

Syllabus

Food Microbiology

11:400:423

Class Schedule: <https://sis.rutgers.edu/soc/#home>

3 credits

INSTRUCTOR CONTACT INFORMATION

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IFNH #220, Rutgers University

61 Dudley Road, New Brunswick, NJ 08901

Office Hours: Tuesdays and Thursdays, 3:50 - 5:10 pm**COURSE WEBSITE, RESOURCES AND MATERIALS**

Canvas Web site: Lectures, readings, announcements, and other resources will be posted on Canvas. Students are responsible for everything on the site and for all e-mails sent from it. If you have not received Canvas announcements, e-mail the instructor your NetId and ask to be added. E-mail is sent to your address on record with the registrar. You must check your Rutgers account on a regular basis. The instructor/ Canvas is not responsible for messages that are bounced back for “recipient mailbox full” or any other reason.

Textbooks and resources:

- **OpenStax Microbiology**
Access for free at <https://openstax.org/books/microbiology/pages/1-introduction>
- **Basic Immunology, 6th Edition**
By Abul K. Abbas, MBBS, Andrew H. H. Lichtman, MD, PhD and Shiv Pillai, MBBS, PhD
ISBN: 978-0-323-54943-1
Access for free electronically at Rutgers University Libraries with netID and password Login, look up book citation with ISBN #, and click submit
- **Food Microbiology – an Introduction**, 4th edition, Matthews, Kniel, and Montville, 2017. Not free. This edition is substantially different from earlier editions.
- References to other readings will be provided as needed

Prerequisites:

General Biology I, II & lab, General Chemistry I, II & lab *and*
Organic Chemistry 01:160:209 or 307 *or* Intro to Microbiology 11:680:201 *or* General
Microbiology 11:680:390/11:447:390

COURSE DESCRIPTION:

The role of microorganisms in food processing and preservation and health promotion. The relation of microorganisms to food spoilage, food-borne illness and intoxication, and general food quality.

LEARNING GOAL

This course fulfills LG#3: Graduates will demonstrate and apply knowledge of the core competencies of Food Microbiology.

Course Learning Objectives

At the conclusion of this course, students will be able to:

- Explain basics of microbiology, immunology, and gut microbiota
- Outline and integrate factors that determine microbial growth, survival, and death in foods; explain methods for detection and enumeration.
- Identify relevant foodborne microbes according to their biochemical traits, characteristic illnesses, and/or commonly associated foods.
- Determine appropriate physical, chemical, engineering and/or regulatory approaches to controlling undesirable microorganisms in foods.
- Identify beneficial microbes and understand their role in food production and health promotion

ASSIGNMENTS/RESPONSIBILITIES, GRADING & ASSESSMENT

This course does not require an introductory microbiology course as a prerequisite therefore to bridge the knowledge gap the first part of the course covers the basics of microbiology and immunology. The rest of the lectures cover the role of microorganisms in foodborne illness and intoxication, food spoilage, food processing and preservation, and finally beneficial microbes in agriculture and fermented foods. After taking this course you should have a good understanding of the breadth of microbiology-related knowledge that is relevant to the food industry.

Course lectures cover 4 main themes:

1. Introduction to microbiology, immunology and food microbiology (Lectures 1 - 6): General Microbiology is no longer a requirement for taking this course therefore the first section of this course (lectures 1 - 4) will cover the basics of microbiology and immunology to provide a foundation for understanding food microbiology. An introduction to gut microbiota-host interactions will be covered (lecture 5) to introduce the gut microbiota and its relationship to food and food microbes. Lecture 6 will introduce food microbiology.

2. Deleterious microorganisms and their growth in foods (Lectures 7 - 16): This section will cover general bacterial growth dynamics and bacterial growth in foods as well as the microbes

(bacteria, viruses, fungi) commonly associated with food borne illness, intoxication, and spoilage.

3. Control of microorganisms in food (Lectures 17 - 22): This section will cover different methods of food preservation, basics of sanitation, and food safety.

4. Beneficial microbes (Lectures 23 - 25): This section will introduce the importance of microbes in agriculture and the development of food products (fermented foods, probiotics) that benefit host health.

Teaching approach:

This course uses a **flipped classroom model**. Lectures are asynchronous therefore PPT recordings will be posted in advance so you can listen to lectures and consult relevant reading materials at your convenience. Lectures may reference videos posted in the Media section of each module and these serve to supplement information related to the lecture.

Quizzes:

During lecture videos there will be quizzes (based on lecture content), which you must complete to progress to the end of the lecture. Lecture quizzes contribute to 20% of final grade. Please double check grading in a timely fashion so any errors can be corrected.

Class Hours:

We will meet on Tuesdays and Thursdays, 3:50 - 5:10 pm to discuss lecture material and questions about lectures posted for that week. RU classes will be remote for January so we will meet via Zoom. Once in-person classes resume, we will meet in Bartlett Hall 123.

Exams:

There are 4 scheduled open-book exams worth 20% each. Exams will be in Canvas and are not cumulative but understanding previous lectures will be important for understanding subsequent lectures. Please double check grading in a timely fashion so any errors can be corrected.

Student Instructional Rating Surveys (SIRS):

Student feedback helps me know what is working what can be improved. Completing the mid-course and final SIRS will earn you an extra 1% (0.5% for each) on your final grade.

Grading scheme

Lecture Quizzes = 20%

Exams 1 - 4: 20% each x 4 = 80%

Mid-course SIRS: 0.5%

Final SIRS: 0.5%

Final Exam/Paper Date and Time: [Online Final Exam Schedule](#).

ACCOMODATIONS FOR STUDENTS WITH DISABILITIES

Please follow the procedures outlined at <https://ods.rutgers.edu/students/registration-form>. Full policies and procedures are at <https://ods.rutgers.edu/>

Disability Services: (848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / <https://ods.rutgers.edu/>

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation:

<https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://ods.rutgers.edu/students/registration-form>.

Absence Policy

Rutgers Dean of Students <http://deanofstudents.rutgers.edu/>

The University does recognize that temporary conditions and injuries can be problematic and may adversely affect a student's ability to fully participate in class.

Absences or making up work: <https://temporaryconditions.rutgers.edu/>

The Dean of Students Office at Rutgers University-New Brunswick provides solutions, services, and support to help students navigate Rutgers University. By focusing on students' educational, social, and personal development, staff in the Office promote academic success and student retention. The Office serves as a student support network by providing advocacy, problem resolution, and critical incident intervention for those times when additional assistance is needed.

- **Self-Reporting Absences:** For absences in class or labs less than a week that are not confidential in nature, students need to inform faculty directly by using the Absence Reporting System (ARS) (<https://sims.rutgers.edu/ssra/>).
- **Longer Periods of Absence:** If you anticipate missing more than one week of classes for serious illness, confidential, or sensitive personal reasons, you should also consult with a New Brunswick Dean of Students who will help to verify your extended absences from classes.
- **Absences due to illnesses:** If your absence is due to illness, visit New Brunswick Health Services for information about campus health services, including information about: how to make an appointment, self-care advice for colds/flu, mental health and counseling options.

You **must** still contact the instructor to develop a plan for when you return to health. If you develop any issues that affect your academic performance during the semester, please inform the instructor as soon as possible.

COURSE SCHEDULE	
Lecture	Topics
1	Course orientation and Introduction to microbiology 1
2	Introduction to microbiology 2
3	Introduction to immunology 1 (innate)
4	Introduction to immunology 2 (adaptive)
5	Gut microbiota-host interactions
6	Introduction to food microbiology
7	Bacterial growth, survival, and death
8	Exam 1, lectures 1 - 6
9	Factors affecting microbial growth in foods, microbe detection and enumeration
10	<i>Campylobacter</i> and <i>Salmonella</i>
11	<i>Shigella</i> and <i>E. coli</i>
12	<i>Vibrio</i> and <i>Listeria</i>
13	<i>Staphylococcus aureus</i> and <i>Bacillus cereus</i>
14	<i>Clostridium botulinum</i> and <i>Clostridium perfringens</i>
15	Viruses
16	Exam 2, lectures 7 - 13
17	Spoilage organisms
18	Molds and mycotoxins
19	Indicator microbes and microbiological criteria
20	Non-Thermal Methods of Food Preservation
21	Biological and Chemical Methods of Food Preservation
22	Physical and Thermal Methods of Food Preservation
23	Exam 3, lectures 14 - 19
24	Food safety modernization act, a risk-based approach to food safety
25	Regulatory issues, sanitation, and related practices
26	Soil microbiology and foods
27	Regeneration Agriculture (videos and reflection assignment)
28	Fermented Foods
Final Exam/Paper Date and Time: Online Final Exam Schedule .	

ACADEMIC INTEGRITY

The university's policy on Academic Integrity is available at <http://academicintegrity.rutgers.edu/academic-integrity-policy>. The principles of academic integrity require that a student:

- properly acknowledge and cite all use of the ideas, results, or words of others.
- properly acknowledge all contributors to a given piece of work.
- make sure that all work submitted as his or her own in a course or other academic activity is produced without the aid of impermissible materials or impermissible collaboration.

- obtain all data or results by ethical means and report them accurately without suppressing any results inconsistent with his or her interpretation or conclusions.
- treat all other students in an ethical manner, respecting their integrity and right to pursue their educational goals without interference. This requires that a student neither facilitate academic dishonesty by others nor obstruct their academic progress.
- uphold the canons of the ethical or professional code of the profession for which he or she is preparing.

Adherence to these principles is necessary in order to ensure that

- everyone is given proper credit for his or her ideas, words, results, and other scholarly accomplishments.
- all student work is fairly evaluated, and no student has an inappropriate advantage over others.
- the academic and ethical development of all students is fostered.
- the reputation of the University for integrity in its teaching, research, and scholarship is maintained and enhanced.

Failure to uphold these principles of academic integrity threatens both the reputation of the University and the value of the degrees awarded to its students. Every member of the University community therefore bears a responsibility for ensuring that the highest standards of academic integrity are upheld.

Cheating and Plagiarism

(From Spring 2010 Andy Egan 01:730:252 Eating Right): “Cheating on tests or plagiarizing materials in your papers deprives you of the educational benefits of preparing these materials appropriately. It is personally dishonest to cheat on a test or to hand in a paper based on unacknowledged words or ideas that someone else originated. It is also unfair, since it gives you an undeserved advantage over your fellow students who are graded on the basis of their own work. In this class we will take cheating very seriously”.

Turnitin will be used to assess students’ submissions and all suspected cases of cheating and plagiarism will be automatically referred to the Rutgers Academic Integrity office.

Just In Case Web App <http://codu.co/cee05e>

Access helpful mental health information and resources for yourself or a friend in a mental health crisis on your smartphone or tablet and easily contact CAPS or RUPD.

Counseling, ADAP & Psychiatric Services (CAPS)

(848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901/ www.rhscaps.rutgers.edu/
CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students’ efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

Violence Prevention & Victim Assistance (VPVA)

(848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / www.vpva.rutgers.edu/

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932- 1181.

Scarlet Listeners

(732) 247-5555 / <http://www.scarletlisteners.com/>

Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space.