FOOD MICROBIOLOGY
Biology 4770

COURSE OUTLINE WINTER 2020

Instructor:
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Office hours: Monday, Wednesday: 9 – 10 am
You can also email for an appointment.

Laboratory Instructor:
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Teaching Assistant:
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Lectures	Monday, Wednesday: 1:00pm - 2:30pm, ATAC 2019
Laboratory Sessions	Wednesday: 8:30am - 11:30am, CB 3012

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

Learning Objectives: *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 required 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 long-answer questions.

Performance Evaluation:

Activity	**Weight**
Laboratories	15%
Class Participation (i>Clicker)	5%
D2L Assignments	5%
Lab Report – Quality Control	15%
In-class quizzes *Best two of the three count*	25%
Final exam	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. 2014. Food Microbiology: An Introduction. 4th edition. ASM Press, Washington, DC. Available in the bookstore. (The 3rd edition of this book is fine to use as well.)
- Laboratory Manual, compiled by H. Schraft

Highly recommended:
A good basic microbiology textbook may also be useful (many are available in the library):
- Foster et al., Microbiology: The Human Experience. Norton.
- Nester et al., Microbiology: A Human Perspective. McGraw-Hill, Boston.
- 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.

i>Clicker REEF or i>Clicker2 Remote:

In addition to the book, you will need an i>Clicker2 remote or the i>Clicker REEF app with a subscription You can purchase the i>Clicker REEF app on-line.
The bookstore sells i>Clicker2 remotes or you may be able to buy a used i>Clicker2 remote from another student.

> To receive credit for the responses you submit to i>Clicker sessions, you **must register by Sunday, January 19, 2020**. Students who register after this date will not receive credit.

Academic Integrity:
I consider bringing a fellow student's iClicker remote to class and/or submitting responses on behalf of another student to be cheating and a violation of the Student Code of Conduct – Academic Integrity. If you are caught with a remote other than your own or have votes in a class that you did not attend, both you and your classmate will forfeit all clicker points for this course and may face additional disciplinary action.

For additional information, please refer to the iClicker section on the D2L course site.

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 Integrity

A breach of Academic Integrity is a serious offence. The principle of Academic Integrity, particularly of doing one's own work, documenting properly (including use of quotation marks, appropriate paraphrasing and referencing/citation), collaborating appropriately, and avoiding misrepresentation, is a core principle in university study. Students should view the Student Code of Conduct – Academic Integrity – for a full description of academic offences, procedures when Academic Integrity breaches are suspected and sanctions for breaches of Academic Integrity.

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

Schedule for Lectures:

	Date	Topic of Lecture	Quizzes and Materials due
Mon	Jan. 6	Overview and history of food microbiology	
Wed	Jan. 8	Growth, survival and death of bacteria in foods	
Mon	Jan. 13	Detection and enumeration of bacteria in foods	
Wed	Jan. 15	Detection and enumeration of bacteria in foods	Jan. 17: Last day to add
Mon	Jan. 20	Indicator organisms and microbiological criteria	From this day on, i>Clicker will count
Wed	Jan. 22	Indicator organisms and microbiological criteria	
Mon	Jan. 27	**Test #1**	Jan. 27: Test #1
Wed	Jan. 29	Lactic acid bacteria and fermentation	
Mon	Feb. 3	Red meat, poultry, seafood and meat products	
Wed	Feb. 5	Milk and dairy products	
Mon	Feb. 10	Produce	
Wed	Feb. 12	**Test #2**	Feb. 12: Test #2
	Feb. 17 – 21	February Break	
Mon	Feb. 24	Chemical antimicrobials	
Wed	Feb. 26	Biologically based preservation and probiotic bacteria	
Mon	Mar. 2	Physical methods of food preservation and nonthermal processing	March 2: Lab Report due
Wed	Mar. 4	HACCP, food safety objectives and sanitation	**March 6:** Last day to withdraw
Mon	Mar. 9	*Staphylococcus aureus*, *Bacillus cereus*	
Wed	Mar. 11	*Clostridium botulinum*, *Clostridium perfringens*	
Mon	Mar. 16	**Test #3**	March 16: Test #3
Wed	Mar. 18	*Salmonella enterica*	
Mon	Mar. 23	*Salmonella enterica*	
Wed	Mar. 25	Selected foodborne infections	
Mon	Mar. 30	Selected foodborne infections	
Wed	Apr. 1	Selected foodborne infections	

Schedule for Laboratory Sessions:

Date	Topic	Lab Questions Due
Jan. 8	No Lab	
Jan 15	Safety Laboratory 1: Review Techniques	
Jan. 22	Laboratory 1: Review Techniques Preparation for Laboratory 2	Lab-Questions 1
Jan. 29	Laboratory 2: Quality Control	Lab-Questions 2
Feb. 5	Laboratory 2: Quality Control Preparation for Laboratory 3	
Feb. 12	Laboratory 3: Spores and Sporeformers Preparation for Laboratory 4	Lab-Questions 3
Feb. 17 - 21	Study Week	
Feb. 26	Laboratory 4: Intoxications	
Mar. 4	Laboratory 4: Intoxications Preparation for Laboratory 5	Lab-Questions 4
Mar. 11	Laboratory 5: Infections	Lab-Questions 5
Mar. 18		
Mar. 25		
Apr. 1		