

FOOD MICROBIOLOGY

FOOD 3005

Fall 2021

COURSE OUTLINE

Instructor: Tyler Avis
Food Science Program
Department of Chemistry
Carleton University

Lectures: No live lectures. Asynchronous learning through Brightspace.

Reviews/Practice: Occasional synchronous meetings on Fridays 1:05-2:25 PM on BigBlueButton (through Brightspace)
Meetings will be recorded for those unable to attend live.

Laboratory: Section A1: In-person labs. Room 409 SC, Wednesdays, 2:35-5:25 PM
Section A2: In-person labs. Room 409 SC, Wednesdays, 8:35-11:25 PM
Section AW: Asynchronous learning through Brightspace

Contact: **Student hours (a.k.a. office hours:** By appointment (virtual)
Email: tyler.avis@carleton.ca
I can be reached by email at almost any time. When possible, I will reply promptly. Expect a response within 24 to 48 h.

Marking/evaluation:

Assignments (6):	Total	70%
	Basics	10%
	Fermentation	10%
	Pathogens (Gram -)	15%
	Pathogens (Gram +)	10%
	Spoilage and molds	10%
	Control	15%
Laboratory (4)	Total	30%
	Pre-lab questions	3%
	Technique/safety or video quizzes/critiques	6%
	Assignments and lab reports	18%
	Reflection assignments	3%

There will be **no changes** (reweighting or any other modification) to this evaluation scheme.

Assignments: Students are required to complete all assignments. The instructor will apply the **same policies** on exemptions for illness, family emergencies, etc. and academic misconduct to assignments as the University applies to formally scheduled final examinations and take-home examinations, as indicated in the Undergraduate Calendar at the following link:
<https://calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/examinations/>

Specifically concerning the exemptions, the instructor will apply the policies outlined in Section 4.3 of the aforementioned Undergraduate Calendar to the assignments as follows:

1. A request for a deferral must be made in writing (e.g., by email) to the instructor no later than three working days after the due date of the assignment; and
2. A request for deferral must be fully supported by appropriate documentation, which must include the following form <https://carleton.ca/registrar/wp-content/uploads/self-declaration.pdf>.

Laboratory: Successful completion of the laboratory work is **required** to pass the course.

Learning format: There will be no synchronous lectures in this course. There will be six modules in the course. Each module will be scheduled for approximately a two-week period as described below. Each module comprises the following:

- a. **Content:** PowerPoint slides, short videos, and additional reading (optional)
- b. **Learning activities:** These activities will take the form of Brightspace quizzes on the material and will help you prepare for the assignments. In this portion of the course, learning activities will not be graded. However, you **must complete the quiz** in a satisfactory manner or you **will not be allowed to complete your assignment**.
- c. **Assignments:** These will be graded. Failure to complete the assignment on time will result in a grade of zero. You will have 48 h to complete each assignment. Assignments will be available at 2:30 PM on the Monday of the second week of the module. Assignments will be due no later than 2:30 PM on Wednesday of that same week.

Teaching and learning activities, including lectures, discussions, presentations, etc., by both instructors and students, are copy protected and remain the intellectual property of their respective author(s). All course materials, including PowerPoint presentations, outlines, videos, and other materials, are also protected by copyright and remain the intellectual property of their respective author(s).

Students registered in the course may take notes and make copies of course materials for their own educational use only. Students are not permitted to reproduce or distribute lecture notes and course materials publicly for commercial or non-commercial purposes without express written consent from the copyright holder(s).

Recommended textbook:

There are no required textbooks. Reading of a textbook is optional. If you choose to read a textbook pertaining to the materials in this course, the instructor recommends:

Food Microbiology: an Introduction (2017) by Karl R. Matthews, Kalmia E. Kniel & Thomas J. Montville (publisher: ASM Press). This book can be read online by accessing the resource through the CU library's catalogue.

Learning outcomes (LOs):

1. Describe the principles involved in food preservation via fermentation processes
 - a. Identify and characterize different fermentation microorganisms
 - b. Explain how specific fermentation processes preserve food
 - c. Select and justify appropriate microorganisms for different fermentation processes
 - d. Explain biochemical mechanisms of action in how these microorganisms ferment food

2. Describe the role of pathogenic microorganisms in food and how it is influenced by environmental factors
 - a. Identify and characterize different pathogens
 - b. Explain biochemical mechanisms of action in how the microorganisms cause disease
 - c. Describe conditions under which specific pathogens grow, multiply and/or adapt
 - d. Explain the conditions under which the important pathogens are commonly inactivated, killed or made harmless in foods

3. Describe the role of spoilage microorganisms in food and how it is influenced by environmental factors
 - a. Identify and characterize different spoilage microorganisms
 - b. Explain biochemical mechanisms of action in how the microorganisms cause spoilage
 - c. Describe conditions under which spoilage microorganisms grow, multiply and/or adapt
 - d. Explain the conditions under which the important spoilage microorganisms are commonly inactivated or killed in foods

4. Demonstrate proficiency in a food microbiology laboratory
 - a. Understand proper techniques for media preparation, sterilization, and culturing microorganisms
 - b. Choose and judge the appropriate techniques for identifying and enumerating specific microorganisms
 - c. Assess and critique proficiency and safety techniques when using laboratory equipment, including glassware, software, instruments, and biosafety cabinets

5. Evaluate data obtained from food microbiology experiments
 - a. Apply appropriate calculations to data to determine amounts of microorganisms in food
 - b. Compare calculated food microbiological values to expected values including those from microbiological criteria or other appropriate scientific documents
 - c. Select and perform appropriate statistical analysis methods
 - d. Present results in the form of graphs, tables, and prose
 - e. Interpret results for a scientific audience of peers

Topics covered

Week starting	Topic			
		Material and Learning Activities	Live Sessions	Graded Assignments
Sept. 6	W	Course introduction Basics of food microbiology	Course Introduction	
	F	Basics of food microbiology		
Sept. 13	W	Basics of food microbiology		
	F	Basics of food microbiology	Practice and Review Basics	
Sept. 20	W	Basics of food microbiology Fermentation		Basics Sept 20 – Sept 22
	F	Fermentation		
Sept. 27	W	Fermentation		
	F	Fermentation	Practice and Review Fermentation	
Oct. 4	W	Fermentation Gram -		Fermentation Oct 4 – Oct 6

	F	Gram -		
Oct. 11	W	Gram -		
	F	Gram -	Practice and Review Gram -	
Oct. 18	W	Gram - Gram +		Gram - Oct 18 – Oct 20
	F	Gram +		
Oct. 25	W	Fall break		
	F	Fall break		
Nov. 1	W	Gram +		
	F	Gram +	Practice and Review Gram +	
Nov. 8	W	Gram + Spoilage/Mold		Gram + Nov 8 – Nov 10
	F	Spoilage/Mold		
Nov. 15	W	Spoilage/Mold		
	F	Spoilage/Mold	Practice and Review Spoilage/Mold	
Nov. 22	W	Spoilage/Mold Control methods		Spoilage/Mold Nov 22 – Nov 24
	F	Control methods		
Nov. 29	W	Control methods		
	F	Control methods	Practice and Review Control	
Dec. 6	W	Control methods		Control Dec 6 - Dec 8
	F			

Minimum technological needs:

In order to use the tools on Brightspace effectively, a desktop or laptop computer and a reliable internet connection are **highly recommended**. In order to access material (slides, videos and other content/resources), connect to live session through BigBlueButton, perform learning activities, and submit assignments, the following is also recommended:

- a. The latest version of your web browser(s): Chrome or Firefox are highly recommended. Some functionality of BigBlueButton and other tools are not compatible with other browsers. Safari should be avoided.
- b. Make sure you have pop-ups and cookies enabled.
- c. The latest version of Java (www.java.com) is also recommended.
- d. The recent version of MS Office such as MS Office 365 Pro Plus for Mac or PC (available free for Carleton University students at <https://carleton.ca/its/ms-offer-students/>)
- e. During live synchronous sessions, a headset, headphones, earphones/earbuds or similar technology are highly recommended.

Requests for academic accommodation:

You may need special arrangements to meet your academic obligations during the term. Please see the following link for additional information <https://students.carleton.ca/course-outline/>. For an accommodation request, the processes are as follows:

Students with Needs Related to Family Status: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the following website: <https://carleton.ca/equity/>.

Student with Religious Obligations: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the undergraduate calendar at the following website: <https://calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/regulations-for-students-with-religious-obligations/>.

Students with disabilities requiring academic accommodations in this course must register with the Paul Menton Centre for Students with Disabilities (PMC) for a formal evaluation of disability-related needs. Documented disabilities could include but are not limited to mobility/physical impairments, specific Learning Disabilities (LD), psychiatric/psychological disabilities, sensory disabilities, Attention Deficit Hyperactivity Disorder (ADHD), and chronic medical conditions. Registered PMC students are required to contact the PMC, 613-520-6608, every term to ensure that I receive your Letter of Accommodation, no later than two weeks before the first assignment is due or the first in-class test/midterm requiring accommodations.

For more details visit the undergraduate calendar at the following website: <https://calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/regulations-for-students-with-disabilities/>.

Academic Misconduct:

The consequences of copying, plagiarism and other forms of cheating are substantial. Students are referred to the 2021/2022 Undergraduate Calendar for information on this topic. The Carleton University Academic Integrity Policy can be found online at <https://carleton.ca/registrar/academic-integrity/>. It is **your responsibility** to know the contents of these policies, so it is highly recommended that you read them.