

Food Microbiology 11:400:423

Syllabus 2020

Location and Time: Bartlett 123, Tuesday and Thursday, 2:15 - 3:35 pm

Instructor: Dr. Diana Roopchand; roopchand@sebs.rutgers.edu

Ways to contact me: RU email is the best way to contact me.

Course description: This course will cover the basics of microbiology and immunology followed by the role of microorganisms in foodborne illness and intoxication, food spoilage, general food quality, food processing and preservation, and microbes in food health.

Prerequisites: General Biology I, II & lab, General Chemistry I, II & lab, Organic Chemistry 209/307

The course is divided into 4 parts/themes:

1. Basics of Microbiology and Immunology: 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: This section will cover microbes most commonly associated with food borne illness.

3. Control of microorganisms in food: This section will cover different methods of food preservation, basics of sanitation, and food safety.

4. Fermented foods and probiotics: This section will cover the importance of microorganisms for development of food products and microbes that benefit host health.

Learning goals:

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

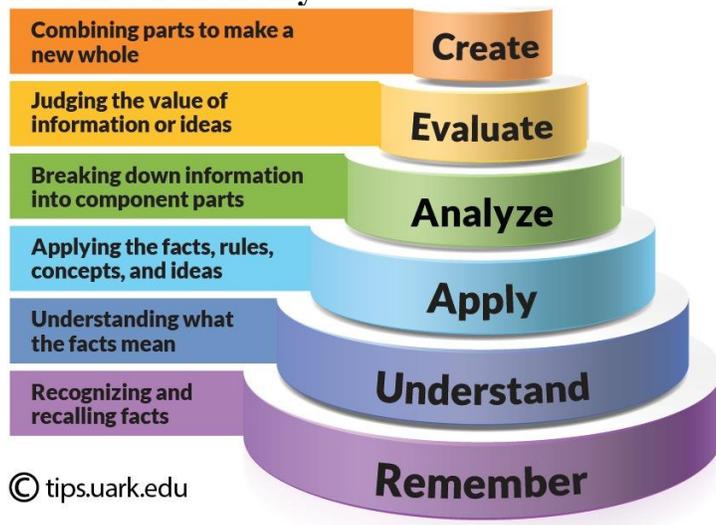
Textbooks and resources:

- **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

Web site: The course uses Canvas. PowerPoints and other resources will be posted. Students are responsible for everything on the site and for all e-mails sent from it. If you haven't 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.

Teaching approach: Teaching is based on the flipped classroom model of instruction. It is therefore imperative that you come to class prepared, meaning you have already viewed the lecture videos, completed the readings or other prep work before class. Class time is then used for interactive learning activities to solidify recall and comprehension of material and move towards other higher-level learning goals as shown in the below Bloom's Taxonomy graphic. **Check out this video for more information on the flipped classroom model.**

<https://www.youtube.com/watch?v=paQCE58334M&vl=en>

Bloom's Taxonomy

Grading

Exams 1 – 4: 15% each x 4 = 60%

Quizzes and Assignments: 20%

Class Participation: 20%

Lectures: Lectures will be posted on Canvas before class. For 2:15 pm Tuesday class, lecture will be posted by Monday.

Quizzes: During lecture videos there will be quizzes you must complete to progress to the end of the lecture. **Quizzes will be based on both lecture material and assigned readings.** There may be material presented in the lecture that is not in the assigned reading and you are responsible for both.

Assignments: These will be posted on Canvas or given at the end of a lecture. Example assignment - 1) Answer a series of questions using assigned reading(s). Answers will be discussed in class and be used to develop study notes. 2) Think of a system's level question/problem (preferable to a content question) that might be a possible exam question for specific topic(s) covered in lecture.

Class Participation: Class time will be used as a **workshop** for discussions, group work, presentations, questions, clarifications, and/or other learning activities to develop knowledge of the course material.

Exams: There will be 4 scheduled exams, one at the end of each block of lectures (see themes on page 1). Exams are not cumulative, but material builds on the principles of the previous lectures. The exams are scheduled well in advance, there are no make-ups. Plan accordingly. You are welcome to review your exams and double check grading in a timely fashion. (Don't ask to review Exam 1 at the end of the semester). Any *errors* will be corrected.

In case of emergency:

In the event of dire emergency, you can take an exam by special arrangement, with appropriate documentation. The official university website for reporting illness is

<https://sims.rutgers.edu/ssra/>

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 see the instructor sooner, rather than later.

Classroom etiquette:

Do not use your electronic devices during class for nonacademic activity. Do not take phone calls, wander in and out of the room, or carry on conversations with your friends, it's distracting to students and the professor. Students who are disrespectful will be asked to leave.

Academic integrity:

Honesty is the best policy. Anyone caught cheating on exams or individual assignments will be dealt with harshly according to University policy. Do not risk your academic career by cheating. Cheating is a high risk, low payoff gamble.

Food Microbiology 11:400:423 (tentative class schedule)

	Workshop	
Lecture	Day/Date	Class
1	Tu 1/21	Introduction to microbiology 1
2	Th 1/23	Introduction to microbiology 2
3	Tu 1/28	Introduction to immunology 1
4	Th 1/30	Introduction to immunology 2
5	Tu 2/4	Gut microbiota-host interactions (NO CLASS)
5	Th 2/6	lecture 5 workshop
6	Tu 2/11	Introduction to Food microbiology
	Th 2/13	Exam 1 (15% of grade)
7	Tu 2/18	Bacterial growth, survival and death; detection and enumeration; pathogen modeling program
8	Th 2/20	<i>Salmonella, Campylobacter</i>
9	Tu 2/25	<i>E. coli, Vibrio</i>
10	Th 2/27	<i>Listeria</i>
11	Tu 3/3	<i>Staphylococcus aureus</i>
12	Th 3/5	<i>Clostridium botulinum, Clostridium perfringens, Bacillus cereus</i>
14	Tu 3/10	Viruses, parasites, prions
	Th 3/12	Exam 2 (15% of grade)
	3/14 – 3/22	Semester Break
15	Tu 3/24	Regulatory issues, Sanitation and related practices (Prof. Matthews)
16	Th 3/26	Food safety modernization act, a risk-based approach to food safety (Prof. Schaffner)
17	Tu 3/31	Thermal and non-Thermal Methods of Food Preservation (Prof. Karwe)
18	Th 4/2	Biological and Chemical Methods of Food Preservation
19	Tu 4/7	Spoilage organisms, molds, yeasts
20	Th 4/9	TBD
	Tu 4/14	Exam 3 (15% of grade)
21	Th 4/16	Fermentation
22	Tu 4/21	Probiotics and fermented foods
23	Th 4/23	Prebiotics
24	Tu 4/28	Importance of microorganisms in agriculture
25	Th 4/30	TBD
26	Tu 5/5	Reading Day (NO CLASS)
spring exams begin	Th 5/7	Exam 4 (15% of grade)

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.

STUDENT WELLNESS SERVICES

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.

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>.

Scarlet Listeners

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

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