POINT 1902 LOMA NAZARENE UNIVERSITY	**Department of Biology** **BIO3015-1: Microbiology Lecture Section 1** **Lecture (3 units) + Lab (1 unit)**
Fall 2021	

Meeting days: M/W/F	Instructor title and name: Dr. David Cummings
Meeting times: 11:00 – 11:55 am	Phone: 619-849-2642
Meeting location: BAC 151	Email: davidcummings@pointloma.edu
Final Exam: Monday December 13, 10:30-1:00pm	Office location: Rohr Science room 162
	Office Hours: On Zoom every Monday from 2-5 pm. Or, e-mail me with your availability to set up a one-on-one appointment.

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 DESCRIPTION

An in-depth exploration of the world of microscopic organisms, including their diversity, physiology, biochemistry and ecology. Emphasis is on prokaryotes, but also some discussion of microscopic eukaryotes and viruses. Lecture and lab. Offered every year.

Prerequisite(s): BIO2010 and BIO3045.

COURSE LEARNING OUTCOMES

The primary objective of this course is to familiarize the Biology student with the world of microorganisms with an emphasis on the domain *Bacteria*. We will begin with fundamental concepts of microbiology (architecture, growth, and metabolism) followed by focused discussions of medical microbiology and immunology.

Specific course learning outcomes (CLOs): By the end of this course, students will be able to

1. describe the physical architecture and physiology of *Bacteria*;
2. explain the ways in which *Bacteria* cause disease and resist antibiotics;
3. paraphrase the mechanisms involved in the innate and adaptive immune system;
3. analyze the methods and results reported in the primary research literature in microbiology;
4. evaluate the validity of an author's main arguments in a primary research article in microbiology.

REQUIRED RESOURCES

(1) Brock *Biology of Microorganisms*, 16th ed. E-Book is strongly recommended.
(2) *Sanford Guide to Antimicrobial Therapy*. See separate instructions for a 40% student discount on the app.

ASSESSMENT AND GRADING

Assessment and grading:

A total of 675 points are possible in the class: 550 points in lecture and another 125 points in lab (see separate lab syllabus on Canvas).

Exams (400 points) – There will be four exams, including the final, in this course, each worth 100 points. Each exam will consist of various question types (multiple choice, fill-in-the-blank, short answer) to assess your retention of basic facts and concepts as well as your ability to apply them. The final exam will consist of 50% new material (the immune response) and 50% cumulative content from the rest of the semester. If you have a legitimate conflict with an exam date/time, you must let the instructor know prior to the week of the exam to make arrangements for a makeup exam. Exam dates are firm - please make your plans accordingly. Missed exams cannot be made up without prior instructor approval and only for a legitimate reason. If you have more than two final exams scheduled on the same day as our final you may be eligible to re-schedule, but you must inform the instructor no later than December 1.

In-class activities (150 points) – Ten of these activities will be worth 15 points each.

Laboratory experience (125 points) – The BIO3015 lab consists of a bona fide research experience. Students will learn fundamental microbiology lab techniques in this context. See separate syllabus for details.

Point breakdown

Exams (4)	400 points
In-class activities (10)	150 points
Laboratory experience	125 points
TOTAL	675 possible points

Grade Scale Based on Percentages

A	B	C	D	F
A 93-100	B+ 88-89	C+ 78-79	D+ 68-69	F 59 or lower
A- 90-92	B 82-87	C 72-77	D 62-67	
	B- 80-81	C- 70-71	D- 60-61	

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

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

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities. Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center (EAC@pointloma.edu or 619-849-2486). Once a student's eligibility for an accommodation has been determined, the EAC will issue an academic accommodation plan ("AP") to all faculty who teach courses in which the student is enrolled each semester.

PLNU highly recommends that students speak with their professors during the first two weeks of each semester/term about the implementation of their AP in that particular course and/or if they do not wish to utilize some or all of the elements of their AP in that course.

Students who need accommodations for a disability should contact the EAC as early as possible (i.e., ideally before the beginning of the semester) to assure appropriate accommodations can be provided. It is the student's responsibility to make the first contact with the EAC.

PLNU ATTENDANCE AND PARTICIPATION POLICY

Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions, 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.

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.

TOPICS AND SCHEDULE

Module/Dates	Topics	Reading Guides and Videos
Weeks 1 and 2 T 8/31 – F 9/10	Microbial architecture • Viruses • Fungi, protozoa, helminths • Bacteria and archaea	RG-Ch5 Viruses and their multiplication RG-Ch2 Microbial cell structure and function BIO3015 Episodes 001-008 BIO2020 Episodes 006-017
Weeks 3 and 4 M 9/13 – F 9/24	Bacterial growth • Batch growth • Continuous culture • Environmental factors • Biofilms	RG-Ch5 Microbial growth and its control RG-Ch20 Microbial ecosystems BIO3015 Episodes 009-010 BIO2020 Episodes 023-026, 016 Center for Biofilm Engineering
F 9/24	**Exam 1**	
Weeks 5 and 6 M 9/27 – F 10/8	Energy metabolism • Aerobic respiration • Anaerobic respiration • Fermentation	RG-Ch3 Microbial metabolism BIO2020 Episodes 018-022
Weeks 7 and 8 M 10/11 – W 10/20	Horizontal gene transfer • Transformation • Transduction • Conjugation and plasmids • Insertion sequences and transposons • Integrons	RG-Ch11 Genetics of *Bacteria* and *Archaea* BIO2020 Episode 034
W 10/20	**Exam 2**	**Up to 20% cumulative**

Weeks 9 and 10 M 10/25 – F 11/5	Antibiotics and resistance • The Sanford Guide • Mechanisms of action • Mechanisms of resistance	RG-Ch28 Clinical microbiology and immunology BIO2020 Episodes 035-040
Weeks 12 and 13 M 11/8 – F 11/19	Infection and virulence factors • Structures • Proteins	RG-Ch25 Microbial infection and pathogenesis BIO2020 Episodes 053-057
F 11/19	**Exam 3**	**Up to 20% cumulative**
Week 14 M 11/22	Exam 3 follow-up Thanksgiving break	
Weeks 15 and 16 M 11/29 – F 12/10	The immune response • Innate immunity • Adaptive immunity	RG-Ch26 Innate immunity RG-Ch27 Adaptive immunity BIO2020 Episodes 058-068
M 12/13	**Final exam (10:30-1 pm)**	**50% new, 50% cumulative**