

Renewable Thermal Energy Technician

Associate in Applied Science Degree (AAS)

Overview

The Renewable Thermal Energy Technician program will prepare technicians who design, install, operate and maintain solar, geothermal and biomass heating systems for both residential and commercial applications. Technicians will perform site assessments and integrate new

renewable thermal systems with current existing energy sources. Renewable thermal energy technician may be involved in the sale or marketing of solar, geothermal and biomass thermal energy technologies.

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



Career Options

Controls Technician
Geothermal Installation, Maintenance and Repair Technician
Geothermal Sales Representative
Heat Load Estimator
Pre-Apprentice/Laborer
Production Assistant
Service Technician
Solar Site Assessor
Solar Thermal Installation, Maintenance and Repair Technician
Solar Thermal Sales Representative

Potential for Advancement

Energy Analyst
Journey person: Plumber, Steamfitter
Master Technician
Project Development Engineers
Project Manager
System Designer
Potential advancement generally requires further education or training.

Admissions Procedures

To apply to the Renewable Thermal Energy Technician program, please submit the following to MSTC Student Affairs Admissions Office:

1. WTCS application form and \$30 non-refundable application fee
2. Completed Accuplacer test. (Other test scores may be acceptable alternatives.) Entrance exam requirements for the Renewable Thermal Energy Technician program are:
 - Reading—Accuplacer score of 55 or equivalent
 - Language—Accuplacer score of 60 or equivalent
 - Math—Accuplacer score of 34 or equivalentIf a student does not meet the required scores in these academic areas, they may

remediate and retest or complete an identified structured remediation course(s) in the Academic Support Center.

3. High school transcript or GED/HSED scores

Mid-State Technical College
Admissions
500 32nd Street North
Wisconsin Rapids, WI 54494
mstc.edu
888.575.MSTC

Program Course Descriptions

10001148

People, Resources & Biosphere 3 credits

Global resource and environmental problems from a historic, socioeconomic and biological perspective.

10103106

Microsoft Office-Beginning 3 credits

Develops introductory skills in the Microsoft Office Suite (Word, Excel, Access, PowerPoint), Windows Explorer, Internet and computer concepts through demonstrations and lab exercises.

10103124

Excel-Intermediate 1 credit

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

10468100

Alternative Energy Overview 2 credits

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.

Program Outcomes

Employers will expect you, as a Renewable Thermal Energy Technician graduate, to be able to:

- Work safely with renewable thermal systems
- Install solar collectors
- Install geothermal heat pumps
- Install biomass boilers
- Install water heater and storage tanks
- Install piping, pipe insulation and connect system piping
- Install balance of system components
- Install electrical control systems
- Perform a system checkout and inspection
- Maintain and troubleshoot a renewable thermal system
- Select a system design
- Adapt a system design
- Conduct a site assessment

10482105
Building Codes & Standards **3 credits**

This course will cover the building codes and standards relevant to the installation of renewable energy systems. Additionally the LEED Certification and Wisconsin Green Built Home standards will be presented.

10482107
Construction Fundamentals **3 credits**

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.

10483100
Intro to Renewable Thermal Systems **3 credits**

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.

10483101
Solar Hot Water Site Assessor Training **2 credits**

Students will learn how to assess a facility for its potential for a solar hot water system. Students will learn how to define a site's solar window, interpret solar radiation and temperature data, size a system, identify mounting and engineering considerations relevant to the installation; identify & recommend steps for energy efficiency; perform a load analysis; describe and identify components of a solar water heating system; perform a general cost estimate for a solar water heating installation; list installers and equipment vendors; provide information on financial programs in Wisconsin. Prerequisite: Intro to Renewable Thermal Systems 10483100

10483110
Solar Hot Water System Installation I **2 credits**

This course will involve students in the installation of a solar hot water system. Topics include safety, system design and layout, component selection, mounting collectors, plumbing and insulating copper pipe, and installing a storage tank, heat exchanger, circulation pump and other system components. Prerequisite: Piping Fundamentals 10483121

10483111
Solar Hot Water System Installation II **2 credits**

This course is a continuation of Solar Hot Water System Installation I and will involve students as the lead installer in a solar hot water system installation. Prerequisite: Solar Hot Water Installation I 10483110

10483115
Heat Load Estimation **2 credits**

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.

10483120
Traditional Heating & Plumbing Systems **3 credits**

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.

10483121
Piping Fundamentals **2 credits**

This course will present the theory of basic methods of plumbing and piping installation practices. Laboratory activities will provide students with basic pipe joining processes associated with the plumbing field.

10483130
Electrical Controls & Systems **3 credits**

Topics in this course include an introduction to AC/DC electricity and the physical laws that apply to electronic circuits. Direct Current (DC) covers basic definitions of voltage, current and resistance and analysis of series and parallel resistive circuits. Alternating Current (AC) includes an introduction to AC generation, capacitors, inductors and transformers and their applications in electronic circuits. Additional topics include control circuits, symbols, diagrams, protection devices, relays, thermostats, single-phase motors, control components and troubleshooting ACR system wiring diagrams. Prerequisite: Electrical Circuits I 10605105

Curriculum

First Semester (17 credits)

10801195	Written Communication	3
10103106	Microsoft Office-Beginning	3
10482105	Building Codes & Standards	3
10482107	Construction Fundamentals	3
10483120	Traditional Heating & Plumbing Systems	3
10606105	Intro to AutoCAD	2

Second Semester (17 credits)

10001148	People, Resources & Biosphere	3
10103124	Excel-Intermediate	1
10468100	Alternative Energy Overview	2
10483100	Intro to Renewable Thermal Systems	3
10483121	Piping Fundamentals	2
10605105	Electrical Circuits I	3
10804110	Elementary Algebra with Applications	3

Third Semester (18 credits)

10483101	Solar Hot Water Site Assessor Training	2
10483110	Solar Hot Water System Installation I	2
10483115	Heat Load Estimation	2
10483130	Electrical Controls & Systems	3
10801196	Oral/Interpersonal Communication3 or	3
10801198	Speech	3
10809122	Intro to American Government	3
10809143	Microeconomics or	3
10809144	Macroeconomics	3

Fourth Semester (16 credits)

10483111	Solar Hot Water System Installation II	2
10483131	Control Circuit Applications	3
10483140	Renewable Thermal Systems Troubleshooting/Repair	3
10809172	Race, Ethnic & Diversity Studies3 or	3
10809196	Intro to Sociology	3
10809198	Intro to Psychology Elective	3

Total Credits **68**

Please Note:

- The Renewable Thermal Energy Technician program has August and January starting dates. However, we advise you to meet with a counselor to successfully plan your academic schedule.
- Degree completion time may vary based on student scheduling needs and course availability.
- For General Education course descriptions (800 level courses), see section marked under Course Descriptions.

Renewable Thermal Energy Technician (continued)

10483131

Control Circuit Applications **3 credits**

Topics include control circuit terminology, measuring devices, and control systems. The principles of self-contained, electro-mechanical and electronic-electric controls are examined and applied to control systems operation and design. Prerequisite: Electrical Controls & Systems 10483130

10483140

**Renewable Thermal Systems
Troubleshooting/Repair** **3 credits**

In this class the student will be responsible for troubleshooting and repairing a variety of renewable thermal equipment, including electronic control systems. The student will be required to diagnose the faulty equipment, select the proper replacement parts, return the equipment to a working condition and prepare a detailed work order listing all work performed. Prerequisite: Control Circuit Applications 10483131

10605105

Electrical Circuits I **3 credits**

An introduction to AC/DC electricity and the physical laws that apply to electronic circuits. Direct Current (DC) covers basic definitions of voltage, current and resistance and analysis of series and parallel resistive circuits. Alternating Current (AC) includes an introduction to AC generation, capacitors, inductors, and transformers and their applications in electronic circuits. Approximately 50% of the course is spent in the laboratory applying the principles and theory presented in the classroom. Corequisite: 10804113 College Tech Math 1A or Elementary Algebra w/Applications 10804110

10606105

Intro to AutoCAD **2 credits**

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. Prior knowledge of drafting techniques is recommended.