BIO 660: Microbiology & Immunology

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Course Learning Outcomes: Students will:

a. discuss major concepts and theories relevant in the study of microbiology and immunology. (PLO 1)
b. articulate the persistent challenges faced by scientists in microbiology and immunology. (PLO 1)
c. demonstrate both an ability to perform, and an understanding of, experimental methods and data analysis used in the study of microbiology and immunology. (PLO 2)
d. access and use databases, simulations and/or journals related to microbiology and immunology. (PLO 2)
e. analyze representative research papers in microbiology and immunology. (PLO 3)
f. examine the science/faith relationship in the context of microbiology and immunology. (PLO 4)

Course description:

Concepts in microbiology, including the diversity and ecology of microscopic organisms, and in immunology, focusing on cellular and molecular regulation of the immune system in health and disease, are addressed from the perspective of teaching for conceptual understanding. Lecture and lab.

Class Sessions:

Monday-Thursday from 1:00 - 5:30 pm, BAC151 and RS119, July 13 - 30. Class attendance will be kept and the school's policy will be enforced as outlined in the university catalog. ***Attendance at all labs is required, unless you have a doctor's note excusing you.***

Course credit hour information

It is expected that the completion of the reading, participation in discussions (online and in person), and writing required for this course will take approximately 150 hours (or approximately 10 hours per week), therefore, this class meets the PLNU credit hour policy for a 3-unit class.

Required Texts:

Microbiology: Microbiology Brief Edition (ISBN 0-8053-7676-3) by Robert W. Bauman. This is a paperback condensation of Bauman's larger texts: Microbiology with Diseases by Body System and/or Microbiology with Diseases by Taxonomy. Page numbers and chapters associated with reading assignments will correspond to the Brief Edition. However, the other editions can be used if you have access to either of the other texts.

Immunology: Immunology readings will be found in the reader that accompanies the course. These are referenced as Parham in the schedule below, and most of the readings are from The Immune System, 4th edition, Peter Parham (ISBN: 978-0-8153-4466-7).

Important dates:

Last day to add the course:	July 14, 2013
Last day to drop the course:	July 21, 2013
Refund schedule	100% refund if dropped after 1-2 sessions
	75% refund if dropped after 3-4 sessions
	50% refund if dropped after 5 sessions
	25% refund if dropped after 6-7 sessions
	0% refund if dropped after 8-12 sessions

Assessment:
Grades will be based on laboratory reports and participation (35%), homework/quizzes (30%), and take-home exams (35%), as follows:

2 Laboratory Reports for Immunology) (5 and 15%)
Lab Reports and Participation for Microbiology (15%)
Case Studies (5%)
Immunology Homework (15%)
Microbiology Homework & Quizzes (10%)
Take-Home Microbiology Exams (20%)
Take-Home Immunology Exam (15%)

Microbiology exams will be divided into three portions (one each week). The first two exams will be posted on Friday morning and will be due on Saturday by midnight. The third will be included with the Immunology final examination, which will be passed out on the last day of class. These finals exams should be received as a Microsoft Word document to dawnepage@pointloma.edu by 8:00 a.m. on Monday, August 3. There will be a 10 percent penalty for each late day after this.

Academic Misconduct Policy:
Academic misconduct includes plagiarism and the use of unauthorized materials, information, or study aids in any exam or other academic exercise. It also includes assisting others in any attempt to cheat. It will not be tolerated. However, respect for academic honesty is consistent with discussing the ideas of the course with others. In fact, I encourage you to discuss any and all of the course material that you find interesting outside of class. In the end, however, you must do your written work on your own. If you have any questions about academic honesty, either in general or in particular, please ask me.

A special note on *plagiarism* is warranted. Each student is responsible to know what plagiarism is and to avoid even the appearance of plagiarism in his or her work. No act of plagiarism, whether born of one's intention or ignorance, will be tolerated in this class. Any student caught plagiarizing will incur severe academic punishment. Such punishment will include a grade of zero for the plagiarized work, and may also include expulsion with a failing grade from the course. The student's name and an explanation of the incident will also be forwarded to the Provost of the University. Please see the University policy stated in the catalogue:
http://catalog.pointloma.edu/content.php?catoid=9&navoid=932#Academic_Honesty

Spiritual Care:
PLNU strives to be a place where you grow as a whole person. To this end we provide resources for our graduate students to encounter God and grow in their Christian faith. At the Mission Valley campus we have an onsite chaplain, Rev. Nancy Pitts who is available. If students have questions, a desire to meet with the chaplain, or prayer requests send a message to: gradchaplainmissionvalley@pointloma.edu

Additional resources for your Christian faith journey can be found here:
http://www.pointloma.edu/experience/faith/graduate-student-spiritual-life

Graduate Academic Accommodations Policy:
While all students are expected to meet the minimum academic standards for completion of this course as established by the instructor, students with disabilities may request academic accommodations. At Point Loma Nazarene University, students must request that academic accommodations by filing documentation with the Disability Resource Center (DRC), located in the Bond Academic Center. Once the student files documentation, the Disability Resource Center will contact the student's instructors and provide written recommendations for reasonable and appropriate accommodations to meet the individual needs of the student. See Academic Policies in the PLNU graduate academic catalog here: http://catalog.pointloma.edu/content.php?catoid=9&navoid=932#Academic_Accommodations

FERPA policy:
In compliance with federal law, neither PLNU student ID nor social security number should be used in publicly posted grades or returned sets of assignments without student written permission. This class will meet the federal requirements by returning papers individually and posting grades n Canvas so that only students have access to their grades. Also in compliance with FERPA, you will be the only person given information about your progress in this class unless you have designated others to receive it in the "Information Release" section of the student portal. See Policy Statements

Date	Topic*	Homework*
WEEK 1		
July 13	Cells of the Immune System – Lab (DP)	Parham, Ch 1, p. 1-20 Bauman, Ch 2 (optional) Bauman, Ch 3, pg. 56-90
July 13	Class: Introduction – Bacterial cellular and molecular structures (BN)	
July 14	Overview of the Immune System Response (DP)	Parham, Ch 3(AI), p. 56-62 Microscopy handout Bauman, Ch 14, pg. 404-434
July 14	Lab: Microscopy and simple staining (BN)	
July 14	Class: Principles of disease (BN)	
July 15	Innate Immunity: Toll Receptors (DP)	**Parham, Ch 3(II), p. 44-50** Microscopy handout Parham, Ch 2, p. 29-39 **Cell lab write--up DUE**
July 15	Lab: Gram staining and skin flora (BN)	
July 15	Innate Immunity: Complement (DP)	
July 16	Role of Lymphoid Organs in the Immune System (DP)	**Read Case Study 1, Answer Q1-6** **Read Immune Response Lab Handout** Parham, Ch 1, p. 20-27 Bauman, Ch 5. pg. 125-152
July 16	Class: Bacterial metabolism: Fermentation vs. respiration (BN)	
July 16	Immune Response, Part I - Lab (DP)	
July 16	Lab: Gram stain experiment – skin flora (BN)	
WEEK 2		
July 20	Antibody Structure & Function (DP)	**Complement HW DUE** **Case Study Write-up DUE** Parham, Ch 3 (AI), p. 68-70 Bauman, Ch 7, pg. 208-237
July 20	Immune Response, Part II - Lab (DP)	
July 20	Lab: Gram stain skin flora (BN)	
July 20	Class: Bacterial genetics (BN)	
July 21	Immune Response Part III - Lab (DP)	**Read Immune Response Lab Handout #2** **Cell type vs. Immune Response HW DUE** Bauman, Ch 7, pg. 208-218
July 21	Lab: GI flora (streak and spread plates) (BN)	
July 21	Class: Control of gene expression (BN)	
July 22	Antibody & T Cell Receptor Diversity (DP)	Parham, Ch 3 (AI), p. 57-59
July 22	Immune Response, Part IV - Lab (DP)	
July 22	Lab: GI flora (pure culture); differential tests (BN)	
July 23	T Cell Recognition of Pathogens (DP)	**Antibody HW DUE** **Immunodeficiency Case Studies HW** Parham, Ch 3 (AI), p. 60-68
July 23	Immune Response, Part V- Lab (DP)	
July 23	Lab: GI flora (pure culture); read differential tests (BN)	

Date	Topic	Homework
WEEK 3		
July 27	Class: Viruses: DNA viruses and viral life cycles (BN)	Bauman Ch 13, pg. 378-394 **Influenza Homework DUE** **T cell homework DUE** Parham, Ch 3(AI), p. 66-76
July 27	Influenza Virus Immune Response (DP)	
July 27	Lab: Final streak plate; differential tests on isolate (BN)	
July 28	Immune Response, Part VI - Lab (DP)	**Immune Response Homework DUE** Characterization handout
July 28	Lab: Read tests; antibiotic sensitivity plates (BN)	
July 29	Vaccination & Immunological Memory (DP)	Bauman, PDF Readings Characterization handout
July 29	Class: Viruses: RNA viruses HIV and Influenza (BN)	
July 29	Lab: Read antibiotic sensitivity plates; laboratory wrap-up (BN)	
July 30	Challenge for Future (DP)	Handout, Parham, p. 332-4 Bauman, Ch 10, pg. 287-311
July 30	Student presentations: Immune Response	
July 30	Class: Antimicrobial drugs and pharmacologic control of microbial disease (BN)	
July 30	Class: Wrap-up	

* Please note the timing of topics and exact homework assignments is approximate and should be viewed as tentative. We'll want to tweak this depending upon how class proceeds.
Assignments in bold need to be done by the beginning of class.

Microbiology laboratory safety guidelines

1. Wash your hands regularly with warm water and soap. Hands should be washed upon entering the lab and before exiting the lab, at the very least. It is a good idea to wash your hands occasionally during the lab as well, especially if you suspect that they have been contaminated.

2. Benchtops should be disinfected routinely at the beginning and end of lab and anytime during lab that you suspect surface contamination.

3. Closed-toed shoes must be worn at all times – no sandals/flip-flops allowed.

4. Bacterial cultures, living or dead, pathogenic or not, must be handled with gloves.

5. Be sure all cuts are properly covered/bandaged.

6. Alert the instructor to any illnesses, medications, and compromises to your immune system. Ask your doctor if you are unsure.

7. Handle Bunsen burners with caution. Alert your benchmates when a burner has been lit. Secure loose clothing (such as frilly sleeves). Turn off burners when not in use or when you are leaving the lab, evenly temporarily.

8. Hair that is longer than shoulder-length must be tied back.

9. Break yourself of the habit of touching your face with your hands. You should not rub your eyes or touch your mouth or nose during lab.

10. Absolutely no food or drink in the lab, even temporarily. If you want to bring snacks or a drink to lab and leave it in the hallway, be sure to be aware of what you've touched and what may be on your hands before you take a break to eat or drink.

11. BIOHAZARD BIN: Dispose of all contaminated *disposable* materials in the biohazard waste bin. Do not place glass or other sharps in this bin. Never reach into a biohazard bin to retrieve something. Liquids should not be placed in this container. All gloves, contaminated or not, should be disposed into the biohazard bin. All disposable plates, pipettes, pipette tips, gloves, etc. that have come into contact with any culture, pathogenic or otherwise, must be disposed in a biohazard bin.

12. AUTOCLAVE TUB: Dispose of all *re-useable* supplies such as glass test tubes in the autoclave tub. Place anything that requires sterilization before disposal in this container, such as tubes with live cultures, or microscope slides prepared with live cultures.

13. SHARPS BOX: Only uncontaminated sharps should be placed in the sharps box. Contaminated sharps (for example, microscope slides that you prepared with a live culture), must be autoclaved before being placed in this container.

14. REGULAR TRASH CAN: Only uncontaminated, disposable, non-sharps can be placed in the regular trash can. No sharps, no cultures, no contaminated materials, and no re-useable materials should be placed in the regular trash can.

15. Do not dump any live culture down the drain. All cultures must be autoclaved before being dumped. Place cultures in the autoclave tub.

16. On the first day of lab, locate the first aid kit, fire extinguisher, safety shower, and eye wash stations.

17. If you spill a culture on the floor or lab bench, make others aware of the spill and notify the instructor or lab assistant immediately. Spills will be cleaned and disinfected.

18. If you spill a culture on yourself, notify the instructor or lab assistant immediately.

19. If a chemical or culture splashes into your eyes, have a labmate help you to use the eye wash station immediately. Flush eyes for at least 5 minutes. Ask another student to notify the instructor or lab assistant.

20. Do not attempt to clean up broken glass. Notify the instructor or lab assistant immediately.

21. If you are injured in any way, big or small, notify the instructor or lab assistant immediately.

22. Do not remove any culture, reagent, or other material/supplies from the lab at any time.

*** Conscientious behavior will mitigate many safety hazards in the lab.**