

FDSC / BIOL 4122 FOOD MICROBIOLOGY

Fall 2017

Course Description:

The study of food microbiology including classification/ taxonomy, contamination, preservation and spoilage of different kinds of foods; pathogenic microorganisms, food poisoning, sanitation, control and inspection; as well as beneficial uses of microorganisms.

Instructor: Franck Carbonero

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Office Hours; Call/email for appointment or take your chances

Lecture: MW 9:40 – 10:30 POSC Classroom 0133

Textbooks:

Fundamental Food Microbiology, Fifth Edition, by Bibek Ray and Arun Bhunia.
<https://www.crcpress.com/Fundamental-Food-Microbiology-Fifth-Edition/Ray-Bhunia/p/book/9781466564435>. Food Science majors may be interested in getting the hard copy, others will probably prefer the cheap 6-month e-book rental.

Course Objectives:

- 1) Identify the characteristics, sources and significance of predominant food microorganisms.
- 2) Explain the benefits of microorganisms in starter cultures, biopreservation, bioprocessing and probiotics
- 3) Understand food spoilage by microorganisms and the strategies implemented to prevent spoilage.
- 4) Understand the foodborne pathogens associated with intoxication, infections and toxicoinfections.
- 5) Understand the methods used to control microorganisms

Course Topics:

History of food microbiology

Classification / Taxonomy of Microorganisms

Characteristics of Predominant Microorganisms

Important Bacterial Groups in Food

Sources of Microorganisms in Food

Normal Microbiological Quality of Foods and Its Significance

Microbial Food Spoilage
 Microbial Growth Response in the Food Environment
 Microbial Metabolism of Food Components
 Microbial Sporulation and Germination
 Microorganisms used in Food Fermentation
 Intestinal Beneficial Bacteria/ Use of Biopreservatives
 Microbial Foodborne Illnesses and Pathogens
 Control of Microorganisms in Food
 Microbial Detection and Food Safety

Assessments:

Grades will be determined using 3 exams. Graduate students must also write a term paper. **Attendance will be monitored and more than one unexcused absence during each section will result in 5 points knocked down from the subsequent exam.**

Assessments;

Method	Date	Points	% Grade Sen- iors	% Grade Grad Students
Exam #1	Sept 25	60 pts	30%	20%
Exam #2	Nov 1	60pts	30%	20%
Term Paper (Grad students only)	Due Dec 14	100 pts		33%
Final Exam	Dec 14	80 pts	40%	27%
Total		300pts/ 400pts	100%	100%

Grading will be as follows:

100 – 85% = A
 75-85%= B
 65 – 75 %= C
 50 -65%= D
 <50% = F

Graduate Students:

Graduate students will be required to do a term paper. See me about topics.

4122 Very Tentative Food Microbiology Lecture Schedule

<u>Dates</u>	<u>Lecture #</u>	<u>SUBJECT</u>
I. Basic concepts and spoilage		
August 21	Lecture 1	Introduction; Syllabus; Survey
August 23	Lecture 2	Food science/safety (BIOL majors)
August 28	Lecture 3	Microbiology refresher (FDSC majors)
August 30	Lecture 4	Characteristics of Predominant food Microbes
Sept 6	Lecture 5	Microbial Growth Characteristics in food (+factors) (+Sporulation and Germination)
Sept 11	Lecture 6	Normal Microbial Quality of Foods
Sept 13	Lecture 7	Laws and regulation Guest Speaker
Sept 18	Lecture 8	Microbial Spoilage 1
Sept 20	Lecture 9	Microbial Spoilage Guest Speaker
Sept 25	EXAM 1	Test over lectures 4-8
II. Beneficial uses and foodborne diseases		
Sept 27	Lecture 10	Test 1 review
Oct 2	Lecture 11	Intestinal Beneficial Bacteria (Probiotics)
Oct 4	Lecture 12	Microbiology of beer- Bacon
Oct 9	Lecture 13	Food Fermentation
Oct 11	Lecture 14	Microbiology of wine- Threllfall
Oct 18	Lecture 15	Microbial foodborne diseases + Intoxications: Staphylococcus aureus Botulism, Mycotoxicosis Other (toxico)infections: Escherichia coli and Shigella Campylobacter Yersinia, Vibrio Clostridium perfringens, E. coli Bacillus cereus, Cholera New and emerging pathogens
Oct 23	Lecture 16	Viruses- Gibson
Oct 25	Lecture 17	Infections: Salmonella- Pravin
Oct 30	Lecture 18	Infections: Listeria- Crandall
Nov 1	EXAM 2	Test over Lectures 9- 17
III. Control and detection of food microbes		
Nov 6	Lecture 19	Review test 2
Nov 8	Lecture 20	Microbial enumeration, MPN
Nov 13	Lecture 21	Guest Speaker
Nov 15	Lecture 22	Modern Methods of detection
Nov 20	Lecture 23	Guest from Tyson- Widemann
Nov 27	Lecture 24	Engineering
Nov 29	Lecture 25	Parker Cole Approaches to prevent microbial contamination
Dec 4	Lecture 26	Engineering- Atungulu
Dec 6	Lecture 27	Review and instructions for finals
Dec 11 or 13	EXAM 3	Final comprehensive exam

Academic Honesty:

I am committed to the principle of academic honesty and I expect each student in my class to maintain a high standard of academic integrity. My commitment to you, the student, is to provide a learning environment that promotes academic honesty in and out of the classroom. I support the University of Arkansas policy concerning academic honesty that is described in the Student Handbook. Consequently, any student involved in an academically dishonest act will be given an F in the class and the action will be reported to the All University Judiciary. Students are expected to work independently on the term paper, food store label project and final examination.

Students with Disabilities:

If you need an accommodation due to a disability, please make arrangements to discuss this with me during the first two weeks of the semester.

Blackboard- I intend to put all lectures and study questions on Blackboard. Discussion boards will be created for each lecture so that any questions and/or clarification will be available to everyone. Please check regularly.

EMERGENCY PROCEDURES

Many types of emergencies can occur on campus; instructions for specific emergencies such as severe weather, active shooter, or fire can be found at emergency.uark.edu.

Severe Weather (Tornado Warning):

- Follow the directions of the instructor or emergency personnel
- Seek shelter in the basement or interior room or hallway on the lowest floor, putting as many walls as possible between you and the outside
- If you are in a multi-story building, and you cannot get to the lowest floor, pick a hallway in the center of the building
- Stay in the center of the room, away from exterior walls, windows, and doors

Violence / Active Shooter (CADD):

- **CALL**- 9-1-1
- **AVOID**- If possible, self-evacuate to a safe area outside the building. Follow directions of police officers.
- **DENY**- Barricade the door with desk, chairs, bookcases or any items. Move to a place inside the room where you are not visible. Turn off the lights and remain quiet. Remain there until told by police it's safe.
- **DEFEND**- Use chairs, desks, cell phones or whatever is immediately available to distract and/or defend yourself and others from attack.