flow, metrics and standards for building 'tightness' (BPI), equipment tolerances for combustion safety and testing procedure, and implications on occupant health and safety.

Prerequisite: Building Envelope Analysis II 10481110

10481130 // 4 credits

Building Energy Modeling

The course covers a variety of computer programs available for analyzing buildings. Topics include BIN methodology, hourly simulations, utility rate analysis, cost estimating, analysis of energy efficiency measures, environmental and pollutant analysis, and financing options. Students will perform supervised computer simulations, using software packages such as eQuest, REM Rate, Energy Gauge, Optimizer, and others. Students will utilize software tools to prioritize potential energy efficiency measures based on both cost effectiveness and environmental impact.

Corequisite: Building Envelope Analysis III 10481111

10481140 // 3 credits

Intro to Commercial Energy Management

This course will provide an overview of energy, process and building systems common to commercial facilities with an emphasis on improving energy efficiency and cost savings. Topics include day-lighting, lighting systems and controls, compressed air systems, heat recovery, chillers/cooling towers, hydronic pumping systems, geothermal systems, motors, commercial HVAC systems and controls, indoor air quality, boilers and steam systems, and commercial energy audits.

Prerequisite: Intro to Energy Efficiency & Management 10481100

10481150 // 3 credits

Energy Analysis Capstone

The student will perform critical examinations of energy consuming facilities, including residential and/or light commercial, for the purpose of identifying energy efficiency opportunities. In addition, the student will identify various energy efficiency measures, including equipment that can be installed to further reduce energy consumption. Energy audits will be performed at various locations. The student will create a final energy audit report and energy management plan, and will present the plan to both the class and to the energy management team or owner of the facility.

Prerequisite: Building Energy Modeling 10481130

10482100 // 2 credits

Intro to Renewable Electricity

Students in this course will learn the basics of renewable electricity generation with particular emphasis on wind and solar energy. Topics will include wind and solar resources, basic system components, system types and applications.

Prerequisite: Admission to Energy Efficiency Technician 104811, Renewable Electricity Technician 104822, Renewable Energy Specialist 104823, or Renewable Thermal Energy Technician 104831 Program

10482107 // 2 credits

Construction Fundamentals

Students will study the concepts associated with the theory, materials, and methods used in construction to include footings and foundations, walls, floors, roofs and roof materials, exterior finishes, interior walls, ceiling and floor finishes, insulation types, vapor and air infiltration, and sound protection. Additionally, students will become familiar with blueprint reading and examine all the trades associated with construction including, electrical, HVAC, and plumbing. The safe use of the appropriate tools for each trade will also be covered.

Prerequisite: Admission to Energy Efficiency Technician 104811, Renewable Electricity Technician 104822, Renewable Energy Specialist 104823, or Renewable Thermal Energy Technician 104831 Program

10483100 // 3 credits

Intro to Renewable Thermal Systems

This course provides an overview of a variety of renewable/alternative water and space heating systems including, solar, geothermal and biomass. This overview will include an introduction to system design, installation and operation.

Prerequisite: Admission to Energy Efficiency Technician 104811, Renewable Electricity Technician 104822, Renewable Energy Specialist 104823, or Renewable Thermal Energy Technician 104831 Program

10483115 // 2 credits

Heat Load Estimation

This course will teach the student how to use "Manual J" from ACCA. The student will develop the skills to do residential heating and cooling heat loads. Students will calculate heat loss and also losses or gains due to infiltration, sun loads etc. The student will do calculations on actual buildings using ACCA industry standard form J-1. The student will also estimate energy upgrades such as insulation, window improvements, etc. and calculating payback and fuel savings.

Prerequisite: College Mathematics 10804107; Corequisite: Heating & Plumbing Systems 10483120 or Ventilation & Cooling Systems 10483122

10483120 // 2 credits

Heating & Plumbing Systems

Heating system topics include introduction to heat principles, temperature measurement, fuels and other sources of heat, combustion, basic heating systems, basic furnace design, gas furnace design and operation, venting of furnaces, chimney or exhaust gases, and system controls. Plumbing system topics include fluid dynamics (pressure, resistance, and flow), basic system design, water heating, and operation of standard plumbing fixtures.

Prerequisite: Admission to Energy Efficiency Technician 104811, Renewable Electricity Technician 104822, Renewable Energy Specialist 104823, or Renewable Thermal Energy Technician 104831 Program

10483122 // 2 credits

Ventilation & Cooling Systems

Topics covered include air conditioning principles and terms, physical principles of air movement, air filtering and humidity, methods of conditioning air for comfort and health. In addition, the proper use of psychrometers, dry bulb thermometers, hygrometers, and the reading and interpretation of psychrometric charts and scales are covered, along with ASHRAE and BPI ventilation standards for residential units. Descriptions of new products, and maintenance and operations for residential and commercial cooling systems are also covered, emphasizing energy conservation and efficiency options for new and existing equipment.

10605108 // 2 credits

Intro to Electronics

This course presents a survey of electricity and electronics which includes lab activities and is designed for persons wishing to learn some of the basics of electricity and electronics. It is an excellent refresher course to get back into electronics or improve a skills list. The course is intended for persons where electronics has become a part of their regular occupation and a need exists to identify various electronic components and perform basic tests using test equipment such as multimeters and oscilloscopes. The course covers concepts and applications of DC and AC electricity, semiconductor components, and digital devices using basic math skills.

10623106 // 2 credits

Intro to AutoCAD

This is an introductory course in computer aided drafting (CAD) using AutoCAD software. It will provide foundation skills in using CAD software to create and print two dimensional technical drawings. This course is available to students in any program. Computer skills and prior knowledge of drawing/drafting techniques is recommended.