Biology 260 Microbiology

Infectious Disease, Immunity, Treatment, and Prevention, Summer 2021

Instructor Information

Instructor's Name: Cindy Xie
Instructor's Zoom Office: See Canvas for link
Instructor's Office Hours: See Canvas
Instructor's Email Address: cxie@highline.edu

Course Information

Department: Life, Ocean, and General Sciences (LOGS)
Class meets: W 1-2:30pm
Class Location: Zoom; See Canvas for link

Course Description

A survey of the characteristics of bacteria and other microorganisms, methods of study, their role in nature and applications to health and environmental problems. Includes laboratory practice and participated research project related real world pandemic discussion.

Course Overview

We live in a world surrounded by microbes! Most of them cause humans no harm at all, some of them help us, and some of them make us sick, causing suffering and death around the world. This introductory microbiology course, designed with allied health majors in mind, will focus on microbes that help and harm human health. Throughout the course we will follow the stages of disease progression, from transmission to pathogenesis to treatment; look at ways that we can control and prevent disease transmission by something as simple as hand-washing to something more complex as vaccination; and learn essential laboratory skills needed to maintain aseptic conditions. Our focus will revolve around understanding Healthcare-associated infections (HAI) and apply our work to discuss COVID19 pandemic. You will apply the course concepts to real world situations, specifically awareness of how COVID19 has impacted the lives of people in South Asia.

Student Learning Outcomes

- Demonstrate knowledge in the topics included in the course outline.
- Demonstrate laboratory skills including, but not limited to: bacterial staining, microscopy, aseptic technique, streak for isolation, serial dilutions, and biochemical testing required for the identification of two unknown microorganisms.
- Correlate knowledge and laboratory skills to solve clinical unknowns.
- Demonstrate a increased skill level in: cognitive processes including application of the scientific method; analysis skills including collecting, organizing, presenting and assessing validity of data to draw appropriate conclusions; communication, interpersonal and citizenry skills including effective time management, group work and group presentation.
- Explain and practice safe microbiological, protective and emergency lab procedures
- Research and communicate (visually, orally, and in writing) credible scientific information from a variety of sources.
- Integrate knowledge and make informed judgments about microbiology in everyday life
- Apply the course concepts to real world situations, and enable to demonstrate awareness of how COVID19 has impacted the lives of people in South Asia.

Course Prerequisites

MATH 091 or higher min 2.0 and BIOL& 211 min 2.0 or BIOL& 160 min 2.0

Required Course Texts

Microbiology, A Human Perspective, 9th ed., D. Anderson, et al. (2019)

Access to McGraw-Hill Connect and eBook for Nester's Microbiology, A Human Perspective

- Required for weekly quizzes, midterms, and the final exam.
- A paper copy can also be purchased to go along with this
- 9th ed., D. Anderson, et al. ISBN: 9781260161526

Note: If you purchase a used paper copy of the 8th or 7th ed, because you have a difficult time reading eBooks, that's fine, but don't buy the old edition to access connect – it won't work.

Concise Version Benson's Microbiological Applications, 14th ed., Smith, *et al.* (2016)
ISBN 978-1-25-970523-6 (13th ed is also OK, also called the "Short Version")

SimUText Software

This only runs on PC or Mac computers (there is no app for mobile devices). If you have a Chromebook, you will be provided additional instructions on how to access this software and the lab assignments that require you to use it.

For Lab, you will be performing online activities, simulations, and experiments at home.

- Links will be provided for online activities and instructions for how to download programs.
- Materials for at-home experiments will be provided, for on-campus pick-up. Check Canvas for updates.

How to Succeed in this Course

This 5-credit online lab course is especially designed for students who have prior basic cell biology and are interested in microbiology in healthcare. Here, students will build upon that basic biological knowledge and to understand how real things like the COVID-19 pandemic, human infections, antibiotics, and antibiotic resistance and host immune system work.

In online classroom, we will put the process of science into practice. You should expect to spend an average of 18-20 hours/week outside of class studying. Also, please be prepared for a large amount of uncertainty as we do this. This uncertainty will mimic the process of science as we start to understand what we think we know and what we need to learn more about. As a result, this class involves a great deal of student participation and group work through online discussions and Zoom meetings.

We won't be reading our textbook straight through like a novel. Instead we will use our texts as resources to find information for our explanations, so, we may jump around in the texts to find it. We will also do writing and critical thinking exercises, some essential at-home hands-on laboratory activities, and cooperative problem solving in order to really understand how something works.

Engage in the Course: This is a course that will require a great deal of individual effort by each student. You are expected to engage in the course by completing assignments, discussions, and other class activities. It is the student's responsibility to complete the assigned readings, and view lectures/recordings, or other materials.

Be a Good Scientist: **You need be prepared for lab activities before they start, with your lab binder and colored pencils ready!** Generally, the more prepared you are, the smoother, easier, and faster you will be able to complete the work. **For at-home experiments,** pick an area that can be easily cleaned and organized before you start working to decrease the possibility of mishaps. All specimen and material kits checked out from campus will be cleaned properly and/or returned for safe disposal.

Turn in Assignments: Assignment due dates are specified in the course schedule and on Canvas. Assignments are meant to guide your learning, not just be turned in for a score. All assignments will be turned in online through Canvas or Connect. No Late online assignment submission is accepted. Each type of assignment will have its own policies (time limit, attempts allowed, etc.), which can be viewed before starting the assignment. If you have special health condition, please contact instructor in advance to provide medical and doctor note for the permission.

Communicate Professionally: Be sure to check the syllabus and Canvas FIRST if you have questions about assignments and due dates! Most communication will be done through Canvas Announcements. Please correspond through your Highline email account, and identify your course, yourself, and your **specific question**.

Respect Each Other and Our Diversity: I recognize and respect diversity of ethnicity and race, gender, sexual identity, class, age, religion, and ability. Differences provide us with opportunities to learn new things, compare experiences, test our assertions, understand ourselves better, and find common ground. Differences also sometimes engender conflict. In the midst of that conflict, I ask everyone to maintain a language and an attitude of respect. If you wouldn't say it to someone's face, don't say it online or in an email. Students will be interacting with their peers on a regular basis and are expected to engage in meaningful and thoughtful discussions. Some topics may be controversial; however, you should remain respectful of your peers (and differences in opinion) at all times. Aggressive or demeaning language will not be tolerated. Student rights and responsibilities are outlined in the Student Rights and Responsibilities Code WAC 1321-120.The document prohibits disorderly or bothersome conduct which interferes with the rights of others or which obstructs or disrupts teaching.

Disease Progression and The Big Micro Ideas

You will work toward explaining disease progression in a human host that can be described as taking place in the following three general stages:

Stage 1: Disease Transmission, Colonization and Infection

- Epidemiology, Microbial Structure, Microbial Growth

Stage 2: Treatment and Drug Resistance

- Microbial Control, Antimicrobials, Natural Selection, Mutations, Bacterial Genetics

Stage 3: Immunity and Pathogenesis

- Innate and Adaptive Immunity, Host-Microbe Interactions

"Transmission of COVID-19 Global Pandemic in South Asian Countries" Module is integrated in this course.

Information about Our Course Assignments

A. **Stage Summaries.** I will provide you with assignment checklist on Canvas. Reviewing my published slides, and assignments will help you prepare your "exam" for each disease stage. During exam and quizzes, If plagiarism is detected, both the copier and the person who was copied from will get a zero on the assignment, reported to the college, and possibly given a zero in the class. You must not give anyone your paper to look at, but instead, talk to them and help them to figure out the concepts so that they can write it in their own words.

B. **Research Project.** We will be working to understand how the COVID-19 pandemic is affecting student health and education outcomes. This will be a whole class project, but will require you to work on your own to understand the issues, to work with a group to discuss what more we need to know, and complete pre- and post- assessment questions. **Transmission of COVID-19 Global Pandemic in South Asian Countries** group project: Students will present information with assigned group members. Detailed information will be available on Canvas.

C. **Lab Activities.** Many labs will be done online. At the beginning of the quarter (see Canvas for sign-up and pick-up procedure) you will pick-up lab kits from campus for you to do at home and to practice aseptic technique.

<u>THIS IS VERY IMPORTANT</u>: You must pass the aseptic technique skills check. Our nursing program has told us that they DEPEND on you to have learned aseptic technique in microbiology. It has always been an essential skill for healthcare, and with COVID-19, it is even more so! Therefore, even if you are getting a 4.0 in the class, if you do not **pass the aseptic technique skills check, you will receive, at most, a 1.9 in the class.**

D. Online Quizzes. Individual quizzes are designed to assess that you have done the required homework (textbook reading, lab preparation, online videos etc).

E. Microbiology in Readings. COVID 19 related scientific reading articles will be assigned to read, group discussion, and submit final written reflections.

Grading and Related Policies

Students will be evaluated as follows:

Stage Assignments	30%
COVID 19 Research Project	20%
Lab Activities	30%
Online Quizzes	10%
Microbiology in Reading and Discussion	10%
Total	100%

See below for a description of how the grading percentage total that you see on Canvas translates into the grade on the grade on the 4.0 scale that appears on your transcript. Please feel free to discuss any assignment, or your grade, with me at any point in the term. I am more than happy to help you in any way that I can in order for you to attain the level of success you want to achieve in this course

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4.0 = 95% +	3.3 = 88%	2.6 = 81%	1.9 = 74% (C)	1.2 = 67% (D+)
3.9 = 94% (A)	3.2 = 87% (B+)	2.5 = 80% (B-)	1.8 = 73%	1.1 = 66%
3.8 = 93%	3.1 = 86%	2.4 = 79%	1.7 = 72%	1.0 = 65%
3.7 = 92%	3.0 = 85%	2.3 = 78%	1.6 = 71%	0.9 = 64% (D)
3.6 = 91%	2.9 = 84% (B)	2.2 = 77% (C+)	1.5 = 70% (C-)	0.8 = 63%
3.5 = 90% (A-)	2.8 = 83%	2.1 = 76%	1.4 = 69%	0.7 = 62%
3.4 = 89%	2.7 = 82%	2.0 = 75%	1.3 = 68%	0.0 = <61% (F)

Note: This course is not curved. There is no grade percentage digit round up for this course. I will complete grading within two weeks after their due date.

Division/Class Specific Grading Policies

It is the policy of the Pure and Applied Sciences Division that students who miss 20% or more of labs will receive a grade of 0.0 for the class!! A student who stops doing work on Canvas without an official withdrawal will be assigned a grade based on the work completed up to that point. But please come see me if any problems come up so we can work together to figure out a solution.

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Course Attendance/Tardiness and Participation Policy

Class will meet on Zoom Wednesdays 1-2:30pm, so try to **<u>show up to class 5 minutes earlier</u>** so that we can get everyone settled in class and start working. I will not be checking attendance and class sessions will be recorded in case something comes up and you have to miss it. However, like any face-to-face class, you will want to show up! During class times, we'll be learning how to solve problems in microbiology, which will help you a lot on your graded assignments. If you are late, come to class anyway, but try really hard not to be late. Come to office hours if you have questions. Wednesdays I will go over class/lecture/lab material.

Assignment Deadlines and Policy on Missed Deadlines and Exams

Extensions may be given due to illness or extreme hardship. **Please make prior arrangements with me by sending me an e-mail as soon as you know you will have to miss the due date**. If prior arrangements are not made, a 0% may be assigned for the missed assignment. However, I understand that you probably have a lot going on while you are also trying to study for class. Please let me know how I can help you to succeed!

Academic Honesty

Students are expected to maintain a high standard of honesty in their academic work. Cheating and plagiarism are specifically prohibited under the college's Student Rights and Responsibilities provisions.

Acts of cheating may include submitting for credit work that is not the student's own, copying examination answers from fellow students or other sources or assisting other students in acts of these kinds.

Plagiarism, the presentation of another's writing or ideas as one's own, can take a number of forms - failing to cite sources, copying source texts or online sources without quotation, or inadequately paraphrasing or synthesizing source materials.
Students who are unsure of what might constitute plagiarism or cheating are encouraged to consult their instructors, class materials and other college resources for guidance.

Results of academic dishonesty:

Each assignment (except for reading guides, where you can take notes directly from the text) must be written in your own words without plagiarism. Each assignment will be checked for plagiarism (copying or incorrectly paraphrasing someone else's work – including your study partner!). The first time any plagiarism is detected, students (both the copier and person who was copied from) will be asked to rewrite their assignments. The second time plagiarism is detected, both the copier and the person who was copied from will be given a grade of 0.0 on the assignment and will be reported to the Office of Student Conduct after speaking with you about the situation. The third or more times plagiarism is detected, both the copier and the person who was copied from will get a grade of 0.0 on the assignment, reported to the Office of Student Conduct, and possibly get a grade of 0.0 in the class, as well as possible disciplinary action from the college.

Students who have more than one report of alleged academic dishonesty during their time at Highline College may be required to meet with a Conduct Officer for a student conduct hearing and have sanctions imposed. It is both your right and responsibility to be familiar with the document entitled Student Conduct Code WAC 1321-125.

Inclusivity Statement

In this class I will work to promote an anti-discriminatory environment where everyone feels safe and welcome. I recognize that discrimination can be direct or indirect and take place at both institutional and personal levels. I believe that such discrimination is unacceptable and I am committed to providing equality of opportunity for all by eliminating any and all discrimination, harassment, bullying, or victimization. The success of this policy relies on the support and understanding of everyone in this class. We all have a responsibility not to be offensive to each other, or to participate in, or condone harassment or discrimination of any kind.

Access Services Statement

Your experience in this class is important to me. If you have already established accommodations with Access Services, please communicate your approved accommodations to me at your earliest convenience so we can discuss your needs in this course.
If you have not yet established services through Access Services, but have a temporary health condition or permanent disability that requires accommodations (conditions include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact

Access Services at 206-592-3857, access@highline.edu or access.highline.edu. Access Services is located in building 99 suite 180.

Grievance Procedures:

I hope that you will communicate with me if you experience anything in this course that does not support an inclusive environment. You can also report any incidents you may witness or experience on campus through the following procedures:

- *For instructional grievance process:*

In the case of a complaint about a course, students are encouraged to speak with their instructor first, and if the matter is not resolved, students should then contact the division chair if the complaint is against a full-time faculty member, or with the department coordinator if the complaint is against a part-time faculty member. For more detail, see the procedure:
http://catalog.highline.edu/content.php?catoid=2&navoid=33#Instructional_grievance

- *For Title IX (claims related to discrimination and sexual harassment)*

It is the policy of Highline College to provide equal opportunity in education and employment and not discriminate on the basis of race, color, national origin, age, disability, sex, sexual orientation, marital status, creed, religion, or status as a veteran of war as required by Title IX of the Educational Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, Title VI of the Civil Rights Act of 1964, the Age Discrimination Act of 1975, RCW 49.60.030 and their implementing regulations. Prohibited sex discrimination includes sexual harassment (unwelcome sexual conduct of various types).
For more detail see the procedure: *https://humanresources.highline.edu/faculty-and-staff/policies/title-ix/*

College Policies

For information on college policies on diversity, classroom behavior, incompletes, absences for religious reasons, student grievances, withdrawals, and emergency procedures please click on the links in your Canvas course.

Emergency Preparation Plan: You can sign up for Highline Text Alerts (https://hctextalerts.highline.edu) to receive emergency information by text, or visit Canvas and the Highline College Home page.

Student Resources

The college offers many resources to support student achievement and success. These include Access Services, faculty advising, the Academic Success Centers (math, writing, and general tutoring), the college library, and technical support. For more detailed information on these services, please click on the links in your Canvas course

Faculty Advising: Highline College instructors are a wonderful resource for students at any stage of the academic process. Many Highline faculty have career experience, are knowledgeable about campus resources, and can assist students in reaching their educational goals through degree planning. If you have an advising question, feel free to approach your instructor. If your instructor cannot answer your question, she/he will help you find someone who can.

Writing Center: provides online one-on-one sessions and writing workshops and have handouts to help with writing skills. You can visit the Writing Center website at https://writingcenter.highline.edu.

Course Calendar

Week	Lecture Topics – See Reading Guides for assigned sections	Lab Activities - These are expected completed on the day specified below!	Weekly Assignment Due Dates
Week 1 6/28	**Stage 01 – Disease Transmission and Infection**		
	Syllabus – read it! **Reading Guide 01** • Microbial World • Host-Microbe Interactions • Epidemiology	**Mon:** • Download SimUText Software for SimBio • Activate your profile **Thurs:** • **Lab 1:** SimBio How Diseases Spread – Section 1 (Online Simulation)	**Wed:** • Syllabus • Distance-Learning Assessment **Friday:** • RG01 Quiz Part 1 and Part 2 • Pre-assessment "COVID 19 Pandemic"
Week 2 7/5	**Reading Guide 02** • Microscopy and Staining • Viruses, Viroids, and Prions • Eukaryotic microorganisms and pathogens	**Mon:** • **Lab 2:** SimBio How Diseases Spread – Section 2 (Online Simulation) **Thurs:** • **Lab 3:** Microscope lab and MSU Gram stain simulation + Benson Manual #14	**Wed:** • RG02 Quiz • Lab 1 due (SimBio Section 1) **Friday:** • Introduce COVID19 project, "Transmission of COVID19 Pandemic in South Asia"
Week 3 7/12	**Reading Guide 03** • Dynamics of Prokaryotic Growth • Microbial Transport	**Mon:** • **Lab 4:** Bacterial Growth Conditions Lab Worksheet • **Lab 5:** Antiseptics and Disinfectants (At home with your own chemicals) **Thurs:** • **Lab 6:** Safety Training (Online)	**Wed:** • RG03 Quiz • Lab 2 due (SimBio Section 2) • Lab 3 due • Unseen Enemy Handout due **Friday:** **<u>Unit Exam 1</u>**
Week 4 7/19	**Stage 02 – Control, Treatment, and Resistance**		
	Reading Guide 04 • Microbial Control • Antimicrobial Medications	**Mon:** • **Lab 7 Part 1:** Clean hands - dirty hands (Kit) • **Lab 8 Part 1:** MSU Streak for Isolation simulation • **Lab 8 Part 2:** Aseptic technique (Kit) **Thurs:** • **Lab 7 Part 2:** Clean hands - dirty hands (Kit) • **Lab 8 Part 3:** Aseptic technique (Kit)	**Wed:** • RG04 Quiz • Lab 4/5/6 due • Lab 8 Part 1 Due **Friday:** • COVID-19 virus structure and vaccine development in South Asian
Week 5 7/26	**Reading Guide 05** **Review DNA Replication, Transcription and Translation** **Drug Resistance** **Bacterial Genetics**	**Mon:** • **Lab 9 Part 1:** Streaking for isolation (Kit) • **Lab 10:** Interpret biochemical data and MSU Kirby Bauer Sensitivity testing simulation **Thurs:**	**Wed:** • RG05 Quiz • Ch. 7 Online Quizzes (Canvas) • Lab 7 due • Lab 8 due

Week	Lecture Topics – See Reading Guides for assigned sections	Lab Activities - These are expected completed on the day specified below!	Weekly Assignment Due Dates
		• **Lab 9 Part 2:** Streaking for isolation (Kit)	**Friday:** **<u>Unit Exam 2</u>**
Week 6 8/2	**Reading Guide 06** • Antiviral Drugs • Influenza and HIV	**Mon:** • **Lab 11 Part 1:** Re-streaking for pure cultures (Kit) • **Lab 12 Part 1:** Make dichotomous key **Thurs:** • **Lab 11 Part 2:** Re-streaking for pure cultures (Kit) • **Lab 12 Part 2:** Identify unknown organisms using Your Dichotomous Key	**Wed:** • RG06 Quiz • Lab 9/10 due • Lab 12 Part 1 due **Friday:** • COVID-19, Immune genetic adaptation in South Asian
Week 7 8/9	**Stage 03 – Immunity and Pathogenesis**		
	Reading Guide 07 • Innate Immunity • Adaptive Immunity	**Mon:** • **Lab 13 Part 1:** Sub-culturing pure cultures (Kit) • **Lab 14 Part 1:** Selective and Differential media (Kit) **Thurs:** • **Lab 13 Part 2:** Sub-culturing pure cultures (Kit) • **Lab 14 Part 2:** Selective and Differential media (Kit)	**Wed:** • RG07 Quiz • Lab 11 due • Lab 12 Part 2 due **Friday:** • COVID19 reflection due • Post-assessment "COVID 19 Pandemic"
Week 8 8/16	**Reading Guide 08** • Pathogenesis and Vaccines	• Pack up and Return Lab Kits	**Wed:** • RG08 Quiz • Lab 13/14 due **Friday:** **<u>FINAL Exam</u>**

<u>Recurring weekly due dates:</u>

Pre-Labs (Lab Kit): **Complete before starting each new lab exercise- hand-written flow chart in lab notebook**

Lab Exercises: **Due Sunday by 11:59pm the week after assigned, unless otherwise noted in the schedule.**

Reading Guide Quizzes: **Due Sunday by 11:59pm.**

Project Assignment: **Due Sunday by 11:59pm *Transmission of COVID-19 Global Pandemic in South Asia***

Note: This provided schedule is tentative. Instructor reserves the rights to modify as necessary to accommodate the needs to cover the content area during the quarter.