DEPT. Renewable Energy Technology

COURSE NUMBER: RNEW 1102

NUMBER OF CREDITS: 2

COURSE TITLE: Biodiesel Process Fundamentals

CATALOG DESCRIPTION: Covers in detail the overall fundamental process of biodiesel production. The course will include a review of biodiesel chemistry, process engineering, post reaction processing, fuel specification and properties, feedstock preparation, treatment and recovery of side streams, fuel transportation, storage, and general plant operations.

AUDIENCE: Trainees for biodiesel process operations and plant personnel

FULFILLS MN TRANSFER CURRICULUM AREA(S) (Leave blank if not applicable)

Area: by meeting the following competencies:
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PREREQUISITES OR NECESSARY ENTRY SKILLS/KNOWLEDGE:

LENGTH OF COURSE: 2 credits, on-line

THIS COURSE IS USUALLY OFFERED:
Every other year ☐ fall X spring ☐ summer ☐ undetermined ☐

Four goals are emphasized in course at Minnesota West Community & Technical College:

1) ACADEMIC CONTENT: The academic objectives of this course are:
   a. Provide students with information as it relates to biodiesel processing
   b. Recognize the chemical reactions associated with the process
   c. Recognize the process parameters necessary for successful biodiesel production
   d. Recognize the fuel quality standards
   e. Globalization of Biodiesel

2) THINKING SKILLS: This course will help students improve the effectiveness of their thinking skills through:
   a. Students will gain a basic working knowledge about biodiesel production and process parameters.
   b. Students will disseminate the impact of out-of-specification fuel
3) COMMUNICATIONS SKILLS: This course will help students improve their oral and written communication skills through:
   a. Interactive participation in class discussion
   b. Oral and written skills development will be reinforced through short reports on both individual and team platforms.

4) HUMAN DIVERSITY: This course will help students recognize, understand, and appreciate human diversity through:
   a. Acknowledging the globalization of the production of biodiesel, and realizing the driving forces for production vary between countries or regions of the world

TOPICS TO BE COVERED:
   a. History of Biodiesel
   b. Define the Common Terminology
   c. Define the Chemistry relating to Biodiesel Production
      i. Reactants: Triglycerides, Fatty Acids, Alcohol, Catalyst
      ii. Products: Biodiesel, Water, Crude Glycerin, Soap
   d. Reaction Trouble Shooting
   e. Describe the process engineering
   f. Fuel Properties
      a. Comparison to petroleum diesel
   g. Fuel Specifications according to ASTM and European Standards
   h. Introduction to BQ-9000
   i. Social, Economic, and Environmental Benefits and Concerns of Biodiesel Production
   j. Globalization

LIST OF EXPECTED COURSE OUTCOMES:
1. Students will have a basic understanding about biodiesel processing and the chemistry that supports the production technology.
2. Students will become familiar with process parameters.
3. Students will become familiar with fuel properties.
4. Students will recognize the differences between biodiesel and petroleum diesel properties.
5. Students will become familiar with fuel specifications.
6. Students will recognize the social, economic, and environmental benefits and concerns associated with biodiesel production.

LEARNING/TEACHING TECHNIQUES used in the course are:
X Collaborative Learning   X Problem Solving
X Student Presentations   X Interactive Lectures
☑ Creative Projects       ☐ Individual Coaching
X Lecture                X Films/Videos/Slides
                     Demonstrations Other (describe below)
Lab

ASSIGNMENTS AND ASSESSMENTS FOR THIS CLASS INCLUDE:
X Reading                 X Tests
☐ Oral Presentations      X Worksheets
X Textbook Problems       ☐ Collaborative Projects
X Group Problems          ☐ Portfolio
X Term Paper
EXPECTED STUDENT LEARNING OUTCOMES:
Students will gain an understanding of the chemical reactions that support successful biodiesel processing. They will be equipped to identify feedstock, production, and storage issues that can relate to production quality. They will also recognize the social, economic, and environmental benefits and concerns that relate to biodiesel production.

The information in this course outline is subject to revision

Veteran Services: Minnesota West is dedicated to assisting veterans and eligible family members in achieving their educational goals efficiently. Active duty and reserve/guard military members should advise their instructor of all regularly scheduled military appointments and duties that conflict with scheduled course requirements. Instructors will make every effort to work with the student to identify adjusted timelines. If you are a veteran, please contact the Minnesota West Veterans Service Office.

To receive reasonable accommodations for a documented disability, please contact the campus Student Services Advisor or campus Disability Coordinator as arrangements must be made in advance. In addition, students are encouraged to notify their instructor.

This document is available in alternative formats to individuals with disabilities by contacting the Student Services Advisor or by calling 800-658-2330 or Minnesota Relay Service at 800-627-3529 or by using your preferred relay service.

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