

# FOOD MICROBIOLOGY

## Biology 4770

### COURSE OUTLINE WINTER 2017

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**Instructor:**

Dr. Heidi Schraft  
Biology, CB4015  
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**Office hours:** Tuesday, 10 – 11am, and Thursday 1 – 2pm  
You can also email for an appointment.

**Laboratory Instructor:**

Mike Moore  
Biology, CB3011A  
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**Teaching Assistant:**

BalRam Adhikari  
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<b>Lectures</b>	Monday, Wednesday: 1:00am - 2:30pm ATAC 2005
<b>Laboratory Sessions</b>	Thursday: 2:30 - 5:30pm, CB 3012

**Prerequisites:**

Biology 2711, or equivalent basic microbiology course, or permission of instructor

## **Course Goals: *What will you learn?***

*After successful completion of this course you will be able to...*

- describe and assess the effects and significance of the presence and/or growth of spoilage and pathogenic microorganisms in foods.
- describe conditions that control microorganisms in foods and use this understanding to solve problems in food processing situations.
- master the methods commonly used to detect, enumerate and identify microorganisms associated with foods and explain the theory behind these methods.
- critically assess and communicate microbiological data.
- explain why microbiological quality control programs are necessary in food production.

## **Course Structure: *How will you learn?***

- **Lectures:** Readings from the textbook will be assigned for most lectures. During classes the information from the book will be complemented with additional background, problem solving exercises and discussions. You are expected to prepare for each lecture by reading the assigned text and to participate in class discussions.
- **Laboratories:** A problem based approach is taken for the labs. A short case study is presented at the beginning of each laboratory exercise. Methods and procedures necessary to solve the problem are compiled in a separate section of the lab manual. To prepare for each lab you will have to outline the experiments needed to arrive at a solution. You are also expected to keep an up-to-date lab-book. Laboratory exercises will be performed in groups. Laboratory participation and submissions of laboratory questions will be graded.
- **Assignments:** Two types of assignments will be given:
  - You will be required to submit a comprehensive report for one of the laboratory case studies.
  - Second, there will be brief assignments on D2L throughout the semester.
- **Tests:** Testing includes three announced in-class tests and a final three-hour examination. They consist mostly of short-answer questions.

**Performance Evaluation:**

<b><u>Activity</u></b>	<b><u>Weight</u></b>
<b>Laboratories</b>	15%
<b>Class Participation (i&gt;Clicker)</b>	5%
<b>D2L Assignments</b>	5%
<b>Lab Report – Quality Control</b>	15%
<b>In-class quizzes</b> <i>Best two of the three count</i>	25%
<b>Final exam</b>	35%

**D2L:**

You will have access to a course homepage through D2L where you'll find slides used in lectures, D2L assignments, course updates, and links to selected web-sites.

**Texts:*****Mandatory:***

- Montville, T.J. and K.R. Matthews. 2012. Food Microbiology: An Introduction. 3<sup>rd</sup> edition. ASM Press, Washington, DC. Available in the bookstore. (The 2<sup>nd</sup> edition of this book is fine to use as well.)
- Laboratory Manual, compiled by H. Schraft, Available at the bookstore.

***Highly recommended:***

A good basic microbiology textbook may also be useful (many are available in the library):

- Nester et al. Microbiology: A Human Perspective. McGraw-Hill, Boston.
- Foster et al. Microbiology: The Human Experience. Norton.
- Black, J. Microbiology: Principles and Explorations. John Wiley & Sons, New York, NY.
- Madigan, M.T., Martinko, J.P. and Parker J. Brock - Biology of Microorganisms, Prentice Hall, Upper Saddle River, NJ
- Additional textbooks and reference materials will be placed in the library on reserve.

**Required i>Clicker2**

In addition to the text-book, you will need an i>Clicker2

- i>clicker2 is available at the bookstore. You may be able to buy a used i>clicker from another student.
- to have your i>clicker performance counted towards the course grade, you will need to register it in class.

## **Accommodation for Disabilities**

Lakehead University is committed to achieving full accessibility for persons with disabilities. Disabilities include physical disability, learning disability, mental disorder etc.

Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as early as possible. For more information, please visit: <http://studentaccessibility.lakeheadu.ca>

## **Academic Dishonesty and Plagiarism**

This course will have a zero-tolerance for academic dishonesty and plagiarism. For further information, please refer to the Code of Student Conduct and the Lakehead University Calendar (Section IX).

### **What is Plagiarism?**

Plagiarism is taking the ideas or words of others and passing them off as your own. Plagiarism is a type of intellectual theft.

Plagiarism can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. Plagiarism can have serious consequences, so it is important that students be aware of what it is, and how to avoid it.

It is also plagiarism, to submit an assessment item that has already been submitted for academic credit elsewhere, or to knowingly permit your work to be copied by another student.

There are very serious penalties for plagiarism, ranging from re-submission, reduction of marks (including to zero), failure of the course, and exclusion from the university.

**Schedule for Lectures:**

Date	Topic of Lecture	Quizzes and Materials due
Jan. 9	Overview and history of food microbiology	
Jan. 11	Growth, survival and death of bacteria in foods	
Jan. 16	Detection and enumeration of bacteria in foods	
Jan. 18	Indicator organisms	<b>Jan 20:</b> Last day to add
Jan. 23	Microbiological criteria	From this day on, iClicker will count
Jan. 25	Lactic acid bacteria and fermentation	
Jan. 30	Test #1	Jan 30: Test #1
Feb 1	Red meat, poultry and meat products	
Feb. 6	Milk and dairy products , produce	
Feb. 8	Biologically based preservation and probiotic bacteria	
Feb. 13	Chemical antimicrobials	
Feb. 15	Test #2	Feb 15: Test #2
Feb. 20 – 26	February Break	
Feb. 27	Physical methods of food preservation, nonthermal processing	Feb 27: Lab Report due
Mar 1	HACCP, food safety objectives and sanitation	
Mar. 6	Staphylococcus aureus, Bacillus cereus	
Mar. 8	Clostridium botulinum	<b>Mar. 10:</b> Last day to withdraw
Mar. 13	Clostridium perfringens	
Mar. 15	Salmonella enterica	
Mar. 20	Test #3	Mar 20: Test #3
Mar. 22	Listeria monocytogenes	
Mar. 27	Campylobacter jejuni	
Mar 29	Escherichia coli	
Apr 3	Parasites	
Apr 5	Viruses	

**Schedule for Laboratory Sessions:**

<b>Date</b>	<b>Topic</b>	<b>Lab Questions Due</b>
Jan. 12	No Lab	
Jan 19	Safety Laboratory 1: Review Techniques	
Jan. 26	Laboratory 1: Review Techniques Preparation for Laboratory 2	Lab-Questions 1
Feb 2	Laboratory 2: Quality Control	Lab-Questions 2
Feb. 9	Laboratory 2: Quality Control Preparation for Laboratory 3	
Feb. 16	Laboratory 3: Spores and Sporeformers Preparation for Laboratory 4	Lab-Questions 3
Feb. 20- 26	Study Week	
Mar. 9	Laboratory 4: Intoxications	
Mar. 16	Laboratory 4: Intoxications Preparation for Laboratory 5	Lab-Questions 4
Mar. 23	Laboratory 5: Infections	Lab-Questions 5
Mar. 30		
Apr. 2		