

# CHEMISTRY > FERMENTATION SCIENCE

Creating a good beer or wine is not just an art - it's a science. At Wayne State College, you'll learn how to brew the perfect craft in the Fermentation Science degree program. Chemistry courses will give you the foundation you need to understand the process of fermentation. Our program includes practical research and outreach to answer questions facing the growing brewing industries in Nebraska, Iowa, South Dakota, and the nation. Hands-on fermentation in the lab paired with an internship in the industry will give you the experience you need to become an expert brewer or winemaker.

## fast facts

**Credit hours:** 57

*Students must also take 30 credit hours of General Studies courses. A total of 120 credit hours are needed to graduate from WSC. Additional majors or minors can be added to help meet graduation requirements.*

**Degree options:** B.A. or B.S.

**Department:** Physical Sciences and Mathematics

**School:** Science, Health, and Criminal Justice

**Popular pairings:** Business Administration

## focus on results

**Skills Learned**

Analytical techniques common to fermentation:

- Determination of alcohol percentage
- Determination of flavor and spoiler components
- Color and iron determinations
- Metal detection (copper/sodium)
- pH / titrations
- Distillation / hydrometer / refractometer

Microbiology techniques:

- Membrane plating - filtration / vacuum
- Catalase test / gram stain
- Microscopy - bacteria and yeast identification
- Incubation
- Autoclave - biohazard removal
- PCR - beer spoiler kits
- Yeast propagation

**Possible Careers**

- Brewer / assistant brewer
- Brewing / distilling manager
- Brewmaster
- Plant manager
- Process engineer
- Distiller
- Quality manager
- Laboratory manager
- Sensory coordinator
- Research and development specialist
- Winemaker
- Vineyard foreman
- Vineyard manager

**Types of Employers**

- Breweries and wineries
- Beer and wine development companies
- Food development companies
- Industrial companies
- Medical research facilities
- Schools, colleges, and universities
- Manufacturing companies
- Research labs
- Biopharmaceutical companies
- Government / federal agencies
- Self employment

## outside the classroom

**Activities / Opportunities**

- Research projects
- Peer mentoring and tutoring
- Service-Learning
- Study Abroad

**Clubs / Organizations**

- FBLA Collegiate



Visit [www.wsc.edu/clubs](http://www.wsc.edu/clubs) to learn more about clubs and organizations on campus.

# Courses and outcomes

2026-27 Academic Year

The following courses are required for the program of study described on this sheet. Every effort is made to ensure this information is current, but please be aware that some content may have changed. To develop a plan for registering and taking these courses, please consult the current academic catalog and your advisor.

## Program courses

For CAT 3, take MAT 180 Applied Probability and Statistics. For CAT 7, take BIO 110 Biology Concepts.

### Chemistry Core Courses

CHE 106 General Chemistry I.....	4
CHE 107 General Chemistry II.....	4
CHE 305 Analytical Chemistry.....	4

### Fermentation Science Concentration Courses

CHE 314 Organic Chemistry I.....	4
CHE 315 Organic Chemistry II.....	4
CHE 326 Biochemistry I.....	4
CHE 370 Introduction to Research.....	1
CHE 470 Research Project.....	2
CHE 481 Principles of Fermentation.....	4
CHE 482 Wine, Beer, and Spirit Production and Analysis.....	4
CHE 483 Sensory Analysis of Beer and Wine.....	3
CHE 497 Chemistry Internship.....	12
BIO 385 Microbiology.....	4
Select one of the following.....	3
CJA 404 Drugs, Alcohol, and Crime (3)	
PSY 440 Psychopharmacology (3)	

## Student learning outcomes

1. Demonstrate mastery of the theoretical aspects of chemistry
2. Demonstrate mastery in the technical aspects of chemistry
3. Communicate effectively in a chemical manner, both verbally and in writing
4. Apply mathematical and mechanistic problem-solving skills to chemistry processes
5. Operate standard laboratory equipment and instruments and be able to interpret the data or spectra obtained

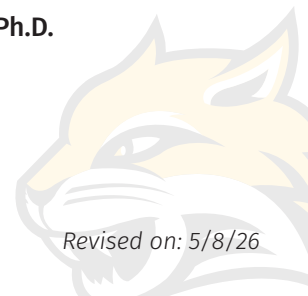
## chemistry faculty



Visit [www.wsc.edu/physical-sciences-mathematics-department](http://www.wsc.edu/physical-sciences-mathematics-department) to learn more about the Department Physical Sciences and Mathematics.

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