

 POINT¹⁹ LOMA⁰² NAZARENE UNIVERSITY	DEPARTMENT OF BIOLOGY BIO2020-1: Microbiology of Infectious Diseases (3 units)
Spring 2023	

Meeting days: M/W/F	Instructor: Dr. Dave Cummings
Meeting times: 11:00 – 11:55 am	Phone: 619-849-2642
Meeting location: Latter 2	Email: davidcummings@pointloma.edu
Final Exam: W 5/3/23 10:30 am	Office location: Rohr Science 176
Additional info: See separate lab syllabus	Office Hours: Mondays 2 – 5 pm

COURSE DESCRIPTION

A study of microbial physiology, the diseases associated with infections by certain pathogenic microbes and the vertebrate response to microbial infections. Does not apply toward the Biology major. Lecture and lab. Offered every year.

Prerequisite(s): CHE1003 (or CHE1052); BIO1040 (may be taken concurrently).

COURSE LEARNING OUTCOMES

The unifying theme of this course is pathogenesis, the detrimental interactions between microorganisms and their human hosts. Our main objectives will be to understand what pathogenic microorganisms are, how they cause disease, and how we may be able to control them.

Specific learning outcomes: By the end of the semester, students will be able to

- describe the physical nature and life cycles of bacteria and viruses;
- distinguish bacteria from viruses and the diseases they cause;
- recognize and distinguish diseases caused by enteric bacteria, Gram-positive rods, and Gram-positive cocci;
- evaluate different antibiotics for application to the different groups of bacterial pathogens;
- carry out and interpret fundamental microbiology lab procedures.

REQUIRED RESOURCES

1. *Microbiology With Diseases by Taxonomy*, 6th Edition. Robert W. Bauman, Pearson. <https://www.pearson.com/store/p/microbiology-with-diseases-by-taxonomy/P100001156922/9780135800010#> (E-Book without Mastering)
2. *Follow Your Gut*. Rob Knight, Simon & Schuster, 2015. ISBN 978-1476784748

3. *The Sanford Guide to Antimicrobial Therapy app:*

<https://www.sanfordguide.com/products/digital-subscriptions/sanford-guide-to-antimicrobial-therapy-mobile/> Discount instructions sent by email.

ASSESSMENT AND GRADING

Assessment and grading:

A total of 805 points are possible in the class: 650 points in lecture and another 155 points in lab.

Exams (500 points) – There will be four multiple-choice exams, including the final, in this course, each worth 125 points. Exam questions will be focused on material from lecture (as opposed to lab). Exams 2 and 3 will be semi-cumulative, with approximately 20% of the points coming from questions associated with the previous chapters (*i.e.*, those on which you have already been tested). The final exam will be approximately 25% on new content and 75% on the cumulative material covering the entire semester. If you have a legitimate conflict with an exam date/time, you must inform the instructor prior to the week of the exam to arrange for a makeup exam.

Homework (100 points) – Weekly homework will be assigned (10 points each). Due dates can be found in the course schedule posted on CANVAS (Calendar) and below. These assignments are usually due on Fridays prior to class time.

Chemistry review quiz (10 points) – Chemistry is an important pre-requisite to BIO2020. To ensure that you remember basic chemistry terminology and principles, you will be given a quiz early in the semester. The instructor will inform you in advance of the topics you can expect on the quiz.

Case studies (30 points) – Learning infectious disease principles in context can be a powerful way to ensure retention of the material. At three strategic points in the semester, students will be assigned a case study describing a real infection. Pre-class worksheets will be assigned and should be typed up and turned in on the due date prior to lecture (4 pts each). All of class time on the due date will be dedicated to an in-class worksheet (6 pts each), and two or three questions from the case studies will be found on the exams.

Laboratory activities (155 points) – The BIO2020 lab is designed to expose the student to some of the essential tools of the microbiologist in a safe, controlled environment. More details can be found in the separate lab syllabus.

Point breakdown

Exams (4)	500 points (62.5%)
Homework assignments	100 points (12.5%)
Chemistry review quiz	10 points (1.25%)
Case studies (3)	30 points (3.75%)

Participation/Attendance	10 points (1.25%)
Laboratory activities	155 points (18.75%)
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TOTAL	805 possible points

Grade Scale Based on Percentages

A	B	C	D	F
A 92-100	B+ 88-89	C+ 78-79	D+ 68-69	F 59 or lower
A- 90-91	B 82-87	C 72-77	D 62-67	
	B- 80-81	C- 70-71	D- 60-61	

*NOTE: At the end of the semester, your lab and lecture grades will be combined into a single grade that will be assigned to both lecture and lab.

*NOTE: Final percentages will be rounded to the nearest whole number and the letter grade assigned will be **non-negotiable**.

PLANNED CLASS SCHEDULE

WK 1 | January 10-13 | The Chemistry of Microbiology (CH.2) and Cell Structures and Function (CH.3)

- Basic chemistry review
- Eukaryotic cells
- Homework 1 (due Friday before class)
- Chemistry review quiz (in class Friday)

WK 2 | January 16-20 | Cell Structures and Function (CH.3) and Pathogenic Gram-Positive Bacteria (CH.19)

- Prokaryotic cells
- Some Gram-positive pathogens
- Homework 2 (due Friday before class)

WK 3 | January 23-27 | Microbial Metabolism (CH.5) and Case Study 1

- Enzymes and energy
- Carbohydrate catabolism overview
- Homework 3 (due Friday before class)
- UTI Case study (definitions due Friday before class)

WK 4 | January 30 – February 3 | Microbial Metabolism (CH.5) and Exam 1

- Cellular respiration
- Fermentation
- **Exam 1 (Friday February 3)**

WK 5 | February 6-10 | Microbial Nutrition and Growth (CH.6)

- Nutrition and growth
- Homework 4 (due Wednesday before class)

WK 6 | February 13-17 | Microbial Genetics (CH.7)

- Overview of replication, transcription, and translation
- Horizontal gene transfer
- Homework 5 (due Friday before class)

WK 7 | February 20-24 | Antimicrobial Drugs (CH.10) and Case Study 2

- Antibiotics
- Antibiotic resistance
- Homework 6 (due Friday before class)
- RTI Case study (definitions due Friday before class)

WK 8 | February 27 – March 3 | Viruses (CH.13)

- Bacteriophage
- Human viruses
- Homework 7 (due Friday before class)

WK 9 | March 6-10 | Spring Break

WK 10 | March 13-17 | Pathogenic RNA Viruses (CH.25) and Exam 2

- Influenza viruses
- Exam 2 (Friday March 17)

WK 11 | March 20-24 | Infection (CH.14)

- Virulence factors
- Modes of transmission
- Homework 8 (due Friday before class)

WK 12 | March 27-31 | Innate Immunity (CH.15)

- Innate immunity
- Homework 9 (due Friday before class)

WK 13 | April 3-5 | Adaptive Immunity (CH.16), Immunization (CH.17)

- Adaptive immune response
- Vaccines
- Homework 10 (due Wednesday before class)
- No class Friday (Easter Break)

WK 14 | April 12-14 | Review and Exam 3

- No class Monday (Easter Break)
- Review on Wednesday
- Exam 3 (Friday April 14)

WK 15 | April 17-21 | Pathogenic Gram-Negative Bacilli (CH.20) and Case Study 3

- Specific Gram-negative bacilli
- GITI Case study (definitions due Friday before class)

WK 16 | April 24-28 | COVID-19 (CH.25) and review for final exam

- Coronaviruses in general
- SARS-CoV-2 and COVID-19

WK 17 | May 1-5 | Final Exam Week

- Final Exam on Wednesday May 3, 10:30 am – 1 pm

POLICY STATEMENTS

PLNU Mission

To Teach ~ To Shape ~ To Send

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

COURSE CREDIT HOUR INFORMATION

In the interest of providing sufficient time to accomplish the stated Course Learning Outcomes, this class meets the PLNU credit hour policy for a 4-unit class delivered over 16 weeks. It is anticipated that students will spend a minimum of 37.5 participation hours per credit hour on their coursework. For this course, students will spend an estimated 150 total hours meeting the course learning outcomes. The time estimations are provided in the Canvas modules.

STATE AUTHORIZATION

State authorization is a formal determination by a state that Point Loma Nazarene University is approved to conduct activities regulated by that state. In certain states outside California, Point Loma Nazarene University is not authorized to enroll online (distance education) students. If a student moves to another state after admission to the program and/or enrollment in an online course, continuation within the program and/or course will depend on whether Point Loma Nazarene University is authorized to offer distance education courses in that state. It is the student's responsibility to notify the institution of any change in his or her physical location. Refer to the map on [State Authorization](#) to view which states allow online (distance education) outside of California.

PLNU COPYRIGHT POLICY

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

PLNU ACADEMIC HONESTY POLICY

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See [Academic Policies](#) for definitions of kinds of academic dishonesty and for further policy information.

PLNU ACADEMIC ACCOMMODATIONS POLICY

While all students are expected to meet the minimum standards for completion of this course as established by the instructor, students with disabilities may require academic adjustments, modifications or auxiliary aids/services. At Point Loma Nazarene University (PLNU), these students are requested to register with the Disability Resource Center (DRC), located in the Bond Academic Center (DRC@pointloma.edu or 619-849-2486). The DRC's policies and procedures for assisting such students in the development of an appropriate academic adjustment plan (AP) allows PLNU to comply with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. Section 504 prohibits discrimination against students with special needs and guarantees all qualified students equal access to and benefits of PLNU programs and activities. After the student files the required documentation, the DRC, in conjunction with the student, will develop an AP to meet that student's specific learning needs. The DRC will thereafter email the student's AP to all faculty who teach courses in which the student is enrolled each semester. The AP must be implemented in all such courses.

If students do not wish to avail themselves of some or all of the elements of their AP in a particular course, it is the responsibility of those students to notify their professor in that course. PLNU highly recommends that DRC students speak with their professors during the first two weeks of each semester about the applicability of their AP in that particular course and/or if they do not desire to take advantage of some or all of the elements of their AP in that course.

PLNU ATTENDANCE AND PARTICIPATION POLICY

Regular and punctual attendance at all **synchronous** class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions (virtual or face-to-face), the faculty member will issue a written warning of de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. In some courses, a portion of the credit hour content will be delivered **asynchronously** and attendance will be determined by submitting the assignments by the posted due dates. See [Academic Policies](#) in the Undergraduate Academic Catalog. If absences exceed these limits but are due to university excused health issues, an exception will be granted.

Asynchronous Attendance/Participation Definition

A day of attendance in asynchronous content is determined as contributing a substantive note, assignment, discussion, or submission by the posted due date. Failure to meet these standards will result in an absence for that day. Instructors will determine how many asynchronous attendance days are required each week.

SPIRITUAL CARE

Please be aware PLNU strives to be a place where you grow as whole persons. To this end, we provide resources for our students to encounter God and grow in their Christian faith.

If students have questions, a desire to meet with the chaplain or have prayer requests you can

contact the [Office of Spiritual Development](#)

USE OF TECHNOLOGY

In order to be successful in the online environment, you'll need to meet the minimum technology and system requirements; please refer to the [Technology and System Requirements](#) information. Additionally, students are required to have headphone speakers compatible with their computer available to use. If a student is in need of technological resources please contact student-tech-request@pointloma.edu.

Problems with technology do not relieve you of the responsibility of participating, turning in your assignments, or completing your class work.

INCOMPLETES AND LATE ASSIGNMENTS

All assignments are to be submitted/turned in by the beginning of the class session when they are due—including assignments posted in Canvas. Incompletes will only be assigned in extremely unusual circumstances.

FINAL EXAMINATION POLICY

Successful completion of this class requires taking the final examination **on its scheduled day**. The final examination schedule is posted on the [Class Schedules](#) site.