



Program Code 10-484-1

Expected Program Costs: \$11,300

Median Annual Salary: \$38,000

OVERVIEW

The Biorefinery Technology program prepares technicians to perform operations and maintenance tasks in the expanding biofuel and biogas production and biorefining industries.

The curriculum emphasizes learning and performing the mechanical processes of biofuel production and biorefining, as well as plant operations, systematic troubleshooting, logical problem-solving and safety.

The Biorefinery Technology program is offered at the Wisconsin Rapids campus.

PROGRAM OUTCOMES

Employers will expect you, as a Biorefinery Technology graduate, to be able to:

- Maintain a safe work environment
- Diagnose, service and repair machinery and manufacturing equipment using appropriate tools, materials and methods
- Plan and execute an effective preventive maintenance program for complex manufacturing processes and machinery
- Manage production process
- Maintain product quality program
- Perform order fulfillment
- Continue career development

CAREER OPTIONS

Anaerobic Biodigester Maintenance Technician
 Anaerobic Biodigester Operator
 Biofuel Plant Maintenance Technician
 Biofuel Plant Operator
 Biorefinery Technician
 Chemical Plant & System Operator
 Chemical Process Technician

POTENTIAL FOR ADVANCEMENT

Plant Maintenance Supervisor
 Plant Manager
 Plant Operations Supervisor
 Quality Assurance Technician

Potential advancement generally requires further education or training.

ADMISSIONS PROCEDURES

To apply to the Biorefinery Technology 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.

**Mid-State Technical College
 Admissions
 500 32nd Street North
 Wisconsin Rapids, WI 54494**

PROGRAM COURSE DESCRIPTIONS

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.

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

10462103 // 2 credits Intro to Mechanical Technology

This course provides a basic introduction to the mechanical principles and components used in industrial machinery and equipment. Learners will gain knowledge in safety, mechanical drive components, bearings, hydraulics and elementary maintenance concepts. Students will demonstrate competence in these areas through the performance of various laboratory and shop activities.

10462107 // 2 credits Industrial Safety

Provides instruction in general safety related to personal protection, work areas, hand tools, material handling, electrical, welding and cutting, hazardous materials, fire prevention, ladders, basic power tools and basic rigging.

10462110 // 2 credits Material Handling

This course introduces the concepts and equipment that transport solid materials in the industrial production process. Various types of equipment including rigging, cranes, mechanical conveyors, pneumatic conveyors, elevators and lift trucks will be discussed. Practical applications and use guidelines will be presented to promote the safe and efficient utilization of this type of material handling equipment.

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

CURRICULUM

| Term | | (17 credits) |
|----------|--|--------------|
| 10103106 | Microsoft Office-Introduction | 3 |
| 10462103 | Intro to Mechanical Technology | 2 |
| 10484117 | Intro to Process Technology | 2 |
| 10605102 | Instrument Mechanics | 3 |
| 10804118 | Intermediate Algebra with Applications | 4 |
| 10806184 | Plant Biology | 3 |

| Term | | (16-17 credits) |
|-------------|--|-----------------|
| 10001148 | People, Resources and the Sustainability | 3 |
| 10462110 | Material Handling | 2 |
| 10484110 | Bioenergy Production I | 2 |
| 10605105 | Electrical Circuits I | 3 |
| -or- | | |
| 10605108 | Intro to Electronics | 2 |
| 10801195 | Written Communication | 3 |
| 10806134 | General Chemistry | 4 |

| Term | | (2 credits) |
|----------|---|-------------|
| 10480190 | Renewable Energy Internship | -or- |
| 10480195 | Renewable Energy/Energy Conservation-Special Topics | 2 |

| Term | | (16 credits) |
|----------|-------------------------|--------------|
| 10103124 | Excel-Intermediate | 1 |
| 10462107 | Industrial Safety | 2 |
| 10484111 | Bioenergy Production II | 2 |
| 10605100 | Process Measurements I | 4 |
| 10806197 | Microbiology | 4 |
| 10809198 | Intro to Psychology | 3 |

| Term | | (17 credits) |
|----------|---|--------------|
| 10480100 | Alternative Energy Overview | 2 |
| 10484112 | Bioenergy Production III | 2 |
| 10484190 | Biorefinery Process Control | 3 |
| 10623110 | Quality Assurance Concepts & Techniques | 3 |
| 10801196 | Oral/Interpersonal Communication | -or- |
| 10801198 | Speech | 3 |
| 10809143 | Microeconomics | -or- |
| 10809144 | Macroeconomics Elective | 3 1 |

Total Credits 68-69

Please Note:

- The Biorefinery Technology 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.

BIOREFINERY TECHNOLOGY

10484110 // 2 credits

Bioenergy Production I

This course provides training on fuel/energy production techniques relating to feed stock preparation, process chemicals and procedures, fuel quality improvements, fuel storage and transportation, fuel use and engine performance, safety, and wastes handling.

Prerequisite: Intro to Process Technology 10484117

10484111 // 2 credits

Bioenergy Production II

This course builds on Bioenergy Production I to provide training on fuel/energy production techniques relating to feed stock preparation, process chemicals and procedures, fuel quality improvements, fuel storage and transportation, fuel use and engine performance, safety, and wastes handling.

Prerequisite: Bioenergy Production I 10484110

10484112 // 2 credits

Bioenergy Production III

This course builds on Bioenergy Production II to provide advanced training in fuel/energy production techniques relating to feed stock preparation, process chemicals and procedures, fuel quality improvements, fuel storage and transportation, fuel use and engine performance, safety, and wastes handling.

Prerequisite: Bioenergy Production II 10484111

10484117 // 2 credits

Intro to Process Technology

This course provides basic orientation for operators in the Biorefining Industry. The course introduces terms that will be encountered in the workplace. Topics include operator roles, responsibilities, and basic plant equipment. Simulation labs on process control and product testing will be included.

Prerequisite: Admission to Biorefinery Technology Program 104841

10484190 // 3 credits

Biorefinery Process Control

This capstone course will examine process control systems and software common to the Biorefining industry. Troubleshooting of processes will be emphasized.

Prerequisite: 4th semester Biorefinery program student

10605100 // 4 credits

Process Measurements I

Reviews basic principles and calibration standards and practices developed in Instrument Mechanics. Common sensing devices and components employed for the measurement of pressure, temperature, flow, level and their related phenomena are studied.

Prerequisite: Instrument Mechanics 10605102 Grade "C" or better

10605102 // 3 credits

Instrument Mechanics

An introductory course into instrumentation emphasizing a functional and mathematical approach to the use and study of various pneumatic instruments and principles. Identifies the duties and functions of instruments and their components. Calculations of springs, force balance, moment balance, and an introduction to pressure measurement and controllers.

Corequisite: Intermediate Algebra w/Apps 10804118

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.

10623110 // 3 credits

Quality Assurance Concepts & Techniques

Quality organizations and programs, analysis under unstable conditions, criteria and methods of control charting means, comparison of various sampling plans, statistical process control methods, codes, specifications, safe applications of equipment, and qualifications of personnel are covered.

Prerequisite: Intermediate Algebra with Applications 10804118