



## SCIENCE OF BREWING AND FERMENTATION — BREW 1100

### A. Course Description

- **Credits:** 4.00
- **Lecture Hours/Week:** 2.00
- **Lab Hours/Week:** 2.00
- **OJT Hours/Week:** 0
- **Prerequisites:** None
- **Corequisites:** None
- **MnTC Goals:** None

Students will learn the biological, chemical, and physical science related to brewing and the fermentation process.

### B. Course Effective Dates: 1/12/15 – Present

### C. Outline of Major Content Areas

As noted on course syllabus

### D. Learning Outcomes

1. Basic science related to heat transfer, thermodynamics, and insulation.
2. Biochemical changes in malting, brewing and fermentation processes.
3. Chemical components and analysis of beer and quality control issues.
4. Chemical properties of brewing ingredients.
5. Chemistry involved in wort production, brewing, and fermentation processes.
6. Ingredient variations, biology, handling, propagation, and metabolism in brewing.
7. Lab techniques for measuring, monitoring, and analyzing chemical properties of wort and beer.
8. Microbiology and chemistry related to brewery sanitation and cleaning.
9. Microbiology of beer souring microorganisms (good or bad)
10. Microbiology of microorganisms in the brewing process.
11. Principles of fluid mechanics, steam, and refrigeration.
12. Properties of gases and liquids, pH & alkalinity, temperature, density, and pressure related to brewing.

### E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

### F. Learner Outcomes Assessment

As noted on course syllabus

**G. Special Information**

None noted