POINT LOMA NAZARENE UNIVERSITY	**Department of Biology** **BIO3015-1: Microbiology section 1** **Lecture (3 units) + Lab (1 unit)**
Fall 2020	

Meeting days: M/W/F	**Instructor title and name: Dr. David Cummings**
Meeting times: 11:00 – 11:55 am	**Phone: N/A for the fall of 2020**
Meeting location: Online	**Email: davidcummings@pointloma.edu**
Final Exam: 12.4.20 10:30-1:00pm	**Office location: N/A for the fall of 2020**
Additional info:	**Group Office Hours: Mondays 11:00-11:55 am on Zoom (see calendar invites for links)** **One-on-One Office Hours: Click here to sign up for an available slot. These meetings will be on Zoom as well.**

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 TEXTS AND RECOMMENDED STUDY RESOURCES

(1) Brock *Biology of Microorganisms*, 15th ed. (Madigan, 2018; ISBN: 978-0-134-26192-8) See separate registration instructions on Canvas for eText with study tools.
(2) *Sanford Guide to Antimicrobial Therapy*. See separate instructions on Canvas for a 40% student discount on the app.
(3) *Reading Primary Literature: A Practical Guide to Evaluating Research Articles in Biology* (Gillen, 2007; ISBN: 978-08053-4599-5)

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 3-unit class delivered over 15 weeks.

Distribution of Student Learning Hours

Assignments	Hours
Readings and videos	90 (6/wk)
Synchronous class time	15 (1/wk)
Studying	30 (2/wk)
Total Hours	135 (9/wk)

ASSESSMENT AND GRADING

Assessment and grading:

A total of 680 points are possible in the class: 550 points in lecture and another 130 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 (December 4) will be 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 November 20.

Synchronous Wednesdays (150 points) – Every Wednesday (11:00-11:55 am) we will meet synchronously on Zoom to work on problems associated with the topic of the week. Ten of these activities will be worth 15 points each.

Laboratory experience (130 points) – With social distancing protocols currently in place, the BIO3015 Lab for Fall 2020 will consist of focused training in the process of reading and critically evaluating the primary literature in Microbiology. This experience will be entirely online using Canvas. See the separate lab syllabus on Canvas.

Point breakdown

Exams (4)	400 points
Wednesday assignments (10)	150 points
Laboratory activities	130 points
TOTAL	680 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.

INCOMPLETE 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.

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.

Format for each week:

1) MONDAY – Optional live office hours 12:15-1:10 pm
2) WEDNESDAY – Required live class 12:15-1:10 pm
3) FRIDAY – Varies: See CANVAS

TOPICS AND SCHEDULE

Module/Dates	Topics	Reading Guides and Videos
Weeks 1 and 2 M 8/17 – F 8/28	Microbial architecture • Viruses • Fungi, protozoa, helminths • Bacteria and archaea	RG-Ch8 Viruses and their replication RG-Ch2 Microbial cell structure and function BIO3015 Episodes 001-008 BIO2020 Episodes 006-017
Weeks 3 and 4 M 8/31 – F 9/11	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 9/11	**Exam 1**	
Weeks 5 and 6 M 9/14 – F 9/25	Energy metabolism • Aerobic respiration • Anaerobic respiration • Fermentation	RG-Ch3 Microbial metabolism BIO2020 Episodes 018-022
Weeks 7 and 8 M 9/28 – F 10/9	Horizontal gene transfer • Transformation • Transduction • Conjugation and plasmids • Insertion sequences and transposons • Integrons	RG-Ch11 Genetics of *Bacteria* and *Archaea* BIO2020 Episode 034
F 10/9	**Exam 2**	**Up to 20% cumulative**
Weeks 9 and 10 M 10/12 – F 10/23	Antibiotics and resistance • The Sanford Guide • Mechanisms of action • Mechanisms of resistance	RG-Ch28 Clinical microbiology and immunology BIO2020 Episodes 035-040
Weeks 11 and 12 M 10/26 – F 11/6	Infection and virulence factors • Structures • Proteins	RG-Ch25 Microbial infection and pathogenesis BIO2020 Episodes 053-057
F 11/6	**Exam 3**	**Up to 20% cumulative**
Weeks 13 and 14 M 11/9 – M 11/20	The immune response • Innate immunity • Adaptive immunity	RG-Ch26 Innate immunity RG-Ch27 Adaptive immunity BIO2020 Episodes 058-068
Weeks 15 and 16 M 11/23 – F 12/4	Thanksgiving Break Review for final exam	
F 12/4	**Final exam (10:30-1 pm)**	**50% new, 50% cumulative**