

FOS 6455C
Industrial Food Fermentations
3 Credits, Fall 2018
Proposed Course Syllabus

Course Instructors and Office Hours

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Office Hours: Wednesday, 1-3pm; Thursday, 1-3pm; or by appointment

Bruna Bertoldi

FSHN MS student and lab/demo TA

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Dr. Goodrich Schneider will be responsible for overall coordination and administration of the course, as well as instructional duties. She will be assisted by Ms. Brunna Bertoldi in the preparation/logistics of labs and demos for this course. Additionally, the specialized expertise of the members of FSHN and other faculty will be utilized in the form of guest lectures, laboratory exercises and/or discussions; see syllabus for tentative dates/topics.

Time/Location:

- M W F: Period 3 (9:35am – 10:25am) MCCB 3124. For weeks with no lab/demo/exercise, we'll generally have three lectures for the week during period 3, and you'll have period 4 free.
- M: Period 4 (10:40am – 11:30am) Location Varies. The FSN 130 (FSHN Pilot Plant), 3rd floor Conference Room, and 3rd floor Teaching Lab will be utilized as outlined in the instructor's weekly email sent out on the Friday preceding the week in question. The laboratory aspect of this class will be a combination of hand-on experiments, demonstrations, taste panels and field trips. There will generally be NO lab exercise if a lecture is scheduled for Monday period 3 per the syllabus. Due to the nature of fermentation itself, demos and trips, there will be occasional events that will not fit into the official time/locations noted. Every effort will be made to accommodate individual schedules.

Course Objectives

The overall objective of the course is to provide graduate-level knowledge, theory and practice for a variety of commercially-important fermented food products and ingredients, from a technical perspective. There will be an interdisciplinary emphasis upon safety, regulatory, nutritional, microbiological and economic considerations of processes which add value to and/or reduce waste from agricultural commodities and natural resources.

Prerequisites

The prerequisite course is FOS 4222 or an equivalent course in food microbiology, or permission of instructor. All students must be 21 years of age or older by October 1, 2018 as we will be examining alcohol-containing products in the latter part of the course.

Course Format

Students will acquire knowledge of the microbiological, chemical and physical aspects of food industry fermentations using various learning modalities including lectures, discussions, laboratory exercises/demonstrations and assignments.

Textbook and References

The required text, containing the basis for the course material, will be available at the UF Bookstores. It will also be on reserve at the Marston Science Library under FOS 6455C and will be made available for 2-hr use, along with other additional resources, in Room 329, FSHN Building. Although I've designated the book as "required", that does not mean that it must be purchased, just that the specified chapters will be part of the material for the exam, along with lecture notes and other designated materials. The book is quite old date-wise (although we are using the most updated—and the only edition) but it's still well-organized and pertinent for the study of fermented foods.

An updated syllabus, lectures and supplemental material will be posted on the UF eLearning site: <https://lss.at.ufl.edu/>. We will be utilizing the Canvas platform primarily as an archive of class lectures, supplemental material and exercises.

Required Text:

Hutkins, R. 2006. Microbiology and Technology of Fermented Foods. Blackwell Publishing, Ames, IA.

Additional Text Resource:

Hui, Y.H. et al. 2004. Handbook of Food and Beverage Fermentation Technology. Marcel Dekker, Inc., New York, NY.

Grading

- Exams (4) 70%

These exams will each cover approximately ¼ of the course material and be equally weighted for each quarter. Exam 4 will also have a section with your choice of 1 of 2 questions that cover the entire course, which will increase the number of points associated with that exam.

- Assignments/Lab Exercises 30%

Assignments/exercises represent a significant part of the course grade, and their completion supports learning in the area of food fermentations. One of these assignments will be a term paper, in the form of a scientific review paper on a particular topic relevant to commercial fermented foods, beverages or food ingredients. Please adhere to stated deadlines for maximum credit.

Course Average Grade Equivalents:

90 - 100 A

88 - 89 B+

80 - 87 B

78 - 79 C+

70 - 77 C

68 - 69 D+

60 - 67 D

This course will not be graded on a curve, and will not utilize minus grades. Please see <http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html> for official University of Florida grading policies.

Working Course Outline

Week 1

8/22/18: Review of syllabus and course objectives; Lecture: Introduction to Food Fermentation (Hutkins Chap. 1)

8/24/18: Lecture: Review of fermentation microbiology and biochemistry (Hutkins, Chap. 2); Assignment 1 (Biochemical Pathways) handed out

Week 2

- 8/27/18: Lecture: Fermented soy products (con't); Demo: Discussion/tasting of soy-based products (Hutkins, Chap. 12)
- 8/29/16: Lecture: Fermented soy products
- 8/31/16: Lecture: Culturing techniques, starter cultures, growth (Hutkins, Chap. 3)
Dr. Keith Schneider (keiths29@ufl.edu); Assignment 1 due;

Week 3

- 9/3/18: No class – UF holiday
- 9/5/18: Lecture: Fermented vegetable products – an overview (Hutkins, Chap. 7)
- 9/7/18: Lecture: Fermented vegetables (con't.)

Week 4

- 9/10/18: Lab: Assignment 2 - fermented vegetable exercise - kimchi
- 9/12/18: Cereal fermentations – yeast-leavened products, sour dough bread (Hutkins, Chap. 8)
- 9/14/18: Lecture: Cereal fermentations with a focus on international products

Week 5

- 9/17/18: Work session/Demo: Wrap-up assignment 2 – fermented vegetable products kimchee assessment; fermented vegetable and cereal product demo
- 9/19/18: Exam 1 (50 minutes, closed book); Assignment 2 due
- 9/21/18: Virtual Lecture: Vinegar production and *Acetobacter* (Hutkins, Chap. 11)

Week 6

- 9/24/18: Lecture: Fermentation technology - unit operations, flow diagrams and processing equipment
- 9/26/18: Lecture: Kombucha, tea and coffee “fermentation”; Begin Assignment 3 (term paper)
- 9/28/18: Lecture: Fermented fish products (Hutkins, Chap. 12)

Week 7 (tentative)

- 10/1/18: Lecture: Fermented meat products – introduction (Hutkins, Chap. 6);
Turn in presentation topic for approval (Assignment 3)
- 10/3/18: Assignment 4: Sausage production lab and demonstration (Animal Sciences Meat Laboratory) time period 9:35-11:35am
- 10/5/18: Lactic acid bacteria – a review

Week 8

- 10/8/18: No formal lecture; sample fermented meat products, receive report directions for Assignment 4 (fermented meat products)
- 10/10/18: Lecture: Lactic acid bacteria – a review
- 10/12/18: Lecture: Milk and dairy product chemistry and processing; Introduction to dairy fermentations – cultured products (Hutkins, Chap. 4)

Week 9

- 10/15/18: Lecture/Lab: Cultured dairy products - yogurt/kefir/crème fraiche (Assignment 5); Assignment 4 due
- 10/17/18: Cultured dairy product demo/sampling; Exam 2 review
- 10/19/18: Exam 2 (50 minutes, closed book); Assignment 5 due

Week 10

- 10/22/18: Lab (Assignment 6): Mozzarella production; ricotta production; cheese evaluation
- 10/24/18: Lecture: Cheese – Overview and Principles (Hutkins, Chap. 5)
- 10/26/18: Lecture: Types of cheese

Week 11

- 10/29/18: Lecture: Wine and winemaking (Hutkins, Chap. 10); Assignment 6 due
- 10/31/18: Lecture: Wine and winemaking technology and analysis; Product Demo (in afternoon): Wine varietal analysis; sensory aspects of wine assessment (no report due)
- 11/2/18: No class – UF Homecoming

Week 12

- 11/5/18: Lecture: Mead, cider and some distilled beverages; Demo in pilot plant immediately following lecture (mead, cider, probiotics)
- 11/7/18: Lecture: Current trends in fermented food products
- 11/9/18: Lecture: Probiotics and their use in commercial food products

Week 13

- 11/12/18: No Lecture – UF holiday
- 11/14/18: Exam 3 (50 minutes, closed book)
- 11/16/18: Lecture: Microbial processes for ingredient production – flavors, vitamins, amino acids, enzymes; Begin Assignment 7

Week 14

- 11/19/18: Lecture: Toxicology of fermented food products; Draft of term paper due for instructor review and comment (optional but highly recommended; please submit electronically)
- 11/21/18: No class – UF holiday
- 11/23/18: No class – UF holiday

Week 15

- 11/26/18: Lecture: History and worldwide economics of beer; Assignment 7 due
- 11/28/18: Lecture: Beer production (Hutkins, Chap. 9)
- 11/30/18: Lecture: Beer and brewing – microbiology, quality and sanitation

Week 16

- 12/3/18: Lecture: Biofuels and food waste utilization; Sensory aspects of beer demo (in pilot plant period 4).
- 12/5/18: Lecture: Biofuels and food waste utilization; Last day of classes; Course review; Assignment 7 due
- 12/7/18: UF reading day

Week 17

- 12/10/18: Assignment 3 due (Term Paper)
- 12/12/18: Final Exam (Exam 4): 12:30 to 2:30pm, Location TBD; 2 hours, closed book

Information for All Students

Age restrictions:

Due to the nature of the products produced and evaluated in this course, all students must be 21 years of age or older by 10/1/18. Registration in this course serves as pledge by student that they meet this requirement.

Academic Honesty:

In the process of enrolling and registering for classes at the University of Florida, every student has signed and presumably understands the following statement:

“I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University.”

The following information is implicit in all exams and assignments:

“On my honor, I have neither given nor received unauthorized aid on this exam/assignment.”

Use of Library, Personal References, PC Programs, and Electronic Data Bases:

These items are university property and should be utilized with other users in mind. Never remove, mark, modify nor deface resources that do not belong to you. If you’re in the habit of underlining text, do it only on your personal copy. It is inconsiderate, costly to others, and dishonest to use common references otherwise.

Software Use:

All faculty, staff and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.

We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

Disability Issues:

Students requesting classroom accommodation should register with the Dean of Students Office, who will then provide necessary documentation to the student. Please provide this documentation to the Instructor when requesting accommodation.

UF Counseling Services:

I hope to establish an effective and professional class relationship and encourage dialog so that students feel comfortable discussing academic problems directly with me. In addition, resources are available on-campus for students having personal problems or lacking clear career and academic goals that interfere with their academic performance. These resources include:

1. University Counseling Center, 301 Peabody Hall, 392-1575, personal and career counseling;
2. Student Mental Health, Student Health Care Center, 392-1171, personal counseling;
3. Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161, sexual counseling; and
4. Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.