

University of New Hampshire

College of Life Sciences and Agriculture

Department of Molecular, Cellular, and Biomedical Sciences

BMS 501 – Microbes in Human Disease

Fall 2020

Course information

Instructor

Juan Ulises Rojo, Ph.D., MLS(ASCP)

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Office hours: Tuesday to Thursday 12:00 a.m. – 1:30 p.m.

I will host office hours both face-to-face and online via Zoom. During this time you can stop by my office or access the following Zoom link: <https://unh.zoom.us/j/92656364502>.

Walk-ins outside office hours are welcome to discuss quick questions. To maximize your time and to respect the time of your peers, please make an appointment by accessing the following link: <https://calendly.com/jurojo/office-hours>. Select the best date and time and we will meet at that time. Use the office hours to clarify any points that were not clear in lecture, to discuss a subject according to your special interests, or talk about your career goals. The best way to reach me is by e-mail; the best time to reach me by phone is during my office hours.

Lecture time and location

Tuesday and Thursday 9:40 a.m. – 11:00 a.m. via Zoom.

Lectures will be streamed during the scheduled class time (Tuesdays and Thursdays from 9:10 a.m. to 11:00 a.m.) Class will begin at the scheduled time so be punctual. This is the Zoom link that we will be using for our classes the entire semester: <https://unh.zoom.us/j/93648145602> Lectures will also be recorded and uploaded to Canvas; however, the instructor does not guarantee that each lecture will be recorded. Therefore, you must be present in class. The purpose of the recorded lectures is for you to review information that you may have missed during class. During class you will have the opportunity to participate by asking questions using your microphone (make sure it is unmuted at the time that you want to ask something), or if you prefer you can participate by using the chat. We will be able to interact with each other during class time so please take advantage of this modality and join class at the scheduled time rather than watching the recorded lectures later.

The material presented in class will require active engagement to better understand it. Throughout the semester there will be opportunities for you to participate in class activities via Zoom and in the lab. Participation in these activities will often include bonus points to put toward your final class grade. During class, students are encouraged to ask questions and contribute to the class discussion.

Laboratory

Laboratory coordinator

Amy E. Michaud, MPH
Office: Rudman Hall 277
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E-mail: Amy.Michaud@unh.edu

Teaching assistants:

Danielle Blumstein	dmb1086@wildcats.unh.edu
Sophia Carson	sc1482@wildcats.unh.edu
Anna Early	ae1092@wildcats.unh.edu
Storm Gardner	dsg1022@wildcats.unh.edu

Laboratory time and location

Section 1A: Monday 6:10 p.m. – 7:30 p.m.; Rudman G30
Section 1B: Monday 7:40 p.m. – 9:00 p.m.; Rudman G30

Section 2A: Monday 6:10 p.m. – 7:30 p.m.; Rudman G40
Section 2B: Monday 7:40 p.m. – 9:00 p.m.; Rudman G40

Section 3A: Tuesday 2:10 p.m. – 3:30 p.m.; Rudman G30
Section 3B: Tuesday 3:40 p.m. – 5:00 p.m.; Rudman G30

Section 4A: Tuesday 2:10 p.m. – 3:30 p.m.; Rudman G40
Section 4B: Tuesday 3:40 p.m. – 5:00 p.m.; Rudman G40

Section 5A: Wednesday 6:10 p.m. – 7:30 p.m.; Rudman G30
Section 5B: Wednesday 7:40 p.m. – 9:00 p.m.; Rudman G30

Section 6A: Wednesday 6:10 p.m. – 7:30 p.m.; Rudman G40
Section 6B: Wednesday 7:40 p.m. – 9:00 p.m.; Rudman G40

Section 7A: Monday 3:10 p.m. – 4:30 p.m.; Rudman G40
Section 7B: Monday 4:40 p.m. – 6:00 p.m.; Rudman G40

Section 8A: Thursday 2:10 p.m. – 3:30 p.m.; Rudman G40
Section 8B: Thursday 3:40 p.m. – 5:00 p.m.; Rudman G40

Due to safety concerns and to minimize the potential risk of exposure to COVID-19 we will maximize laboratory space by reducing the number of students in the lab. This will be achieved by dividing the laboratory time slots into two. Each laboratory section (1-8) will be divided into subsections (A and B) so that each subsection will have half the number of students registered. Subsection A will meet during the first half of the laboratory time slot for which you registered, and subsection B will meet during the second half. The time and room are described above. To find out if you are in subsection A or B please access the Canvas module of the course, here you will find your group.

Keep in mind that this modification will not reduce the number of laboratory experiments performed compared to other semesters, the only difference will be that the introductory presentation delivered by the Teaching Assistant (TA) will be recorded for the students to watch before attending lab. It is the responsibility of the student to watch this presentation before attending the corresponding laboratory. Likely, the student must read, print, and bring the corresponding laboratory manual to follow the procedures.

Due to space limitations we are not able to accommodate make-up laboratory sessions to a different one than the one for which the student registered. In the event of an extenuating circumstance (see below) you must prove the course professor first with valid proof. Failure to contact the instructor and the laboratory TA prior to the lab session will result in missing the experiments and results for that day and a deduction of 25% in the corresponding laboratory notebook grade. One excused absence (with proof) will not affect your grade; however, the student will be responsible for completing any missing notes; otherwise this will impact your laboratory notebook grade. Two missed lab sessions will result in 5% reduction of your total lab notebook grade. Three missed laboratory sessions will result in a grade of 0 for the lab notebook. In the event that a student needs to quarantine therefore having to miss an extended number of laboratory sessions, the student will have access to online materials to complete the notebooks and other assignments.

What are extenuating circumstances? An extenuating circumstance are those which are unforeseeable, in that you could have no prior knowledge of the event concerned; and are unpreventable, in that you could do nothing reasonably in your power to prevent such event. Students are expected to make reasonable plans to consider commonly occurring circumstances such as transport or computer problems.

What are examples of circumstances which would not normally be regarded as extenuating circumstances, and therefore excused absences? Some examples, not limited to computer failure, transport problems, moving to a new house, holiday travel, inadequate planning or time management, misreading of assessment guidelines, missing deadlines, and attending extracurricular activities or social events.

Course description

Welcome to BMS 501, Microbes in human disease. This course is designed to present an introduction of microbial biology and medically important microorganisms. The identification, pathogenesis, epidemiology, treatment, and prevention of clinically relevant pathogens will be emphasized. The biology of microorganisms will be presented in relationship to disease progress and host defense mechanisms. Clinical correlations are emphasized to tie microbes as causative agents of disease. Laboratory exercises designed to introduce techniques for the identification of pathogenic microorganisms are incorporated to reinforce and expand the theoretical aspects of the material.

Course objectives

Students who successfully complete this course will be able to:

1. Correlate the biology, genetics, and metabolism of microorganisms in relation to the environment and human health
2. Identify common infectious agents as causative agents of human disease
3. Describe the pathogenesis, identification, epidemiology, prevention, and treatment of major infectious diseases
4. Recognize different strategies used in the control of infectious diseases
5. Understand the principles of the immune response to microbial infections

Course materials

1. Textbook: Microbiology: The Human Experience, 1st edition, 2018, W.W. Norton & Company. ISBN 978-0-393-60257-9
 - We will be using InQuizitive for homework assignments so make sure to have the student access code.

Grading

The grade for the student taking this course will be solely based on 4 examinations, quizzes, and a comprehensive final exam. There is no extra credit for this course. The distribution of the final grade is as follows:

Midterm exams	35%
Final exam	10%
Homework	15%
Quizzes	10%
Participation	5%
Lab notebook	15%
Lab practical	5%
Case studies	5%
Total	100%

The following grade scale is used in this course:

93% – 100% = A (4.00)	80% – < 83% = B- (2.67)	67% – < 70% = D+ (1.33)
90% – < 93% = A- (3.67)	77% – < 80% = C+ (2.33)	63% – < 67% = D (1.00)
87% – < 90% = B+ (3.33)	73% – < 77% = C (2.00)	60% – < 63% = D- (0.67)
83% – < 87% = B (3.00)	70% – < 73% = C- (1.67)	<60% = F (0.00)

Note: grades are a measure of performance and mastery of the material based on the outcome for each of the assignments. Do not expect or ask for your final grade to be roundup to a higher letter grade. No extra-credit or extra-assignments will be given. Unless there is an error in the grading of the assignment, grades are not up for discussion. No assignments will be accepted after the last day of classes.

Midterm exams: There will be 3 exams throughout the semester. Each exam will consist of 50 questions based on both lecture and laboratory material. The questions will include factual questions, problem solving, and case studies. Exams will open at 8:00 a.m. one day before the due date and close at 11:59 p.m. on the due date. It is the responsibility of the student to ensure a stable internet connection and reliable computer equipment to take the exam. Plan a time for you to take the exam. Make-up exams will not be given. If you miss an exam, you must contact the course instructor and provide valid proof of illness, arrest, death of immediate family member, or extenuating circumstance as deemed appropriate by a letter from the Vice President of Student Affairs Office. For documentation to be valid, a time conflict between the event and the exam must be demonstrated. Failure to provide proof or contact the instructors prior to the examination will result in zero (0) earned points for that exam.

Points to keep in mind during exams:

- Ensure that you have a reliable internet connection and computer equipment. Exams will not be re-opened, and extensions will not be given due to technical problems.
- You will have 65-minutes to complete the exams. Use your time wisely. We will not have class on the due date of the exam, if possible, use this time to take your exam.
- Be careful to select the answer that you intended during the exam. Do not leave questions unanswered as partial credit will be given as appropriate.
- After finishing the exam and reviewing your answers, do not hesitate to contact the instructor if you think a question was not properly graded. Keep in mind that the instructor will grade the exams and update scores accordingly.

Final exam: A 100 questions multiple choice exam covering the material from all lectures and laboratory material will take place at the end of the semester. The date and location of the final exam will be announced later in the semester.

Homework: Three homework assignments will take place during the semester.

For homework we will be using InQuizitive. To access the homework, follow this link: <https://digital.wwnorton.com/michum>. The first time that you access this website you will need to enter the **course code** which is **268058**. You can find detailed instructions on how to register in **page 17** of the syllabus. A 21 days trial access is available for you to start the first homework as soon as the semester begins. Each homework will consist of a minimum of 53 questions with a target score of 4,000 points. Detailed

InQuizitive is a formative adaptive quizzing tool, meaning that there is no time limit and you can continue answering questions beyond the minimum assigned until you reach a higher grade. However, grades will not be accepted past the due date as described in the Lecture schedule. There will be no make-up for missed homework.

Quizzes: A total of 8 quizzes will be administered online in Canvas throughout the semester. Each quiz will be available from Wednesday at 8:00 a.m. to Friday at 11:59 p.m. every week as scheduled in the *Lecture Schedule* section of the syllabus. Each quiz will consist of 10 multiple choice questions to be completed in 15-minutes. The questions will assess the material covered in lecture after the last quiz or exam. The lowest quiz grade will be dropped. If for any reason you miss a quiz, that will count as your dropped quiz grade. A second missed quiz will result in a grade of zero for that quiz. There will be no make-up quizzes for any reason; that includes travel, technical problems, personal issues, or failing to submit within the deadlines. The purpose of the quizzes is to assess your knowledge of the material and prepare you for the type of questions you will see on the exams.

Participation: After each class you will have to create 2 multiple choice-style questions. Type them in a Word document and save the file. You will have to submit your participation questions at multiple points during the semester (see *Lecture calendar*). Each question will be worth one point. We will cover 20 topics in classes during the semester, so the total possible points for this assignment will be 40 points.

Lab notebook: You will be keeping track of the experiments by keeping a digital lab notebook. Lab notebooks will be submitted and graded a total of 3 times during the semester. Your notebook will be assessed on the quality and thoroughness of the work you put into it. The laboratory notebook must provide enough information to 1. Document your actions; 2. Describe your results; and 3. Answer the questions posed in the laboratory. It is crucial you take clear and concise notes. Guidelines for keeping a proper laboratory notebook can be found in page 15 of this document. Late notebook submissions will only be accepted at the discretion of the instructor and the lab TA and will be penalized.

Lab practical: The lab practical is a series of questions and laboratory exercises designed to test the skills and theory you have acquired over the entire semester. Your Graduate TA will provide more details on the nature of the practicum during the semester.

Case studies: Identification of bacteria infections will be based on case studies correlating biochemical and morphological characteristics. This assignment will be available in Canvas.

Lecture schedule*

Week	Date	Topic	Reading assignment	Assignment due
1	M Aug 31	Fall semester classes begin		
	T Sep 1	1. Introduction to microbiology	Chapters 1 and 3.1-3.4	
	R Sep 3	2. Cell biology of bacteria and eukarya	Chapter 5	
2	M Sep 7	Labor day - No classes		
	T Sep 8	3. Bacterial metabolism	Chapter 7	
	R Sep 10	4. Bacterial genetics	Chapter 8	
	F Sep 11			Quiz 1 (will cover topics 1 - 3)
3	T Sep 15	5. Viruses and epidemiology	Chapter 12 and 26	
	R Sep 17	Exam 1 review		
	F Sep 18			Quiz 2 (will cover topics 4 and 5)
4	M Sep 22			Homework 1 and Participation questions 1
	T Sep 24	Exam 1: topics 1 - 5		
	R Sep 25	6. Bacterial growth	Chapter 6	
5	T Sep 29	7. Controlling microbial growth	Chapter 13.1 - 13.4	
	R Oct 1	8. Antimicrobial drugs	Chapter 13.5 - 13.8	
	F Oct 2			Quiz 3 (will cover topics 6 - 7)
6	T Oct 6	9. Environmental and food microbiology	Chapter 27.1 - 27.5	
	R Oct 8	10. Human microbiome	Chapter 14	
	F Oct 9			Quiz 4 (will cover topics 8 - 9)
7	T Oct 13	11. Principles of infectious diseases	Chapters 2; 18.1 - 18.5	
	R Oct 15	Exam 2 review		
	F Oct 16			Quiz 5 (will cover topics 10 - 12)
8	T Oct 20	Classes follow Monday schedule		
	W Oct 21			Homework 2 and Participation questions 2
	R Oct 22	Exam 2: topics 6 - 11		
9	T Oct 27	12. Host defense	Chapters 15.1 - 15.4; 15.6; 16-1 - 16.5	
	R Oct 29	13. Microbial diseases of the skin	Chapter 19	
	F Oct 30			Quiz 6 (will cover topics 13 - 14)
10	T Nov 3	14. Bacterial diseases of the respiratory system	Chapter 20.1 - 20.5	
	R Nov 5	15. Viral diseases of the respiratory system	Chapter 20.2; 12.5	
	F Nov 6			Quiz 7 (will cover topics 15 - 16)
11	T Nov 10	16. Bacterial diseases of the digestive system	Chapters 22.1 - 22.3; 22.5	
	R Nov 12	17. Viral diseases of the digestive system	Chapter 22.4	
12	T Nov 17	18. Microbial diseases of the nervous system	Chapter 24.1 - 24.5	
	R Nov 19	19. Microbial diseases of the genitourinary tract	Chapter 23	
	F Nov 20	All face to face class instruction ends		Quiz 8 (will cover topics 17 - 19)
13	T Nov 24	20. Systemic infections	Chapter 21.1 - 21.4	
	R Nov 26	Thanksgiving holiday - No classes		
14	M Nov 30	Exam 3 review		Homework 3 and Participation questions 3
	T Dec 1	Exam 3: topics 12 - 18		
15	R Dec 3	Finalize course material		
	T Dec 8	Course wrap-up		
16	R Dec 10	Review for final exam and course evaluations		
	M Dec 14	Fall semester classes end		
16	TBA	Final exam: cumulative topics 1-20		
	T Dec 22	Last day of final exams		

* Topics and dates are subject to change

M = Monday, W= Wednesday, R = Thursday, F = Friday, TBA = To Be Announced

Laboratory schedule*

Week	Laboratory activity	Lab assignment due
1 Aug 31	Lab 1: Laboratory safety and basic laboratory techniques	
2 Sep 7	Labor day week - No labs	
3 Sep 14	Lab 2: Infection control methods	
4 Sep 21	Lab 3: Bacterial growth	
5 Sep 28	Lab 4: Counting microorganisms and water microbiology	
6 Oct 5	Lab 5: Fermentation microbiology	Notebook 1 (Labs 1 - 3)
7 Oct 12	Lab 6: Epidemiology and antimicrobial drugs	
8 Oct 19	Lab 7: Identification of medically important Gram-positive bacteria	
9 Oct 26	Lab 8: Identification of medically important Gram-negative bacteria	
10 Nov 2	Lab 9: Case studies and review for practical exam	Notebook 2 (Labs 4 - 6)
11 Nov 9	Veteran's day observed - No labs	
12 Nov 16	Lab 10: Practical exam	
13 Nov 23	Thanksgiving holiday - No labs	
14 Nov 30	Identification of unknowns - Case studies due	
15 Dec 7	Last week of classes	Notebook 3 (Labs 7 - 9)
16 Dec 14	Final exams begin	

* Topics and dates are subject to change

M = Monday, W= Wednesday, R = Thursday, F = Friday, TBA = To Be Announced

Advice to master the course material and succeed in class

1. **Read.** To maximize your learning, it is important to attend class prepared. Read the corresponding chapter before and after class; by doing so you will be able to better understand and reinforce the material during the lecture as well as you will be able to ask any questions that came up while reading the chapter. Make up possible questions while reading.

2. **Notes.** Practice notetaking during class and while studying, write down possible exam questions, highlight important concepts, and identify topics that need clarification. Create outlines, flow charts, and drawings. Correlate keywords with microorganisms and disease. Identify unique characteristics as these are usually starting points for exam questions.

3. **Participation.** Take advantage of lecture time for your studying and learning. The more time you spend studying a subject the better and easier will be to understand the material. This is also your time to actively participate in class and contribute to the class discussion. Your ideas, questions, and insight are key in the learning process, so make sure to attend all classes and voice your opinion and knowledge.

4. **Nomenclature.** One of the most important aspects of clinical microbiology is the correct spelling of microorganisms' names. Genus name is capitalized followed by lowercase species name, all in italics. Example: *Staphylococcus aureus*. Practice writing by hand the organisms name to ensure proper spelling and memorization. The correct spelling of microorganism is emphasized not to give you a hard time, but to keep you focused on details, an attribute that is essential in the medical laboratory field.

5. **Objectives.** Make sure to read and understand the objectives for every class. The objectives will give you an idea on the most important aspects to learn as well as serve as a study guide.

6. **Observation.** A major part in the identification of microbial infections relies on the correct visual identification of microorganism, their morphological features, and their associated disease. Practice looking at pictures to identify key structures that hint the corresponding microorganism.

7. **Organization.** A practical approach to deal with the amount of information presented in this course is to prepare diagrams and tables to group microorganisms based on their similarities, such as structures, pathogenicity, or taxonomy. Keep your notes and study guides in a binder or notebook.

8. **Practice.** Constantly practice what you have learned by answering the practice questions and exams in your textbook. Form study groups and quiz each other on the material. Answer the provided study guides.

9. **Communication.** The amount of information presented in this course can be challenging. If you need reinforcement in any of the topics presented in class or require studying advice, feel free to communicate with me.

10. **Study.** Dedicate time in learning the material. Do not wait until the day before the exam to study all the lectures. It is more efficient to keep up with the course material by regularly studying every day. Set a time and place to study, make a routine, and apply all the above described points.

Academic honesty

Academic dishonesty will not be tolerated. The attempt of students to present as their own any work not honestly performed is regarded by faculty and administrators as a serious offense that renders the offender liable of serious consequences that will be detrimental in their professional development.

The University of New Hampshire Academic Honesty Policy states the following:

Academic honesty is a core principle of learning and scholarship. When you violate this principle, you cheat yourself of the confidence that comes from knowing you have mastered the targeted skills and knowledge. You also hurt all members of the learning community by falsely presenting yourself as having command of competencies with which you are credited, thus degrading the credibility of the college, the program, and your peers. All members of the learning community share an interest in protecting the value, integrity, and credibility of the outcomes of this learning experience. We also have the responsibility to censor behaviors that interfere with this effort. The following behaviors will be subjected to disciplinary action:

- Plagiarism - presenting someone else's words, ideas, or data as your own work
- Fabrication - using invented information or falsifying research or other findings
- Cheating - misleading others to believe you have mastered competencies or other learning outcomes that you have not mastered
- Collusion – secret cooperation to cheat or deceive

The University endorses collaborations within students in studying and working together as an appropriate way to facilitate learning and skill development. However, assignments and exams must demonstrate individuality and independence. If your written work exhibits wording that is sufficiently similar to another student, this will be considered to be unethical and an inappropriate manipulation of coursework.

If two students submit identical work and neither student admits to cheating, the instructor has no other option but to give both students a grade of zero. This might indeed penalize someone who is not cheating. So, take this as a warning that it is your responsibility to protect your exams, quizzes, and assignments in such a way that cheating from you is not possible.

If you require further clarification on what is considered academic dishonesty visit the Rights, Rules, and Responsibilities Handbook which is available on-line at <http://www.unh.edu/students/right/> and <http://unh.edu/vpas/handbook/academic-honesty>

Failure to comply with the UNH Honor Code (see Student Rights, Rules, and Responsibilities Handbook) on an exam, quiz, or assignment will result in a 0 for all parties involved. For more information view the tutorial on plagiarism on the College website: <http://Cola.unh.edu/plagiarism-tutorial-0>

Remember, a low grade on a transcript does not look bad compared to a report on academic dishonesty.

Use of electronic devices

Electronic devices (cell phones, tablets, and laptops) are strictly prohibited in the laboratory. Leave your electronic devices in your backpack during the entire laboratory session.

Counseling center

Your academic success in this course is very important to me. If, during the semester, you find emotional or mental health issues are affecting that success, please contact [Psychological and Counseling Services](#) (PACS) (3rd fl., **Smith Hall; 603 862-2090/TTY: 7-1-1**) which provides counseling appointments and other mental health services.

Student Accessibility Services

According to the Americans with Disabilities Act (as amended, 2008), each student with a disability has the right to request services from UNH to accommodate his/her disability. If you are a student with a documented disability or believe you may have a disability that requires accommodations, please contact Student Accessibility Services (SAS) at **201 Smith Hall**. Accommodation letters are created by SAS with the student. Please follow-up with your instructor as soon as possible to ensure timely implementation of the identified accommodations in the letter. Faculty have an obligation to respond once they receive official notice of accommodations from SAS but are under no obligation to provide retroactive accommodations. Faculty are advised by the Dean of Students to not provide accommodations to students who are not registered with SAS. For more information refer to www.unh.edu/studentaccessibility or contact SAS at 603.862.2607, 711 (Relay NH) or sas.office@unh.edu

Confidentiality and Mandatory Reporting

The University of New Hampshire and its faculty are committed to assuring a safe and productive educational environment for all students and for the university as a whole. To this end, the university requires faculty members to report to the university's Title IX Coordinator (Donna Marie Sorrentino, dms@unh.edu, 603-862-2930/1527 TTY) any incidents of sexual violence and harassment shared by students. If you wish to speak to a confidential support service provider who does not have this reporting responsibility because their discussions with clients are subject to legal privilege, you can find a list of resources here ([privileged confidential service providers/resources](#)). For more information about what happens when you report, how the university considers your requests for confidentiality once a report is made to the Title IX Coordinator, your rights and report options at UNH (including anonymous report options) please visit ([student reporting options](#)).

Safety guidelines for working in a Microbiology laboratory

This is a Biosafety Level Two Laboratory. Throughout the semester we will work with bacteria that can cause human illness. If you are immuno-compromised or are taking a medication that may suppress your immune system, please contact the course instructor prior to attending laboratory. In the interest of keeping you safe and keeping this laboratory an opportunity for future students, your instructor and your Graduate TA ask that you follow the basic guidelines outlined below.

General information

The work habits you develop here will carry over into advanced courses and for many of you, into your professional lives. In this laboratory course, you will build upon the experiences you've had in general biology laboratories. But in many important respects, the microbiology laboratory is like no other biology laboratory. For instance, here you will not see the organisms you are studying—they are invisible to the unaided eye. It is crucial for you to learn to "see" them with your "mind's eye".

Will I really be working with dangerous microorganisms in this course?

Yes. Although particular strains of microbes used in this course can be pathogenic for humans (or are opportunistically pathogenic), most of the isolates you will use are not dangerous. For example, we work extensively with *Escherichia coli* which, in the 1950s, was considered "non-pathogenic", and so was chosen to be the organism destined for intensive genetic and molecular studies. Today, even though the vast majority of isolates are harmless, certain strains of *E. coli* cause significant illness and deaths among human newborns each year, some cause significant numbers of urinary tract infections among humans, and some such as the O157:H7 strains are responsible for foodborne illnesses and deaths. Therefore, even some microbes previously considered innocuous, can harm us if:

1. They gain access to certain body areas in which they are normally not found (e.g. transfer from the rectal or perineal region to, say, a cut or abrasion, or to the vagina—most urinary tract infections [cystitis] are caused by displaced indigenous *E. coli*).
2. They are enterotoxin-producing strain thereby causing a (frequently fatal in infants) dehydrating diarrhea.
3. The immune status of the host is weak, for instance, with persons taking immunosuppressive drugs, or those "predisposed" to secondary infection because of infection by another organism.
4. They are the O157:H7 strain of *E. coli*, which can be found in undercooked hamburger or other foods. This strain can produce the so-called Shiga-like toxin (different from the enterotoxin noted above) thereby producing a bloody diarrhea that may lead to hemolytic uremic syndrome, which is potentially fatal.

Furthermore, because of the concept of "infectious dose" (the quantity of organisms required to establish infection), many normally harmless micro-organisms are potentially dangerous in the laboratory where we intentionally grow them to abnormally high population densities.

Rules of conduct and general safety

1. Biological safety cabinets should be used whenever possible and always when the procedures conducted have a high potential for generating aerosol droplets from contaminated material. These include activities such as blending, sonicating, and vigorous mixing.
2. Mechanical pipetting devices should be used for manipulating all liquids in the laboratory. Mouth pipetting is strictly prohibited.
3. Laboratory work surfaces should be decontaminated with an appropriate chemical germicide at the beginning of each laboratory period, after a spill of contaminated material, and when work activities are completed.
4. Contaminated materials used in laboratory tests should be decontaminated before reprocessing or be placed in bags and disposed of in autoclavable bags that the TA will remove at the end of each day.
5. Scientific equipment that has been contaminated with blood or other body fluids should be decontaminated and cleaned before being repaired in the laboratory or transported to the manufacturer.
6. All persons should wash their hands after completing laboratory activities and should remove protective clothing before leaving the laboratory.
7. No eating, drinking, or smoking in the work area.

Student materials

What should I bring to lab?

1. An alert, and inquiring mind.
2. Your Laboratory Notebook - You will keep your notes and results in it.
3. A Sharpie® marking pen for labeling plates and glassware (Please, not black -it doesn't wash off; blue or red is fine)

Discarding used materials

It is mandatory that you discard biological materials in a correct, responsible manner. Moreover, broken glassware, disposable needles and some chemicals we will use all present potential hazards -especially to housekeeping staff. Separation of waste materials is essential. All biological material must be collected for autoclaving (killing) prior to disposal and any broken (or unbroken, for that matter) glassware must be placed in the special container for glass disposal. Plastic pipette tips must be separated from regular trash. If you even suspect that something may be contaminated, it must be autoclaved before disposal. These regulations extend beyond the 501 laboratory and are general laboratory protocol in all UNH microbiology courses. Train yourselves here.

Personal safety

Pathogens in high concentration in combination with even minor cuts or wounds make a delectable mix from the bacterial perspective. Aerosolized bacteria can be taken directly into your lungs or eyes. Pencils and fingers can take them directly from tabletops or culture tubes to your taste buds. So, there is an element of danger here and our goal is to reduce the risk of harm to a minimum. If you are on long-term antibiotic therapy, have a compromised or depressed immune system, or are pregnant, please let the laboratory instructor know. On the other hand, to the best of our knowledge, despite the fact that students have occasionally been cut or slightly burned in the laboratory, we have never experienced a laboratory-acquired infection in this course. Your

instructor will review some Rules for this course relating to hand washing, nail biting, pencil chewing, bench disinfection, and use of laboratory coats.

Burners and fire

What do I do in case of a fire or fire drill?

Shut off your burner and leave the laboratory and building immediately! Don't close windows. Don't collect books. Don't run. Just leave in an orderly fashion! Your TA will review some Rules pertaining to fire and flames and you will be quizzed on this.

How do I light the burner?

You will need to do this repeatedly throughout the semester. The strikers work best when you hold them such that you can put some thumb pressure downward on the flint against the striker plate. The burner is turned on and off at the gas valve on the bench. Do not attempt to turn the flame on or off using the valve at the burner base!

Should I turn off the burner when I am not using it?

Avoid having flames near microscopes. Keep the burner toward the back of your bench workspace. Also, WATCH YOUR HAIR around the burners! If necessary, tie it back. In the past, students have set their hair on fire because they became absorbed in using the microscope and a burner had been left on near it. A good general practice is not to mix flames and microscopy. When in doubt, turn the burner off. Never leave flames unattended in this laboratory. It is good practice to first collect all your materials before lighting the burner and beginning your work.

Personal protective equipment (PPE)

Improper use or lack of gloves and other protective clothing can lead to chemical burns, biological exposures, or other potential dangers. The Office of Environmental Health & Safety (EH&S) encourages informed and safe use of gloves, laboratory coats, and other personal protective equipment (PPE) within the laboratory but asks that their use be voluntarily limited or prohibited in some public areas of all scientific research buildings. The following guidelines are a reminder that soiled, potentially soiled, or the perception of potentially soiled gloves and other clothing beyond the laboratory may transmit a hazard, project a disturbing or careless image, or both, to colleagues and visitors.

Please follow these guidelines when wearing protective laboratory clothing.

- Wearing gloves outside the laboratory is not recommended, except to move hazardous materials between laboratories. Instead, shuttle chemicals from place to place on a cart, in a clean secondary bin, or in a bottle carrier with secure handles.
- If you must transport hazardous materials, use a clean, ungloved hand to touch common surfaces and a gloved hand to carry the items: the one-glove rule. (Alternatively, package the material so you may touch the packaging with bare hands, without apprehension, knowing the material is completely contained if dropped.)
- Gloves should never come in contact with door handles, elevator buttons, telephones, lavatory faucets, vending machines, bottled-water dispensers, ice-making machines, or other surfaces outside the laboratory.

For the sake of safety, appearances, and courtesy, please do not wear soiled, stained, or potentially contaminated laboratory clothing in a cafeteria, lounge, auditorium, or other nonhazardous area.

Laboratory notebook guidelines

1. What kind of notebook will I need?

For this course, you will keep a digital notebook. You can bring a notebook or loose sheets to the lab to record your observations and write down notes. However, the final lab notebook is to be typed and submitted in Canvas.

2. What must be included in the lab notebook?

Your notebook should include the following sections in order as listed:

1. Notebook name
 - Course Name, Semester and Year on the inside cover or cover page
2. Your name and contact information
3. Table of Contents
 - Organized by Experiment, including page numbers.
4. Body of notebook
 - Experimental entries, one per laboratory activity.
5. Laboratory notebook rubric
 - Available in Canvas for you to download and print.

3. What should not be included in my lab notebook?

Do not include notes on lectures or study material in your laboratory notebook. Please keep those notes separate from your lab notebook.

4. How should experimental entries be written?

Each experimental entry must include the following items:

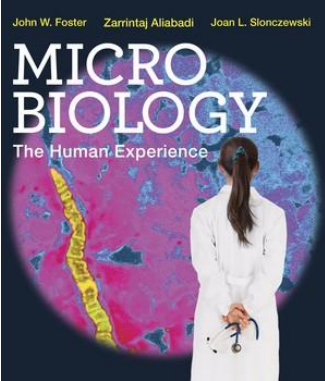
1. **Date** (Month/Day/Year)
2. **Title** (Example: Laboratory 1 – Aseptic Technique)
3. **Hypothesis** or goal of the experiment: brief statement of purpose
4. **Materials and Methods**
 - Print the lab protocol for the corresponding activity and include it in your notebook
 - List the materials and reagents used in each laboratory exercise
 - List and describe each of the steps that you performed (you can use the Lab Protocol as a reference)
 - The how of the experiment, include protocols, calculations, reagents, and equipment
 - Your lab notebook should include all of the relevant information it would take to repeat your experiments. You may reference protocols found in your lab manual for protocols but be sure to record what protocols you followed and when you followed them.
5. **Results** (observations):
 - All that happens during the experiment (planned or unplanned)
 - Raw experimental data

- Present your results in a concise manner: use tables to summarize your results
- 6. Discussion** (data analysis and interpretation):
- Processing of raw data, graphs, and interpretations. Making sense of the results
 - Write in paragraphs the meaning of your results
- 7. Post-lab questions**
- Print the Lab questions for the corresponding activity and include them in your lab notebook
- 8. Pre-lab questions**
- At the beginning of every lab, your TA will assign a number of questions for you to answer before starting the experiments. You must submit them on the corresponding date for grading. Your TA will include these at the end of each notebook entry.

Additional resources you may find helpful during the semester in dealing with students facing difficult challenges are:

- **Center for Academic Resources (CFAR):** Provides services and resources to support undergraduate students in their pursuit of academic success. (<https://www.unh.edu/cfar>.)
- **Sexual Harassment and Rape Prevention Program (SHARPP):** Provides free and confidential advocacy and direct services to survivors. (<https://www.unh.edu/sharpp>.)
- **QPR** is a new training program in mental health matters offered by PACS colleagues. Please do contact Dr. Elisa Bolton at elisa.bolton@unh.edu should your department or program want a training session.
- **Behavior Intervention Team (BIT):** This team provides assistance to the UNH community when a student's behavior suggests harm to self or others, making referrals to appropriate resources and recommends appropriate actions to the Dean of Students when needed. (<https://www.unh.edu/student-life/behavioral-intervention-team-bit>). More information can be provided by calling The Office of the Dean of Students at 862-2053. This year, the Office of the Dean of Students will provide you with guidance in the event that you have concerns about the health, safety, and well-being of a student. Dr. Joan Glutting, Clinical Associate Professor of Psychology and Senior Faculty Fellow in the Dean of Students Office, is available to guide you in determining the proper referral in any given case. She is best reached via email at joan.glutting@unh.edu . Please do not include the student's name in the email. Rather, provide her with the best way to contact you and she will do so. Please know that the associate dean of a student's college is also a helpful resource. We work as close partners in troublesome student cases.

Instructions for accessing InQuizitive homework



Microbiology

The Human
Experience
FIRST
EDITION

Slonczewski, Foster, and Aliabadi

Digital Product Registration and Purchase

1. Visit your book's digital landing page: <https://digital.wwnorton.com/michum>
2. Click the green button in the center of the page.
3. Select "No, I need to register, purchase, or sign up for trial access."
4. Enter your name, school email, and create a password.
5. As you complete registration, you'll have the following access options:
 1. **If you already have a registration code**, enter your registration code and click "Register my Code."
 2. **If you want to purchase digital product access online**, select the "I want to purchase access" option.
 3. **If you want to try digital products before purchasing**, select the "I want to sign up for free trial access" option.
6. The first time you access an activity from the landing page, you'll be asked to enter a Student Set ID number.

Our Student Set

ID is: 258058

Need help? Contact Norton Customer Support at <http://support.wwnorton.com>.

Our representatives will help you via live chat once you submit a request form. Be sure to provide us with the following:

Your school
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Your section name
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Or view our Help Notes at <http://wwnorton.com/helpnotes>.