

**FOOD FERMENTATIONS**  
**FDST/MIBO 4120/6120 – 4120L/6120L**  
**Fall 2021**

Class: 1:50 –2:40 pm MW (Room 131, Food Science Building)  
Lab: 3:00-6:00 pm M (Teaching lab 217/218, Food Science Building)  
3 hours (2 hours lecture + 3 hours lab per week)  
Prerequisites: MIBO 3000-3000L or MIBO 3500 (or equivalent)

**Course Description:** Microbial and technical aspects of dairy, vegetable, meat, grain, and fruit fermentations. Products studied include cheese, sausage, beer, wine, vinegar, cultured dairy products, vegetables, and soy products.

This course will cover the microbial, technological, and quality control aspects of lactic acid, alcoholic, and fungal fermented foods with emphasis on preparation of cultures, fermentation control, shelf life, formation of flavor compounds, and control over physical properties. Characteristics of probiotic cultures and prebiotic food additives will also be covered.

**Course Objectives:**

After completion of this course students should be able to:

1. Describe the enzymatic and microbial activities which lead to desirable changes in food commodities that result in fermented food products.
2. Describe technical methods used to control and optimize microbial activities during fermented food production.
3. Describe the various types of fermented foods in terms of primary and secondary microbial and enzymatic activities involved in their production.
4. Identify various flavors and flavor defects in fermented foods.
5. Identify and know how to avoid or correct common defects occurring in fermented foods.
6. Develop new and improve existing fermented foods utilizing culture selection and fermentation control techniques.

**INSTRUCTORS**

**Office, Office Hours, and Contact Information:**

**Dr. Abhinav Mishra** (Instructor)

Room 335 (Food Science Building); Office hours: By appointment

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**Xinran Xu** (Teaching Assistant)

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## GRADING

### Grading Scale:

Labs and Assignments:	15%
Quizzes:	50%
Participation and attendance:	5%
Exams:	30%

### Typical cut-offs:

A =	>92	C+ =	<80 to >78
A- =	<92 to >90	C =	<78 to >72
B+ =	<90 to >88	C- =	<72 to >70
B =	<88 to >82	D =	<70 to >60
B- =	<82 to >80	F =	<60

**Labs and Assignments:** Various assignments and activities will be given during the semester. Two lab reports will be submitted individually. The deadlines for submitting the reports will be announced later. One project will be given during the semester and will have to be presented toward the semester-end. These activities will serve to enhance and assess learning.

**Quizzes:** Quizzes may be announced or unannounced. They may contain questions from lectures, class content, readings, or labs. They will ensure reading has been completed and check understanding of the material. They will typically be completed via eLC.

**Participation, Discussion, Attendance, etc.:** Class time will be used to enhance learning and all students will be expected to be present and participate. Excused absences will be noted for acceptable reasons (e.g., class field trip, illness with documentation, job interview).

**Exams:** There will be two in-class or take-home exams. Final exam will not be cumulative and the date and time will be announced later in the semester.

**Graduate Student Assignment:** Since this is a split 4000/6000 level course, graduate students will be required to complete an additional assignment. This assignment will be graded in such a way that a poor performance will adversely affect the student's final grade. Graduate students do not earn extra credit in completing this assignment. The assignment will be finalized by August 31, 2021. The due date for the assignment is to be determined. Copies of the efforts may be made available to the rest of the class via eLC.

**Academic Honesty:** As a University of Georgia student, you have agreed to abide by the University's academic honesty policy, "A Culture of Honesty", and the Student Honor Code. All academic work must meet the standards described in "A Culture of Honesty" found at: <https://honesty.uga.edu/Academic-Honesty-Policy/>. Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Questions related to course assignments and the academic honesty policy should be directed to the instructor.

## COURSE MATERIALS

**Course Information:** eLC learning management system will be used to distribute course information, materials, updates, messages, etc. It can be accessed at <https://uga.view.usg.edu/>. Check the site frequently. If you have problems with the site, notify the instructor.

**Recommended Course Material:** Microbiology and Technology of Fermented Foods by Hutkins (an electronic copy is available through the UGA library website). Required/suggested readings are listed in the class schedule and are to be completed before the assigned class periods.

### Other Suggested Texts:

- Handbook of Food and Beverage Fermentation Technology by Hui
- Biochemistry of Foods by Eskin
- Applied Dairy Microbiology by Marth and Steele (an electronic copy is available through the UGA library website)
- Wine Science by Jackson

**Other Resources:** There are books and scientific journals relevant to this course available through the UGA libraries (<http://libs.uga.edu/>). There is also a “Food Science and Technology” research guide available (<http://guides.libs.uga.edu/foodscitech/food-science-and-technology-databases>). If you use Google, use Google Scholar (<https://scholar.google.com/>). Typically, “.com” and “.org” websites are not appropriate to use in this course.

**Disability Accommodations:** If you plan to request accommodations for a disability, please register with the Disability Resource Center. They can be reached by visiting Clark Howell Hall, calling 706-542-8719 (voice) or 706-542-8778 (TTY), or by visiting <http://drc.uga.edu>. Students with disabilities who require reasonable accommodations in order to participate in course activities or meet course requirements should contact the instructor or designate during regular office hours or by appointment.

### Instructor Responsibilities:

- Provide information, resources, and opportunities for students to learn.
- Create, collect, plan, organize, and assess content in a meaningful and timely manner.
- Present material and assignment expectations clearly and fairly.
- Provide opportunities for students to comment on instruction and the course and use the feedback to improve the course and learning.

### Student Responsibilities:

- Check eLC and UGA email frequently for course updates.
- Have a serious attitude.
- Understand that learning (and this course) takes time and effort.
- Be willing to ask for assistance when information is not clear.

- Be willing to provide constructive and meaningful feedback to help improve the course and instruction.
- Complete assignments early or on time.
- Actively participate in discussions and group activities.

#### Success Tips:

- Read and follow rubrics and directions carefully. Many points on assignments can be lost for not following directions.
- Manage your time wisely and do not procrastinate.
- For every 1 hour of class time, approximately 2-3 hours should be spent studying and reviewing course materials outside of class.
- Use scientific journal articles as references for assignments whenever possible. Books and “.gov” websites may also be appropriate references.
- Learn from mistakes on your first few assignments, quizzes, exams and lab reports to improve the quality of your later ones. If you are not sure why points are taken off, meet with the instructor or TA to clarify.

\*\*\*The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary. \*\*\*

### FOOD FERMENTATIONS (FDST 4120/6120) Schedule Fall 2021

Date	Day	Topics/Activities	Reading
08/18/2021	W	Introduction	Hutkins Ch. 1
08/23/2021	M	Microbiological concepts in Food Fermentation	
08/23/2021	M	Lab-TA measurement	
08/25/2021	W	Microorganisms in Fermentation	Hutkins Ch. 2
08/30/2021	M	Microorganisms in Fermentation	Hutkins Ch. 2
08/30/2021	M	Lab: Sugar fermentation	
09/01/2021	W	Metabolism of microorganisms in Fermentation	Hutkins Ch. 2
09/06/2021	M	No class-Labor Day	
09/06/2021	M	No lab	
09/08/2021	M	Starter cultures	Hutkins Ch. 3
09/13/2021	M	Starter cultures	
09/13/2021	M	Lab- Wine*	
09/15/2021	W	Starter cultures	Hutkins Ch. 3
09/20/2021	M	Vinegar	Hutkins Ch. 11
09/20/2021	M	Lab-Vinegar	
09/22/2021	W	Wine	Hutkins Ch. 10
09/27/2021	M	Wine	Hutkins Ch. 10
09/27/2021	M	Lab- Wine sensory	
09/29/2021	W	Beer	Hutkins Ch. 9
10/04/2021	M	Beer	

10/04/2021	M	Lab-Root beer	
10/06/2021	W	Bread	Hutkins Ch. 8
10/11/2021	M	Bread	Hutkins Ch. 8
10/11/2021	M	Lab-Bread	
10/13/2021	W	Vegetables	Hutkins Ch. 7
10/18/2021	M	Vegetables	Hutkins Ch. 7
10/18/2021	M	Lab-Pickle*	
10/20/2021	W	Dairy	Hutkins Ch. 4
10/25/2021	M	Dairy	Hutkins Ch. 4
10/25/2021	M	Lab-Yogurt	
10/27/2021	W	Cheese	Hutkins Ch. 5
11/01/2021	M	Cheese	Hutkins Ch. 5
11/01/2021	M	Lab-Cheese sensory	
11/03/2021	W	Meat	Hutkins Ch. 6
11/08/2021	M	Meat	Hutkins Ch. 6
11/08/2021	M	Lab-Meat	
11/10/2021	W	Oriental foods	Hutkins Ch. 12
11/15/2021	M	Oriental foods	Hutkins Ch. 12
11/15/2021	M	Lab-Tempeh	
11/17/2021	W	Guest lecture-sensory	
11/22/2021	M	Project discussion	
11/22/2021	M	Project discussion	
11/24/2021	W	No class-Thanksgiving	
11/29/2021	M	Project presentations	
11/29/2021	M	Project presentations	
12/01/2021	W	Project presentations	
12/06/2021	M	Discussion for Final Exam	

\*: Lab report will be required. The deadlines to submit the lab reports will be announced later.

*The schedule is subject to changes.*