Course Title: Ethanol Separation Technology

Catalog Description:
Covers the basic principles of ethanol distillation, evaporation and dehydration. Included will be an understanding of the operating components in a distillation system; demonstrable familiarity with startup, cleaning, operating, and shutdown procedures; and the ability to interpret both normal and abnormal operating conditions. The evaporative process and its role in processing plants will also be covered as well as the theory of molecular sieve dehydration and how it is used in the ethanol process.

Prerequisites or Necessary Entry Skills/Knowledge:
RNEW 1101

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
- Chemical and physical characteristics of ethanol
- Ethanol and water mixtures
- Alcohol/Water vapor diagrams
- True percent proof tables
- Batch distillation
- Continuous distillation
- Beer column
- Side stripper
- Rectifier column
- Fusel oils
- Reflux condenser
- Reflux ratio
- Azeotropic distillation
- Molecular sieve dehydration
- Three-bed molecular sieve operation and troubleshooting
- Evaporation principles
- Falling film evaporators
- Multiple effect evaporation
- Centrifuge basics and operation

### Student Learning Outcomes
1. Use terminology as it relates to ethanol separation technologies.
2. Identify proper parameters for the distillation, dehydration and evaporation of ethanol.
3. Explain troubleshooting options for each step relating to ethanol separation.
4. Differentiate batch and continuous distillation principles.
5. Explain the process flow of an ethanol separation system.

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

Revised Date: August. 2020