

FOS 6455C
Industrial Food Fermentations
3 Credits, Fall 2016
Proposed Course Syllabus

Course Instructors and Office Hours

Renée Goodrich Schneider, Professor

Food Science and Human Nutrition Department

Room 329, FSHN Building, Newell Drive

Phone: 352.294.3727

Fax: 352.392.9467

Email: goodrich@ufl.edu

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

Brittany Hubbard

FSHN Doctoral Candidate and Supervised Teacher

Room 329, FSHN Building

Phone: 352.294.3727

Email: martinb@ufl.edu

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. Brittany Hubbard in lectures, labs and demos in her role of Supervised Teacher 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) AFPL 101. We will be meeting in the Aquatic Food Product Laboratory conference room instead of our assigned room of MCCB 2102. We will be able to sample/demo a variety of fermented food products in that venue, whereas we would not in official UF classrooms.
- ❑ M: Period 4 (10:40am – 11:30am) FSN 130 (FSHN Pilot Plant) and Teaching Lab as directed, instead of AFPL 101. 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 the first day of class (8/22/16).

Course Format

Students will acquire knowledge of the microbiological, chemical and physical aspects of food industry fermentations through the use of 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) 65%

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 35%

Assignments/exercises represent a significant part of the course grade, and their successful completion is critical. 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

8/22/16: Review of syllabus and course objectives; Read Hutkins Chap. 1
8/24/16: Lecture: Review of fermentation microbiology and biochemistry (Hutkins, Chap. 2); Assignment 1 (Biochemical Pathways) handed out
8/26/16: Lecture: Culturing techniques, starter cultures, growth (Hutkins, Chap. 3) Dr. Keith Schneider (keiths29@ufl.edu)

Week 2

8/29/16: Lecture: Fermented soy products (Hutkins, Chap. 12)
8/31/16: Lecture: Fermented soy products (con't); Assignment 1 due
9/2/16: Demo: Discussion/tasting of soy-based products

Week 3

- 9/5/16: No class – UF Holiday
9/7/16: Lecture: Cereal fermentations – yeast-leavened products, sour dough bread (Hutkins, Chap. 8)
9/9/16: Lecture: Cereal fermentations – international products

Week 4

- 9/12/16: Lecture: Fermentation technology: unit operations and processing equipment
9/14/16: Exam 1 (50 minutes, closed book)
9/16/16: Lecture: Fermented vegetable products – an overview (Hutkins, Chap. 7)

Week 5

- 9/19/16: Lecture/Lab: Assignment 2 - fermented vegetables - kimchi
9/21/16: Continue assignment 2 – fermented vegetable products work session
9/23/16: Virtual Lecture: Vinegar production and *Acetobacter* (Hutkins, Chap. 11)

Week 6

- 9/26/16: Demo/tasting: Fermented vegetable products
9/28/16: Lecture: Tea and coffee “fermentation”; Assignment 2 due; Begin Assignment 3 (term paper)
9/30/16: Lecture: Fermented fish products (Hutkins, Chap. 12)

Week 7

- 10/3/16: Lecture: Fermented meat products – introduction (Hutkins, Chap. 6) (Dr. Sally Williams, wsallyk@ufl.edu); Turn in presentation topic for approval (Assignment 3)
10/5/16: Assignment 4: Sausage production lab and demonstration (Animal Sciences Meat Laboratory, Dr. Williams) – 9:35-11:35am
10/7/16: No Class: UF Homecoming

Week 8

- 10/10/16: No formal lecture; sample fermented meat products, receive report directions for Assignment 4 (fermented meat products)
10/12/16: Lecture: Lactic acid bacteria – a review
10/14/16: Lecture: Milk and dairy product chemistry and processing; Introduction to dairy fermentations – cultured products (Hutkins, Chap. 4)

Week 9

- 10/17/16: Lecture/Lab: Cultured dairy products - yogurt/kefir/crème fraiche (Assignment 5); Assignment 4 due
10/19/16: Cultured dairy product demo/sampling; Exam 2 review
10/21/16: Exam 2 (50 minutes, closed book)

Week 10

- 10/24/16: Lab: Mozzarella production; ricotta production; cheese evaluation; Assignment 5 due
- 10/26/16: Lecture: Cheese – Overview and Principles (Hutkins, Chap. 5)
- 10/28/16: Lecture: Types of cheese

Week 11

- 10/31/16: Lecture: Wine and winemaking history and economics (Hutkins, Chap. 10), Dr. Charles Sims (csims@ufl.edu)
- 11/2/16: Lecture: Wine and winemaking technology and analysis (CS); Product Demo (in afternoon): Wine varietal analysis; sensory aspects of wine assessment (no report due)
- 11/4/16: Lecture: Mead, cider and some distilled beverages (BH)

Week 12

- 11/7/16: Lecture: Probiotics and their use in commercial food products
- 11/9/16: Lecture: Food processing equipment in the fermentation industries (2)
- 11/11/16: No Class: UF Holiday

Week 13

- 11/14/16: Lecture: History and worldwide economics of beer; begin Assignment 6
- 11/16/16: Lecture: Beer production; Lab 4 due (Hutkins, Chap. 9)
- 11/18/16: Lecture: Beer and brewing – microbiology, quality and sanitation

Week 14

- 11/21/16: Exam 3 (75 minutes, closed book); brewed product demo (Pilot Plant); Assignment 6 due
- 11/23/16: No Lecture – UF Holiday; Draft of term paper due for instructor review and comment (optional but highly recommended; please submit electronically)
- 11/25/16: No Lecture – UF Holiday

Week 15

- 11/28/16: Lecture: Toxicology of fermented food products
- 11/30/16: Lecture: Microbial processes for ingredient production - Whey protein isolate, vitamins, amino acids, enzymes; Begin Assignment 7
- 12/2/16: Lecture: Biofuels and food waste utilization

Week 16

- 12/5/16: Lecture: Manipulation of microbes for industrial manufacturing (GMOs and their products), Dr. Keith Schneider (keiths29@ufl.edu)
- 12/7/16: Last day of classes; Course review; Assignment 7 due
- 12/9/16: Reading day

Week 17

12/12/16: Assignment 2 due (Term Paper)

12/15/16: Final Exam (Exam 4): 10:00am to 12:00pm, AFPL 101; 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 at the time of the first class (8/22/12). 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.