University of Regina – Department of Biology
Winter 2026

Biology 302 – Food Microbiology
TR 11:30-12:45, CL417

Professor: Chris Yost

Room	AdHum 514
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Office Hours	TR 12:45-13:45 or by appointment

I respectfully acknowledge that BIOL302 will be taught on Treaty 4 lands, these are the territories of the nêhiyawak (nay-hi-yuh-wuk, Cree), Anihšināpēk (uh-nish-i-naa-payk, Saulteaux), Dakota, Lakota, Nakoda, and the homeland of the Métis/Michif Nation. Today, these lands continue to be the shared territory of many diverse peoples. The nêhiyawak originally referred to Regina as oskana kā-asastēki (os-kuh-nuh-kaa-us-us-tay-kih), Cree for "the place where bones are piled up." This is why Regina's nickname is "Pile O'Bones" and is the origin of the name Wascana Park, where the University's Regina main campus is located.

Course Preamble and Teaching Philosophy

Food microbiology is a technologically dynamic and highly relevant discipline of microbiology. It impacts the lives of everyone and directly contributes both positively and negatively to the global multi-billion dollar food industry. This course will introduce you to the various topics within food microbiology. At the conclusion of this course you will understand the basic principles of microbial growth in foods. Using this foundation you will be able to describe how food spoilage occurs and the processes that occur during various food fermentations. You will know how to detect and quantify microbes in foods and become an expert in selecting which detection method is suitable for different food systems. You will have a solid grasp of microbes that cause food-borne illness and how they are transmitted through foods. You will also understand the various approaches that can be used to ensure food safety during the production of foods. Throughout the course you will become familiar with the new technical innovations that are constantly occurring in all aspects of food microbiology.

My teaching philosophy is to encourage students to develop critical thinking skills and in doing so also have strong retention of course material. My approach is to provide a variety of teaching methods, including lecturing, self-directed learning and peer-directed learning. My ultimate goal is for each of you to get an "A" in the course. However, this can only be achieved if you are an active participant in the course. Active participation is defined by: actively listening and responding to questions in class, staying on top of lecture material and assignments, and seeking help on course material that is not clear. I work hard to provide a lecture environment that is stimulating and interesting and by becoming an active participate you can help me achieve this goal. I look forward to introducing you to the world of food microbiology!

The Specifics

Text: There is no assigned text-book. Assigned readings from the primary scientific literature will be provided throughout the course.

Examination Schedule, Deadlines, and Grade Allocation:

Exam/Assignment	Date and Time	Value (%)
Exam 1	February 5	22
Exam 2	March 10	23
Poster Assignment	April 13	25
Final Exam	April 28	30
	Total	100

Please note that this course falls under the Academic Regulations of the University of Regina and of the Faculty of Science. Students should pay particular attention to the Student Code of Conduct and Right to Appeal section of the Undergraduate Calendar. Plagiarism and other forms of misconduct are not tolerated in this course. Please refer to the Undergraduate Calendar for a clear definition of plagiarism. If there are any uncertainties please ask your instructor for clarification.

Special Accommodations: Students in this course who have need for specialized accommodations should please contact the Centre for Student Accessibility (https://www.uregina.ca/student/accessibility/ centre-Accessibility/index.html).

Lecture outline:

Below is an outline of the topics to be covered during the course and the order they will appear in class.

1. Food as an ecosystem
    a. Factors affecting microbial growth
        i. Intrinsic abiotic factors
        ii. Extrinsic abiotic factors
        iii. Stress response
        iv. Biotic factors
    b. Microbial Community Dynamics
    c. Dispersal and Distribution
2. Control of Microbial Growth
    a. Physical methods
        i. Mechanical
            1. Pressurization
            2. Dehydration
        ii. Temperature
    b. Chemical
        i. pH
        ii. salinity
        iii. nitrite
    c. Biological methods
        i. Bacteriocins
        ii. competitive growth
3. Detection and enumeration of microbes
    a. Culture based detection methods
    b. Molecular based detection methods
4. Hazard Analysis Critical Control Point (HACCP)
5. Food and Beverage Fermentations
    a. Dairy Industry
    b. Meat Industry
    c. Vegetable Fermentations
    d. Ethnic Foods
    e. Beer/Wine/Non-alcohol beverages
6. Microbes causing food spoilage
    a. Gram negatives
    b. Gram positives
    c. Fungi
7. Microbes causing food borne illness
    a. Gram negatives
    b. Gram positive spore formers
    c. Viruses and Prions
    d. Fungi