Department of Chemical & Materials Engineering

CHME 495L Syllabus – Spring 2024

Brewing Science and Engineering Laboratory

Class Schedule

Lab: 9 am–finish (~4 pm) on four Fridays or Saturdays over course of semester, in the Siedel Brewery, in Jett Hall.

Instructors

Dr. Stephen Taylor Office hours by Remind
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Dr. Catherine Brewer Office hours: TBA
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Catalog Description – 1 credit hour

Brewing and brewing operations in a one-barrel brewery. Topics addressed will include brewery safety, characteristics and handling of brewing ingredients, recipe formulation, water treatment, wort preparation, fermentation, waste disposal, and packaging.

Co-requisite

- CHME 495

Textbooks (required)

- None

Textbooks (recommended for those with long-term brewing interests)

- A good home brewing manual written after 2000, such as Papazian, C. *The Complete Joy of Home Brewing, 4th ed.*; Harper-Collins, 2014; ISBN 978-0062215758.
- Holle, S. R., *A Handbook of Basic Brewing Calculations*; Master Brewers Association of the Americas, 2010; ISBN 978-0971825512.

Course Goals

- Demonstrate a working 1-barrel brewery and its individual processes

Course Objectives

By the end of the lab components of the course, students will be able to:

- Calculate brewhouse parameters
- Produce a beer recipe using recipe design software program and beer style guide
- Characterize and modify brewing water chemistry
- Clean and sanitize brewery equipment and tools
- Assemble and plumb brewery unit operations
- Operate brewing processes: grinding, mashing, sparging, boiling, fermenting, post-fermentation conditioning, and packaging/storing
- Demonstrate safety features and engineering controls
- Describe a finished beer using sensory evaluation techniques
- Characterize beer ingredients, intermediate products, and finished beers using instrumental analysis techniques
- Troubleshoot finished beer quality issues including QA/QC processes
- Propose beer styles appropriate for NMSBrew given local ingredients and market

Topics Covered

- Brewing Ingredients: Water, Grains, Hops, Yeast, Adjuncts
- Ingredient Preparation: Water Treatment, Malting, Milling
- Brewing Process: Mashing, Sparging, Boiling, Filtering, Cooling, Pitching
- Fermentation and Maturation
- Packaging, Storage and Stability
- Beer Quality Evaluation and Control
- Alternative Beers: Gluten-Free, Lambics, Sours, etc.
- Brewery Planning and Automation
- Cleaning, Disinfecting and Sterilization
- Energy Integration and Management
- Alcohol Regulations
- Beer Economics and Marketing
- Waste Management

Brew Days

Sign up on Canvas or in person. If you need to change, you arrange.
Over the course of the semester, we will meet for various brewery exercises, such as inventory, cleaning, and brewing. For brewing days, one should budget 8+ hours.

Communicating about Absences

If you need to miss a class due to an illness, professional travel such as a conference or interview, or a family emergency, let us know as soon as possible so that any necessary arrangements can be made. You are responsible for getting any missed materials.

Grading

Lab skills and unit operations (by rubric), lab participation based on instructor and peer evaluations.

Use of A.I.

In this course, employing generative A.I. tools will constitute academic misconduct.

Common Syllabus Addendum

Additional policies can be found in the Chemical & Materials Engineering Department's common syllabus addendum: http://chme.nmsu.edu/academics/syllabi/chme-common-syllabus-addendum/.

Additional guidance with respect to COVID-19 safety can be found at: https://provost.nmsu.edu/faculty-and-staff-resources/syllabus/COVID-Classroom-Safety-Acknowledgement-Statement.pdf; students are encouraged to pre-register for the COVID-19 vaccine at: https://cvvaccine.nmhealth.org/ .

Syllabus Preparation Date 1/17/24