The Art & Science of Brewing
Serious Programs for Serious Brewers

Most of the courses in the Professional Brewing Programs at UC Davis Extension take place at an on-site classroom facility at Sudwerk Brewing Company, a world-class microbrewery and brew pub located in Davis. Students have the opportunity to observe brewing and packaging operations firsthand, including beer production by Sudwerk’s two systems: a fully automated 65-barrel Steinecker system and their original 15-barrel Caspary brewhouse.

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For general information, call toll free (800) 752-0881 (within the U.S.) or (530) 757-8777 (outside of the U.S.). For more specific program information, call (530) 757-8899 or email extension@ucdavis.edu.

For the most up-to-date information about these programs, including course dates and class schedule, visit our website.

extension.ucdavis.edu/brewing

Visit our Facebook page. facebook.com/ucdebrewing
Professional Brewing Programs at UC Davis

With the continued growth of the brewing industry worldwide, owners and managers of major breweries, microbreweries and brew pubs can no longer afford to consider hiring untrained brewing staff. Employers continue to seek professionals who have been trained in the science and engineering of running a brewery operation, as well as those who know and understand the demands of the brewing industry.

The world-renowned brewing programs offered through UC Davis Extension are the only North American programs accredited by the prestigious Institute of Brewing & Distilling in London. And UC Davis has been the leading provider of university-level qualification in brewing science and brewery engineering since 1958.

Not only do our graduates gain unparalleled expertise in brewing science, technology and engineering, they also go on to become leaders in the brewing industry. Discover for yourself the most comprehensive brewing education programs—and join our tradition of excellence.

Our history
Since 1958, UC Davis has offered a unique specialization in brewing science as part of its undergraduate degree program in fermentation science. Michael Lewis, Ph.D., professor emeritus of brewing science, has led the brewing programs at UC Davis for more than 40 years. Throughout his prestigious career, Lewis has authored more than 100 scholarly papers and co-authored the flagship text Brewing.

The UC Davis Extension connection
UC Davis Extension is the professional and continuing education provider for UC Davis. Through UC Davis Extension, the general public has access to university-level training without requiring admission to a degree program.

In response to the demand for condensed technical training programs in brewing science, UC Davis Extension and Lewis collaborated to create several professional brewing programs in the late sixties. The purpose of these programs was to teach a variety of skills that are required in the brewing industry.
Master Brewers Program
Brewing Science and Brewery Engineering

January-June
An intensive course of study to prepare students for the IBD Diploma in Brewing Exam, an internationally recognized qualification in brewing science.

The Master Brewers Program is a unique, 18-week program that provides an in-depth understanding of brewing science and brewery engineering. Major topics covered in brewing science include malting, mashing, brewing, fermentation and finishing, while the brewery engineering subject matter focuses on fluid flow, heat and mass transfer, solid-liquid separation and more. Extensively explore these two fields through courses that are the professional-level equivalents of UC Davis degree-program courses, seminars and tutorials in these fields.

Study brewing science and brewery engineering in courses that include university-level lectures, tutorials and seminars. In addition to such directed studies, students expand their brewing knowledge through assigned reading and writing exercises and visits to breweries in Northern California.

The Diploma in Brewing Examination (DBE)
The objective of the Master Brewers Program is to prepare candidates for the Institute of Brewing & Distilling, London, Diploma in Brewing Examination (IBD DBE). Passing the examination is an internationally recognized standard of achievement and professional qualification for practical brewers, managers and executives in breweries, maltings and allied industries. This challenging nine-hour, three-part examination, consisting of two papers in brewing science and one in brewery engineering, is administered annually to more than 300 candidates worldwide. The examination is written and graded by a distinguished panel of brewing academicians, brewery scientists and engineers selected by the IBD and impaneled as the Board of Examiners. The examination is held each year in June, immediately following the Master Brewers Program, at UC Davis, an approved examination site.

The IBD DBE is undoubtedly the most relevant and important formal professional qualification for brewers currently available in brewing science, brewery engineering and packaging technology. The Master Brewers Program is exceptionally good preparation for this examination, and we are proud of the high achievement of our students over the years. Though we encourage all students to sit all three parts of the examination at one time, we note that this is not common practice worldwide. We also recognize that students come to us from many different backgrounds and with different career objectives. Therefore, we now permit students to register for one, two or all three examinations as best suits their needs.
Lecture topics

Classroom lectures are designed to provide you with an understanding of:

■ Grain handling, malting, malt analysis and their effects in brewing
■ Brewhouse processes and the control of wort quality
■ Yeast and fermentation processes and their effects on beer quality
■ Finishing beer, sterilization of beer and packaging technology
■ Flow of fluids in pipes and through pumps in a brewery setting
■ Heat transfer through flat and curved surfaces and the effects of insulation and fouling on efficiency
■ Theory and practice of carbonation, including mixed gas technology
■ Theory and practice of refrigeration in the brewery

Who should attend

This program is designed for persons who desire a formal professional qualification in brewing science and engineering, either to enter the brewing industry or to advance within it, or for those in formal training programs at breweries. The examinations are challenging, and only those seriously committed to study in the field of brewing science should consider enrolling. You should have some college education in science and/or engineering subjects. Practical experience is a plus, but not essential for admission at this level.

Prerequisites

While a degree is not required for acceptance to this program, college-level work in the subject areas listed below is required for success in the program. All minimum prerequisites must be completed in advance of applying. Incomplete applications will not be considered for admission. You must be able to provide transcripts documenting the math requirement and at least two other subject areas:

■ Mathematics: pre-calculus
■ Biological sciences: microbiology, cell physiology or biochemistry
■ Chemistry: organic, inorganic or analytical
■ Physics: heat and mechanics or process control
■ Engineering: topics in mechanical or chemical engineering

For more information about the academic prerequisites, course content, etc., please visit our website at extension.ucdavis.edu/brewing.

Those who cannot document pertinent experience in at least three of these areas will not be admitted to the program. Such students should prepare at least one year before entering the Master Brewers Program by taking appropriate courses at a local college.

Fees

$16,000

The fee includes all texts, course materials, and Institute of Brewing & Distilling fees associated with the Diploma in Brewing Examination. A nonrefundable deposit of $1,000 is due at the time of acceptance to the program. The balance is due prior to the first day of the program. Fee does not include room and board. This program has been approved for V.A. educational benefits.

If a student elects to take two or fewer exams, their tuition fee will be adjusted accordingly. All fees are subject to change.

Withdrawal/Refund

If a request for withdrawal is received within the first five days of the course and all course materials are returned, a refund will be granted for tuition fees paid beyond the nonrefundable deposit. No refunds will be granted after the fifth class day.

Application deadline

December 1 of the year preceding the program in which you are enrolling. Applications are reviewed and accepted on a first-come, first-served basis. Class size is limited. Early application submission is encouraged.

Complete application packages must include a completed application form, transcripts supporting the academic prerequisites, a résumé listing any practical experience in brewing or related fields and the application fee of $45.
Professional Brewers Certificate Program

January-April

This certificate program is designed to provide a legitimate, university-approved qualification for individuals who want to enter the brewing industry, as well as brewery personnel with no formal scientific training who want to advance their careers.

The curriculum is taught simultaneously with the first 10 weeks of the Master Brewers Program. Through lectures, the program provides you with a solid understanding of brewing science and engineering. Your learning is measured through weekly exams and written exercises.

More specifically, the program is designed to provide you with an understanding of:

- Grain handling, malting, malt analysis and their effects in brewing
- Brewhouse processes and the control of wort quality
- Yeast and fermentation processes and their effects on beer quality
- Finishing beer, sterilization of beer and packaging technology
- Flow of fluids in pipes and through pumps in a brewery setting
- Heat transfer through flat and curved surfaces and the effects of insulation and fouling on efficiency
- Theory and practice of carbonation including mixed gas technology
- Theory and practice of refrigeration in the brewery

Students who successfully complete the program are awarded the Professional Brewers Certificate.

Prerequisites

While a degree is not required for acceptance to this program, college-level work in the subject areas listed below is required for success in the program. All minimum prerequisites must be completed in advance of applying. Incomplete applications will not be considered for admission. You must be able to provide transcripts documenting the math requirement and at least two additional subject areas:

- Mathematics: pre-calculus
- Biological sciences: microbiology, cell physiology or biochemistry
- Chemistry: organic, inorganic or analytical
- Physics: heat and mechanics or process control
- Engineering: topics in mechanical or chemical engineering

Practical brewing experience is a plus, but is not required for entrance to the program.

For more information on the academic prerequisites, course content, etc., please visit our website at extension.ucdavis.edu/brewing.

Fees

$9,800

The fee includes all course materials. A nonrefundable deposit of $1,000 is due upon acceptance to the program. The balance is due prior to the first day of the program. The fee does not include room and board. This program has been approved for V.A. educational benefits. All fees are subject to change.

Withdrawal/Refund

If a request for withdrawal is received within the first five days of the class and all course materials are returned, a refund will be granted for tuition fees paid beyond the nonrefundable deposit. No refunds will be granted after the fifth class day.

Application deadline

The application deadline is December 1 of the year preceding the program for which you are applying. Applications are reviewed and accepted on a first-come, first served basis. Class size is limited. Early application submission is encouraged.

A complete application package must include an application form, transcripts supporting the academic prerequisites, a résumé of any practical experience in brewing or related fields and an application fee of $45.
Diploma in Brewing Examination Review Sessions

A rigorous review for the DBE

Sessions I, II and III:

May-June

For those brewers or brewers-to-be who are studying independently to prepare to sit for the rigorous Diploma in Brewing Examination (DBE), we have designed intensive review sessions that are offered just before the examinations in June. Review Session I focuses on DBE Module I—Materials and Wort. Review Session II focuses on DBE Module 2—Yeast and Beer. Review Session III focuses on DBE Module 3—Packaging and Process Technology. Each six-day session is scheduled Monday through Saturday, with lectures and practice examinations appropriate to each DBE module.

Fees

You may take all sessions or may elect to take any session as a separate unit. The fee for each session is $1,300 or save $900 by enrolling in all three sessions for $3,000. Space is limited. Early registration is encouraged.

Withdrawal/Refund

If a request for a withdrawal is received at least seven days prior to the start of the class, a refund, less a $100 processing fee, will be granted.

“The [Master Brewers Program] teaches the theory behind brewing. . . . Understanding the reasoning behind brewers’ decisions is a really powerful tool that I am grateful to take with me into the industry.”

—Stephen Bossu, Cellarman, Widmer Brothers Brewing Company, Portland, Oregon and winner of the JS Ford Award and Crisp Malting Award for his performance on the Diploma in Brewing Examination.
Brewing Short Courses

Introduction to Practical Brewing

Offered quarterly*
Learn from one of the world’s foremost brewing experts in this in-depth course for advanced homebrewers and early career professional brewers, using the amazing resources of the new 1.5 barrel pilot brewery in the state-of-the-art brewing facility on the UC Davis campus. This class combines clear and detailed lectures with practical, hands-on brewing and laboratory tests. Go all the way from raw material selection through to the quality and stability of the finished beer. A class ale will be brewed, and analyses on barley, malt, hops, yeast, wort and beer will be explored.

Class schedule
Mon.-Thurs., 9 a.m.-4 p.m., and Fri., 9 a.m.-noon

Fees
$1,400
All fees are subject to change

Withdrawal/Refund
If a request for withdrawal is received at least seven days prior to the start of the class, a refund, less a $100 processing fee, will be granted.

*For more information and scheduled dates, please visit our website at extension.ucdavis.edu/brewing.

Intensive Brewing Science for Practical Brewing

Offered twice a year*
Receive an intensive introduction to the sciences of brewing, drawing a direct connection between brewing science and brewing practice in this popular short course. Build your understanding of the technological and biochemical aspects of the brewing process, including raw materials, malting, brewing, fermentation and finishing. Engineering concepts, sanitation, sensory evaluation techniques and quality control are integrated with the main subject matter. Instructors stress the reasons for brewing practices and the relationship between raw materials or processes and product quality. In addition to formal lectures, the course includes a tour of a famous craft brewery and beer tasting with a professional sensory scientist. The instructors always encourage questions and an informal exchange of views among those of the brewing, malting, and service and supply communities, and other attendees.

Class schedule
Mon.-Fri., 9 a.m.-4 p.m.

Fees
$1,400
All fees are subject to change

Withdrawal/Refund
If a request for withdrawal is received at least seven days prior to the start of the class, a refund, less a $100 processing fee, will be granted.

*For more information and scheduled dates, please visit our website at extension.ucdavis.edu/brewing.
Alumni from our professional programs... where are they now?

Bernardo Alatorre
Modelo
Gustavo Arambula
Santa Fe Beer Factory
Petro Sanchez Avila
Cervecería del Pacífico
Dan Badger
Mammoth Brewing Co.
Monique Bailey
St. Vincent Brewery Ltd.
Scott Bannester
Gordon Biersch
Aaron Barth
Florida Avenue Brewing
Juan Carlos Boette
Cervecería y Maltería Quilmes
Stephen Bossu
Widmer Brothers Brewing Co.
Bert Boyce
Boston Beer Co.
Damian Brown
Bronx Brewery
Robert Cannon
Boston Beer Co.
Corey Cocker
Trumer Brauerei
Andrew Colpitts
Seapine Brewing Co.
William Crenshaw
Trim Tab Brewing
Luke DiMichele
River City Brewing
John Donehower
Pyramid Breweries
Trevor Downes
Grenada Breweries Ltd.
William Durgin
Telegraph Brewing Co.
Jeff Eaton Jr.
Trumer Brauerei
Benjamin Einhaus
Sierra Nevada Brewing Co.
Greg Friday
Faultline Brewing Co.
Jorge Garcia
Anheuser-Busch
John Garvin
Coors Brewing Co.
Stephen Gerteisen
Arkose Brewery
Caleb Goodrich
Berkshire Brewing Co.
Larry Goodwin
Flat Branch Pub and Brewing
Dave Hansen
Leinenkugel’s 10th Street Brewery
David Hartman
Empire Brewing Co.
Ryan Harvey
Dogfish Head
Timothy Hawn
MillerCoors
Ryoichi Hirase
Sapporo Breweries Ltd.
Matthew Hoffman
Avery Brewing Co.
Michael Hutson
Sudwerk Brewing Co.
Jeffrey Irvin
Olde Main Brewing Co.
Joseph Jasper
Oakshire Brewing Co.
Philip Johnson
Anheuser-Busch
Andrew Jones
Laketown Brewery
Bill Joslyn
The Saint Louis Brewing Co.
Tommy Keegan
Keegan Ales
Breanna Kennedy
Sierra Nevada Brewing Co.
Edward Kopta
Huppy Brewing Co.
Dimitry Kozemjakin Jr.
SABMiller
Seigo Kubota
Kirin Brewery
Andrew Lamont
Boston Beer Co.
Tyler Laverty
Third Street Aleworks
Ignacio Magnasco
Gambrinus Brewery
Mauro Manriquez
Grupo Modelo’s Headquarters
Randy Marquis
Blue Collar Brewery
David McLean
Magnolia Gastropub & Brewery
Marty Mendiola
Second Chance Beer Company
Ben Mills
Fossil Cave Brewing Co.
Greg Mills
Sleeping Lady Brewing Co.
Matt Murphy
Prescott Brewing Co.
Cam O’Connor
Sierra Nevada Brewing Co.
David Ogilvie
Anheuser-Busch
Christopher Reilly
Weyerbacher Brewing Co.
Michael Richmond
Stone Brewing Co.
Justin Rick
Jacob Leinenkugel Brewing Co.
Urs Riner
Mother Road Brewing Co.
Kevin Robinson
Divine Brewing LLC.
Barbara Roep
Surinamese Brouwerij
Christian Ryan
Meantime Brewing Co.
David Sands
Labatt Edmonton Brewery
Kristopher Scholl
Anheuser-Busch
Inge Schrama
Heineken
Toshinori Segawa
Kirin Brewery
Douglas Smith
Fort Collins Brewery
Nicholas Smith
Abita Brewing Co.
Thomas Stull
Sudwerk Brewing Co.
Jeremy Switzer
Labatt Brewing Co.
Susanne Terharn
MillerCoors
Todd Tomko
Faultline Brewing Co.
Kenjiro Tomita
Triple 7 Restaurant and Brewery
Peter Trapani
Sierra Nevada Brewing Co.
Hsiu-li Tu
Taiwan Tobacco & Wine Bureau
Tony Vieira
Coors Brewing Co.
Daniel Wadyka
MillerCoors
Tristan Warren
Central City Brewing Co.
Seth Weisel
Rooster Fish Brewing
Brandon Winneker
Stone Brewing Co.
Kevin Wright
Hangar 24 Craft Brewery
Nile Zacherle
Anderson Valley Brewing Co.

Alumni from our professional programs... where are they now?

It was customary in the 13th century to baptize children with beer.
MICHAEL J. LEWIS, Ph.D., is professor emeritus of brewing science at the University of California, Davis, and the academic director and lead instructor of UC Davis Extension’s Professional Brewing Programs. Lewis has been honored with the Master Brewers Association of the Americas’ Award of Merit and the Brewers Association’s Recognition Award. He is an elected fellow of the Institute of Brewing & Distilling. He is also a recipient of the UC Davis Distinguished Teaching Award.

CHARLES W. BAMFORTH, Ph.D., D.Sc., is distinguished professor and leader of malting and brewing studies at the University of California, Davis, with more than 35 years of academic and professional brewing expertise, including senior roles with Brewing Research International and Bass Brewers. A fellow of several organizations, including the Institute of Brewing and Distilling (IBD), Bamforth is also editor in chief of the Journal of the American Society of Brewing Chemists (ASBC) and has published extensively on beer and brewing. He is a recipient of the ASBC’s Award of Distinction and is vice president of the IBD.

MIKE HUTSON is the head brewer at Sudwerk Brewing Company in Davis, Calif. He holds a B.S. in microbiology and is a graduate of UC Davis Extension’s Master Brewers Program. Hutson previously worked at Anderson Valley Brewing Company as cellar manager and QA/QC manager. He has worked at Sudwerk since 2005.

JAMES A. BROWN, Ph.D., is the University Extension director of fermentation science at the University of California, Davis. With degrees in fermentation science and microbiology, his graduate research at UC Davis focused on the functional genomics of yeast and fermentation stress. He expanded on yeast responses to environmental stress as a research scientist at Stanford University School of Medicine for eight years before returning to UC Davis. He has taught microbiology of wine and beer since 1994.
TIMOTHY MARBACH, Ph.D., is an associate professor at California State University, Sacramento. His industrial experience includes four years at the U.S. Army Fuels and Lubricants Research Facility at the Southwest Research Institute and a U.S. Department of Energy Industry Fellowship at Siemens Westinghouse Power Corporation. He has taught numerous courses in engineering including thermodynamics, research methodology and combustion. His current research includes experimental study of biofuel combustion and computational analysis of heat recirculating burners.

THOMAS SHELLHAMMER, Ph.D., is the Nor’Wester professor of fermentation science and professor of brewing and food engineering in the Department of Food Science and Technology at Oregon State University where he leads the brewing education and research programs. He has been a brewing engineering instructor for the Master Brewers Program since 1993. Shellhammer is a member of the Institute of Brewing and Distilling and serves on their Board of Examiners.

SUE LANGSTAFF, M.S., is principal of Applied Sensory, LLC, a consulting company specializing in providing independent sensory evaluation services to breweries and wineries, and has extensive experience in the field of sensory evaluation of beer, wine and other alcoholic beverages. Langstaff has published papers in the Journal of American Society of Brewing Chemists and the Journal of the Institute of Brewing. She earned her M.S. in food science from the University of California, Davis. Her thesis, under the guidance of Michael Lewis, Ph.D., explored the sensory and instrumental evaluation of the mouthfeel of beer.

STEVEN P. PRESLEY retired from Anheuser-Busch, Inc. in 2009 as senior assistant brewmaster. During his 30-year tenure with Anheuser-Busch, he held various brewing management positions at several of their 12 breweries and also worked in the company’s international brewing division. Presley is a Beer Steward Instructor and was actively involved in the creation of the Master Brewers Association of the Americas’ Beer Steward Certificate Program. He is past president of the MBAA’s Rocky Mountain and Southern California districts.

“We are true enthusiasts for what we do….We have a lifetime of experience and deep knowledge to share with our students and a dedication to finding and educating the next generation of brewers that far exceeds common sense or reason. The best students tap into this vigorous stream and are enthused by it.”

—Michael Lewis, Master Brewers Program academic director and lead instructor.
Doctor

Lawyer

Stock Broker

Astronaut

Rock Star

Brewer

extension.ucdavis.edu/brewing