

Brewery Engineering

The New Mexico State University Department of Chemical & Materials Engineering offers a program that will prepare students for careers across the brewing industry and provide research & analytical services to the brewing industry. NMSBrew includes:

1. a minor of study education embedded in a Bachelor of Science in chemical engineering;
2. parallel 1-barrel SS fermenters and brewery for hands-on brewery operation and research (available for use by the brewing industry, see: *User Access to NMSBrew*);
3. a full-service characterization analytical lab;
4. training workshops;
5. international studies; and
6. a pipeline of highly-trained interns/employees.

NMSBrew Analytical Lab

The NMSBrew Analysis Laboratory provides a range of resources for characterizing brews by AOAC Official Methods of Analysis. The centerpiece of this laboratory is a fully-optional Anton Paar PBA-B Generation M Packaged Beverage Analyzer (available for use by the brewing industry, see: *User Access to NMSBrew*);



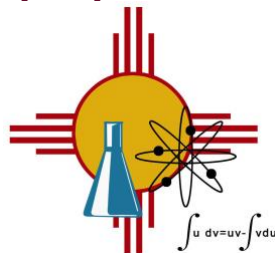
NMSBrew also responds to industry requests and is developing the capability to perform ASBC Hops 6, 12, 13, and 17 by summer 2018 based on such a request.

NMSBrew has the NMSU analytical resources available, including such resources as the Freeport-McMoran Water Quality Laboratory, where a wide range of analytical devices are maintained for use by NMSU researchers (<https://wordpress.nmsu.edu/mchidest/>).

NMSBrew

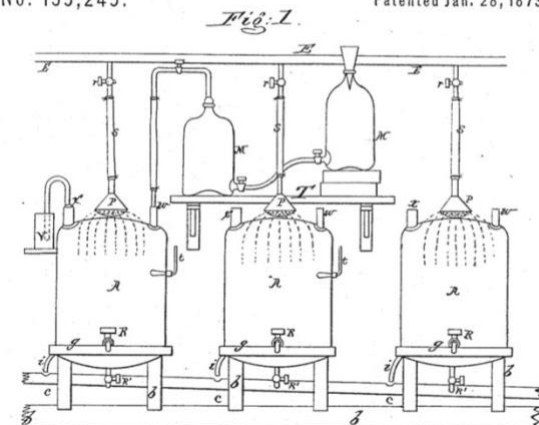
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NMSBrew

No. 135,245. Patented Jan. 28, 1873.



Brewery Engineering @NMSU

Department of Chemical & Materials Engineering

Providing Education, Research,
Service, Outreach, and Personnel

to the Brewing Industry

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Brewery Engineering Education

The Brewery Engineering minor is an 18-credit hour program that builds on the rigorous 136-credit hour curriculum required to earn a Bachelor's of Science in Chemical Engineering, collectively forming an extensive 154-credit hour education, representing one of the most challenging degree paths an academic institution has to offer. Those completing this program are as qualified to operate a brewery as they are to manage the country's plutonium supply, design and start-up an oil refinery or a drilling/fracking operation, develop new computer chip materials, or attend medical or law schools.

The brewing design course contains content from all three areas suggested by MBAA/ASBC: brewing science; brewing analysis and quality assurance; and practical malting and brewing. The capstone has the previous seven semesters of BSCHE coursework as prerequisite, and includes a complete design and economic evaluation of a brewery and requires a clear understanding of batch-wise operations and economies of scale.

In addition, students pursuing the minor will study microbiology, biochemistry, and food science/engineering, where the BSCHE requires inorganic chemistry, organic chemistry, physical chemistry, physics, and biology. Students also complete Calculus I, II, & III, differential equations, and numerical methods of analysis, providing them a tool set for modeling and design of complex processes and phenomena.

These topics are prerequisite to many of the core courses in the CHME curriculum where students develop expertise in process design, analysis, and simulation through a study of the continuity equations, thermodynamics, transport phenomena, the design of "unit operations" of many types relevant to a chemical process (which includes food processing), engineering economics, process safety, and process dynamics and control.

chme.nmsu.edu/NMSBrew/

NMSBrew Personnel

David A. Rockstraw, Ph. D., P. E.

NMSBrew Director

Robert Davis Distinguished Professor

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Catherine E. Brewer, Ph. D. Chemical Engineering

Assistant Professor, Chemical & Materials Engineering

Jerry Grandle , BA Business Administration

NMSBrew Advisor

Owner and head brewer

The Spotted Dog Brewery

Kevin A. Lombard, Ph. D., Agronomy

Associate Professor, Horticulture - Plant & Environmental Science

Agricultural Experiment Station

Lance Lusk, MS Biochemistry; BS Biology,

NMSBrew Advisor

Principal Scientist Foam and Flavor

Miller Brewing Co. (ret)

Tim Kostelecky, BS Biological Sciences

NMSBrew Advisor

Hops & Brewing Technical Specialist

John I. Haas, Inc. (ret)

Past-president, American Society of Brewing Chemists

Juanita Miller, MS/BS Chemical Engineering

Safety Specialist, College of Engineering

Geoffrey Smith, Ph. D. Biology

Professor, Biology

Stephen Taylor, Ph. D. Inorganic Chemistry

Adjunct Professor, Chemical & Materials Engineering

Seidel Brewery Pilot Plant

The Seidel Brewery Pilot Plant was designed by a team of four 2016 alumni as their capstone project. Equipment has been sized, specified, ordered and received, and is on-site waiting on the completion of a \$20 million renovation of Jett Hall.

This facility includes the following major pieces of equipment (mostly manufactured by Stout):

- 45 gal Brew Kettle
- 40 gal Conical Fermenter (2)
- 55 gal Mash Tun
- 40 gal Hot Liquor Tank
- 80 gal Hot Liquor Tank
- 1 BBL Brite Tank 2 bar
- Thermaline T4-21 wort chiller
- Schmidt-Bretten Plate Heat Exchanger
- Glycol Chiller 125' 3/8 HP 7 gal
- keg filling manifold



User Access to NMSBrew

The Seidel Brewery Pilot Plant and NMSBrew Analysis Lab are available for use by NMSBrew Users Consortium members. NMSBrew offers a range of participation levels to permit brewers to customize membership based on their needs.

For details, navigate to chme.nmsu.edu/nmsbrew/ then select "NMSBrew Users Consortium in CHME @ NMSU" from the contents list.

Anyone can support NMSBrew with donations by navigating to <https://advancing.nmsu.edu/givenow> and using the "write in" option, for "NMSBrew."