Faculty members are required to have the outline submitted to the Academic Affairs Office. The course outline is the form used for approval of new courses by the Academic Affairs and Standards Council.

**DEPT. RNEW  COURSE NUMBER: 1101**

**NUMBER OF CREDITS:** 2  
**Lecture:** 2  
**Lab:** 0  
**OJT** 0

| Course Title: |  
| --- | --- |
| Ethanol Process Fundamentals |

| Catalog Description: |  
| --- | --- |
| Covers the history, rationale, and overall fundamental process of ethanol production. A Process Flow Diagram (PFD) of a typical dry mill ethanol plant will be used to examine the sequence of operation, including residence time, pressures, and temperatures seen in various stages of production. This course will explain the rationale for feedstock and additives used in ethanol processing as well as product and co-product production and use. |

| Prerequisites or Necessary Entry Skills/Knowledge: |  
| --- | --- |
| None |

**FULFILLS MN TRANSFER CURRICULUM AREA(S)**

Goal 1: Communication: ____ by meeting the following competencies:

Goal 2: Critical Thinking: ____ by meeting the following competencies:

Goal 3: Natural Sciences: ____ by meeting the following competencies:

Goal 4: Mathematics/Logical Reasoning: ____ by meeting the following competencies:

Goal 5: History and the Social and Behavioral Sciences: ____ by meeting the following competencies:

Goal 6: The Humanities and Fine Arts: ____ by meeting the following competencies:

Goal 7: Human Diversity: ____ by meeting the following competencies:

Goal 8: Global Perspective: ____ by meeting the following competencies:

Goal 9: Ethical and Civic Responsibility: ____ by meeting the following competencies:

Goal 10: People and the Environment: ____ by meeting the following competencies:
### Topics to be Covered
- Introduction to the ethanol industry
- Milling and mixing
- Cook and liquefaction
- Fermentation
- Distillation
- Dehydration
- Evaporation
- Drying
- Thermal oxidation
- Alternative feedstock

### Student Learning Outcomes
1. Explain the dry mill ethanol process.
2. Discuss the history of ethanol and the social, economic and environmental benefits of ethanol production.
3. Describe the sequence of operation, including residence time, pressures and temperatures in various stages of production.
4. Explain the rationale for feedstock and additives used in ethanol processing.
5. Describe product and co-product production and use.

### Is this course part of a transfer pathway:  Yes ☐ No ☒

Revised Date: August. 2020