

**FOOD MICROBIOLOGY LECTURE**  
**The Ohio State University**  
**(Food Science & Technology 5536/ Microbiology 5536)**  
**Three credit hours**  
**Autumn Semester, 2020**

**INSTRUCTOR**

Ahmed E. Yousef, Professor  
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**OFFERING: Hybrid**

Monday: 11:30-12:25 (online)  
Wednesday: 11:30-12:25 (online)  
Friday: 11:30-12:25 (in-person; half the class meets on alternating Friday's)

**Course material will be available on OSU [Carmen/Canvas](#)**

<https://osu.zoom.us/j/95106191249?pwd=djBVcXJPKzB3emdhWDNEMmdBTzZUUT09>

**LOCATION (for in-person lectures)**

Ramseyer Hall, Room 260

**DESCRIPTION**

The course covers essential knowledge on how microorganisms use food as a habitat or a transient medium, and which of these microorganisms are beneficial, cause food spoilage, or pose hazards to human health. The course also covers approaches for making use of beneficial microorganisms, controlling spoilage ones, and eliminating the disease-causing (pathogenic) microbes.

**LEARNING OUTCOMES**

Students completing this course should:

- Understand the **causes** of food spoilage and predict the **microorganisms** that can spoil a given food, when prepared, processed, and stored under given conditions.
- Understand the **causes** of foodborne microbial diseases and predict the **pathogens** that can grow in a food, when prepared, processed, and stored under given conditions.
- Be able to predict the necessary **measures to control** the spoilage and pathogenic microorganisms in food.
- Understand the role of **beneficial microorganisms** in food processing, preservation and safety, and the possible health benefits resulting from the consumption of these microorganisms.

## RESOURCES

### Handouts

- Provided for each lecture; these are to be downloaded from course Carmen page, and reviewed before listening or attending the lecture.
- Handouts serve only as lecture outlines, but they don't contain enough information to prepare the students for quizzes or exams.

### Lectures and Assigned Readings

- Take notes and follow the lectures carefully
- Read assigned research papers (posted on Carmen)
- Read chapters, assigned occasionally
- Ask questions during the in-person sessions

### Office Hour

- Zoom-meeting will be set every Tuesday at 4:00-5:00pm to answer question and address concerns.

### The following are recommended (but not required) books:

- Ray B & Bhunia A. 2014. Fundamental food microbiology, 5<sup>th</sup> Ed. CRC Press, Boca Ratan, FL.
- Doyle MP, Diez-Gonzalez F & Hill C. 2019. Food Microbiology: Fundamentals and frontiers, 5<sup>th</sup> Ed. ASM Press, Washington, DC.

## GRADING<sup>1</sup>

### Exams

First Mid-Term	25%
Second Mid-Term	25%
Final (not comprehensive)	30%

### Activities

Activities	10%
Participation <sup>2</sup>	10%

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<b>Total</b>	<b>100</b>
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<sup>1</sup>Exams and quizzes will be held in the classroom, unless circumstances change

<sup>2</sup>Mode of participation will be decided after the course begins

## Final Grade

Grade will be based on the relative performance of individual students within the class. A grading curve will be constructed with a (B-) median. The instructor reserves the right to skew grades below or above the grade median for exceptional or less than exceptional classes. The approximate cutoffs for the grading curve are as follows:

Grade	Percentile	Explanation (of percentile ranking)
A	75 to 100	After grades are ranked, students in the top 25% of the ranking get A (regardless their actual score)
B	35 to < 75	
C	10 to < 35	
D	5 to < 10	
E	< 5	Lowest scoring students (the bottom 5% of ranked grades) get E, regardless their actual score

**Note: The above grading scheme is more generous than the OSU standard system**

## Make-up Exams

There is NO make-up for mid-terms or final exam, except when a student is under **extraordinary circumstances**. The instructor reserves the right to determine what constitutes an extraordinary circumstance. Well-documented justification will be needed for any potential make-up exam. **There will be no make-up exams for the quizzes, regardless the circumstances.**

## ACADEMIC MISCONDUCT

The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the university's Code of Student Conduct ([studentconduct.osu.edu](http://studentconduct.osu.edu)), and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the university's Code of Student Conduct and this syllabus may constitute "Academic Misconduct."

## ACCESSIBILITY ACCOMMODATIONS

If you anticipate or experience academic barriers based on your disability, please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307.

## HEALTH AND SAFETY REQUIREMENTS

All students, faculty and staff are required to comply with and stay up to date on all university safety and health guidance (<https://safeandhealthy.osu.edu/>), which includes wearing a face mask in any indoor space and maintaining a safe physical distance at all times. Non-compliance will be warned first and disciplinary actions will be taken for repeated offenses.

### TENTATIVE SCHEDULE

Week	Date	Theme	Lecture
1			
	8/26	<b>Introduction</b>	Syllabus discussion
	8/28		Basics of food microbiology
2			
	8/31	<b>Microbial groups in food</b>	Firmicutes (Gram-positive bacteria)
	9/2		Spore-forming bacteria
	9/4		Proteobacteria (Gram-negatives)
3			
	9/7		<i>Labor Day (no classes)</i>
	9/9		Foodborne fungi
	9/11		Discussion/Activities
4			
	9/14	<b>Microbe-food interactions</b>	Characteristics of food microbiota
	9/16		Food characteristics important to microbiota
	9/18	<b>Food microbiota</b>	Meat microbiota
5	9/21		Poultry microbiota
	9/23		Dairy microbiota
	9/25	Discussion/Activities	
6			
	9/28		Fresh produce microbiota
	9/30		Seafood microbiota
	10/2		<b>First Midterm Exam</b>
7		<b>Pathogens in food</b>	
	10/5	Gram-positives pathogens	<i>Staphylococcus aureus</i>
	10/7		<i>Listeria monocytogenes</i>
	10/9		<i>Clostridium botulinum</i>
8			
	10/12		<i>Clostridium perfringens</i>
	10/14		<i>Bacillus cereus</i>
	10/16		Discussion/Activities
9			
	10/19	Gram-negative pathogens	<i>Salmonella</i>
	10/21		Pathogenic <i>Escherichia coli</i>
	10/23		Pathogenic fungi
10			
	10/26	Miscellaneous pathogens	Foodborne parasites
	10/28		Foodborne viruses
	10/30		<b>Second Midterm Exam</b>

11	<b>Control of microorganisms in food</b>		
	11/2	Physical factors	Thermal inactivation
	11/4		Gamma radiation
	11/6		Emerging technologies
12			
	11/9	Chemical factors	Antimicrobial preservatives
	11/11		<i>Veteran's Day (no classes)</i>
11/13	Discussion/Activities		
13			
	11/16		Cleaning and sanitization
	11/18	Biological	Biopreservation
11/20	Probiotics		
14			
	11/23	Miscellaneous	Foodborne disease outbreaks: Case studies
	11/25		<b>Final Exam</b>
	11/27		<i>Thanksgiving (no classes)</i>