

FST 3V: Introduction to Brewing and Beer

Part 1: Course Information

Instructor Information

Instructor: Professor Glen Fox

Instructor Office: RM 1258 Robert Mondavi Institute North

Instructor Office hours: Email to make an appointment either in-person or via zoom.

Instructor Email: gpfox@ucdavis.edu

Teaching Assistants: TBC

Email Etiquette: We receive a lot of emails, to ensure that we see them please **always include FST3 in the subject line**. You can expect an email to be answered within 24 hours from **8 am-6 pm** Pacific Time (PT), **Monday through Friday**.

Student emails that are sent on Friday evenings will not be answered until the following Monday.

Emails will not be answered over the weekend. If an email is not answered within this given range, you are welcome to send a follow up email. Some exceptions may be made depending on extenuating circumstances.

Course Description

This course will provide students with a basic description of brewing and associated processes, from raw materials to final product; history of brewing and brewing science; types of beer worldwide; world beer markets; basics of beer quality, including wholesomeness; role of scientist in brewing.

Prerequisites: None

GE Area if Applicable: Science and engineering; Scientific literacy

Part 2: Course Objectives

The course objectives encompass four primary areas: product; process; history and society; and business. There are specific objectives for each area.

Product:

Apply principles from general chemistry, biology, physics, statistics, and / or mathematics to food science problems

- Compare the major styles of beer according to raw materials and production protocols.
- Articulate the basis for quantifying beer strength.

Process:

Analyze contemporary food science information and literature.

- Categorize the major substances that contribute to beer taste and aroma, foam, clarity, gushing, and color.
- Identify the locations within human sensory systems where major contributors to flavor are detected.
- Articulate the relationship between beer composition and human health.
- Diagram the successive unit stages in malting and brewing, including the purpose, duration, and temperature ranges associated with each stage.
- Classify the major ingredients used in the production of beer and the key properties demanded of them.

History and Society:

Apply critical thinking and analytical evaluation to contemporary food science information and literature

- Explain the evolution of the brewing from its ancient origins to its growth as an industry in America.
- Analyze the social and legal consequences associated with diverse perspectives on alcohol consumption.

Business:

Analyze contemporary food science information and literature

- Summarize production and consumption trends in the world beer market.
- Describe the processes that breweries implement to make, package and distribute their products.

You will meet the objectives listed above through a combination of the following activities in this course:

- Quizzes
- Weekly reading

Part 3: Course Text, Materials, Logistics, and Writing Support**Textbook & Course Materials****Required Text (available through Equitable Access)**

Charles Bamforth: Beer: Tap Into The Art and Science of Brewing, 3rd edition. ISBN 978-0-19-530542-5

please note that the 1st and 2nd editions of this text contain information distributed amongst different chapters than in the 3rd edition, and thus may cause confusion when reading the chapters for the weekly readings.

Course Structure

This course is in-person with two weekly lecture of 50 minutes.

Course Site and Connectivity Requirements

Access to Canvas, which requires an Internet connection. (<https://login.canvas.ucdavis.edu/>)

Quizzes will be run through the Canvas section for this course.

Technical Assistance

If you need technical assistance at any time during the course or to report a problem with Canvas you can:

- Call the Canvas support hotline (844) 303-8285
- Review the Technical Support Page
- Review the Accessing the Course Page
- Select “Help” on the left bar once within Canvas

Important Note: This syllabus, along with course assessments, are subject to change. It is the student’s responsibility to check the Canvas website for announcements on a regular basis.

Writing Support

For writing support, please visit the [Writing Support Center’s website](http://success.ucdavis.edu/services/writing.html) <http://success.ucdavis.edu/services/writing.html>. The Writing Support Center offers a variety of support services ranging from writing specialists and tutors who can provide feedback on your writing to the writing studio where you can work on your writing in a collaborative writing space.

Part 4: Grading Policy

Graded Course Activities

Visit the **Modules** link in Canvas for details about each assignment and quiz listed below.

Points	Description
100	Quizzes (5 Quizzes with 20 questions at 1 point each)

Quizzes

To best test your understanding of course content, take the quizzes without notes or the course text, but these quizzes are open-book, open-note. The quizzes will have an open window to begin on their given dates from **6:00 am to 11:59 pm PST** (18 hours) but once you start the quiz, you will have **40 minutes** for the 20 question quiz. The time will stop after 40 minutes and your results recorded. The quizzes will be True/False, multiple choice, and fill-in-the-blank.

Quiz dates: To be confirmed

Quiz #	Quiz Date	Lecture content dates	Chapter content
1		Week 2	
2		Week 4	
3		Week 6	
4		Week 8	
5		Week 10	

There will be no additional midterms or final exam for this course. There is no written assignments.

Letter Grades

Final grades assigned for this course will be based on the percentage of total points earned and are assigned as follows:

Letter Grade	Percentage	Performance
A+	96-100%	Outstanding Work
A	91-95%	Excellent work
A-	86-890%	Nearly Excellent Work
B+	81-85%	Very Good Work
B	76-780%	Good Work
B-	71-75%	Mostly Good Work
C+	66-70%	Above Average Work
C	61-65%	Average Work
C-	56-60%	Mostly Average Work
D+	51-55%	Below Average Work
D	46-50%	Poor Work
F	0-45%	Failing Work

Late Work Policy

Be sure to pay close attention to deadlines—there will be *no make up* assignments or quizzes, or late work accepted without a compelling reason and instructor approval. Contact instructor for further information.

Viewing Grades in Canvas

Points you receive for graded activities will be posted to the Canvas Grade Book. Click on the Grades link on the left navigation to view your points.

Quizzes will be graded automatically and grades will be made available for viewing immediately after completion.

Important note: For more information about grading at UC Davis, visit the [academic policies and grading section](#) of the university catalog.

Part 5: Course Policies

Participation

Attendance to the live lectures is not compulsory and will not factor into the final grade. But these are fun so you should come along anyway

Understand When You May Drop This Course

It is the student's responsibility to understand when they need to consider un-enrolling from a course. Refer to the <https://registrar.ucdavis.edu/calendar/quarter.cfm> for dates and deadlines for registration. After this period, a serious and compelling reason is required to drop from the course. Serious and compelling reasons includes: (1) documented and significant change in work hours, leaving student unable to attend class, or (2) documented and severe physical/mental illness/injury to the student or student's family.

For specific information on how to drop the class, refer to this site:
<http://crossenroll.universityofcalifornia.edu/content/dropping-course>

Incomplete Policy

Under emergency/special circumstances, students may petition for an incomplete grade. An incomplete will only be assigned if it meets the conditions outline by the UC Davis Senate Regulations Section A540C;
http://academicsenate.ucdavis.edu/bylaws_and_regulations/regulations.cfm?#A540.

Inform Your Instructor of Any Accommodations Needed

If you have a documented disability and verification from the [UC Davis Student Disability Center](#) (SDC), and wish to discuss academic accommodations, please contact your instructor as soon as possible. It is the student's responsibility to provide documentation of disability to the SDC and meet with a SDC counselor to request special accommodation *before* classes start. [Contact the SDC](#).

Commit to Integrity

As a student in this course (and at this university) you are expected to maintain high degrees of professionalism, commitment to active learning and participation in this class and also integrity in your behavior in and out of the classroom.

UC Davis's Academic Honesty Policy & Procedures

Read about UC Davis's **Code of Academic Conduct**. The Code of Academic Conduct clearly defines what UC Davis considers cheating and plagiarism.

Important Note: Any form of academic dishonesty, including cheating and plagiarism, may be reported to the Office of Student Support and Judicial Affairs: <http://sja.ucdavis.edu/>.

Course policies are subject to change. It is the student's responsibility to check Canvas for corrections or updates to the syllabus. Any changes will be posted in Canvas.

Part 6: Topic Outline/Schedule

Week 1:

History:

- Describe the evolution of brewing from its
- ancient and medieval origins
- modern age developments
- history in America
- Explain the role of women in the history of beer.
- Identify scientists and their scientific contributions to the advancement of the brewing process.
- Synthesize the social effects associated with the consumption of beer during its history

Beer Basics

- Discover the breadth of topics that will be examined in Introduction to Beer and Brewing.
- Identify the key ingredients and processes involved in brewing

Week 2:

The Brewhouse

- Differentiate between the processes that occur during the “hot side” and the “cold side” of beer production.
- Explain how a brewery’s distribution processes, cleaning in place (CIP) systems, sensory and pilot work, and waste management practices contribute to a brewery’s reputation and the quality of its beer.

Downstream Processing

- Explain how flavor changes during the aging of beer
- Describe the different techniques and processes through which beer is clarified
- Understand how flavors and quality is stabilized over time
- Describe the effect of spoilage microorganisms on beer
- Understand the differences between different packaging methods

Week 3.

Malt

- Understand properties of barley that facilitate good malt.
- Explain nature of malting process
- Classify types of malts and identify when certain malts would be used.
- Articulate the reason for the unit stages in malting

Week 4:

Water

- Summarize the desired ratio of water use to beer produced
- Explain how different ionic components affect water hardness
- Describe the types of water used in the brewing process

Week 5:

Hops

- Explain the role of hops in the brewing process.
- Describe how hops are cultivated.
- Compare and contrast the trade-offs associated with when to add hops to the brewing process.
- Summarize the advantages and disadvantages of using whole cone hops as opposed to hop products in the brewing process

Week 6:

Yeast

- Compare characteristics of *Saccharomyces cerevisiae* and *Saccharomyces pastorianus*
- Identify the methods used to determine yeast age, viability and concentration and what the methods measure specifically.
- Identify the chemical products from yeast that deliver specific flavors

Week 7.

The Quality of Beer

- Describe the eight categories that are used to describe the quality of beer.
- Synthesize why brewers view consistency as a critical factor in the quality of beer.
- Identify the attributes that contribute to the flavor of beer.
- Apply descriptors from the beer flavor wheel to distinguish a beer's taste.
- Summarize the meaning of flavor threshold.
- Graph the changes that can take place in flavor over time.
- Discuss the practices brewers use to minimize change in beer over time.
- Describe how the appearance of beer is described in terms of foam, clarity and color.
- **Beer as Part of the Diet**
 - Review the evidence surrounding arguments for and against beer consumption.
 - Describe which nutritional properties of beer lead some to refer to it as “liquid bread.”
 - Summarize the main findings of scientific research studies that examined the relationship between alcohol consumption and health outcomes.

Week 8:

Beer Styles and Types

- Explain what traditionally distinguishes lagers from ales.

- Identify at least one example of a lager; lighter ale; and darker ale and describe the character of each.
- Gain an appreciation for the diversity of beer styles and the skill required to brew high quality beer.

Week 9:

How Beer is Analyzed

- Understand why and how beers are analyzed at the brewery and as a final product
- Be able to reference parameters that are measured on beers throughout the process
- Name a few methods or instruments that are used to assess quality
- Appreciate the importance of the most sensitive instrument used in the brewery: the human body

The Future of Malting and Brewing

- Be able to explain some of the potential future directions of beer and the brewing industry in general