

BIOLOGY 3090: Immunology (3 units) & Immunology Lab (1 unit)
Spring, 2020

I will praise Thee; for I am beautifully and wonderfully made: marvelous are Thy works, and that my soul knoweth right well. Psalm 139:14

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Office Hours: Mon, 3-5 pm; Wed, 10:30 am – Noon; Thur, 1:30 – 2:30 pm; or just drop by!

Texts: 1) The Immune System, 4th ed. by Peter Parham
2) Case Studies in Immunology, 6th ed. by Rosen & Geha

Lecture: MWF, 1:30 – 2:25 p.m., SA120

Lab: Friday, 2:45 – 5:45 p.m., SA120

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 becomes an expression of faith. Being of Wesleyan heritage, we aspire to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Course Description:

BIO3090: Introduction to the immune system with an emphasis on mammalian models. The course focuses on the cellular and molecular regulation of the immune system in health and disease. Topics include recognition of antigen, development of lymphocyte repertoires, and innate and adaptive immune responses. Also included are discussions of the immune system's responses to cancer cells, tissue transplants, and allergenic substances.

BIO3090L: An inquiry-based laboratory that is a co-requisite for BIO3090. Letter graded.

Course Learning Outcomes: Immunology students will be able to

1. analyze the genetics, biochemistry, cellular biology, and developmental biology of the immune system.

{Note: For those of you who have taken Advanced Cell Biology, you will find some common themes emerging in Immunology, namely cell compartments and vesicular traffic, endocytosis/phagocytosis, cell signaling, cytoskeletal reorganization, and apoptosis.}

2. analyze the ways in which the components of the immune system interact to protect organisms from disease.
3. analyze diseases of the immune system.
4. conduct immunology research, including designing and conducting at least one independent investigation.
5. analyze data, formulate conclusions, and design a follow-up experiment for each lab investigation.
6. analyze and present primary literature from the field of immunology.

Attendance: Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member has the option of filing a written report which may result in 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. See [Academic Policies](#) in the Undergraduate Academic Catalog. **Attendance at all labs and exams is required, unless you have a doctor's note excusing you.**

Participation and Cooperation: In an effort to create the best learning environment possible, all students should work in groups when asked to do so – whether in the lab or lecture. In lecture, you will be discussing topics with the students of your choice. In lab, I will assign groups, and I will shuffle the groups during the semester. You may be surprised how much you can learn from one another, especially from people who you may not have chosen to work with in lab.

Cell phones must be muted/on vibrate during class and lab. Only in cases of emergency should you leave class to take a phone call, unless the lab is on a break. Please, NO electronic distractions during class or lab, as it distracts both you and people around you.

Academic Honesty: 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.

We will do a lot of group work in this class, and I encourage you to work in groups; you have much to learn from each other. However, when you work together, each member of the group should be contributing to the final product, and each person must hand in their own homework. Each assignment must be written in your own words, and no electronic files should be exchanged. Work together, contribute to the final product, and don't copy someone else's work.

It is also plagiarism if you use old homeworks, lab reports, exams, etc. to get ideas for how to complete current homeworks, labs, and exams. In addition, if you use someone else's ideas, you will not get the benefit of figuring the assignment out on your own, which will greatly decrease your chance of success on the exams.

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. **In particular, all homeworks, assignments, and laboratories are owned by Dr. Page and may not be shared with other individuals or groups outside of the students registered for the BIO390, Spring, 2020 section.** It is a violation of copyright law to otherwise distribute these materials in any form.

Academic Accommodations: 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 (a) 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.

Grading: 1000 points total: Please note that your grade for BIO3090 and BIO390L will be calculated together, and the same grade will be given for both courses. In addition, the following dates and times may be changed, as necessarily determined by the instructor.

580 Points: 4 exams – 100 pts, 140 pts, 140 pts, 200 pts (final exam)

100 Points: End of chapter homework

(I will randomly pick 7 of the homework assignments to grade; the 2 lowest grades will be dropped.)

50 Points: Reading Assignment Homework

26 Points: Case Study Homework Quizzes

30 Points: Special Case Study Assignments

14 Points: Lab Quizzes

200 Points: Lab Reports / Research Presentation (see separate handout)

90% - 100% A

80% - 89.9% B

70% - 79.9% C

60% - 69.9% D

0 – 59.9% F

+ and – grades will be assigned as follows: B⁻ is 80 – 81.9% and B⁺ is 88-89.9%

Late work policy: For work that is one day late, 10% will be deducted from the final grade. For work that is two days late, 20% will be deducted from the final grade. *Note that late work will not be accepted after a graded assignment has been returned to the class.*

Also late Reading Assignment Homework and Case Study Quizzes will not be accepted at all, since it is specific to that day's material.

Summary of Due Dates:

Exams: 2/14 during lab

3/6 during lab

4/17 during lab

5/8, 1:30 pm – 4:00 pm (final exam)

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. No requests for early examinations or alternative days will be approved.

Lab Reports: 1/27

Lab 1 (Individual)

3/18

Lab 2 (Individual)

4/24

Lab 3 Research Presentation Poster (Group)

5/1

Lab 4 PowerPoint Presentation (Group)

5/6

Lab 4 Report (Group)

Date	Lectures	Reading	Labs
1/14 1/15 1/17	Cells & Organs of the Immune System	p. 1-8 p. 8-17, CS25, RA1 p. 18-26, CS30	Lab 1: Cells of Immune System
1/20 1/22 1/24	Holiday Antibodies	p. 81-91, RA2, HW-1 p. 91-98, RA3	Lab 2: Immune Response, Part I
1/27 1/29 1/31	T Cell Receptors & MHC	p. 98-101, RA4 p. 101-107, CS3 p. 113-120, RA5	LAB 1 DUE on 1/27 Lab 2: Immune Response, Part II
2/3 2/5 2/7		p. 120-125, CS12, HW-4 p. 125-135 p. 135-140, RA6	Lab 2: Immune Response, Part III
2/10 2/12 2/14	B cell development	p. 140-145, CS – kidney p. 149-163, CS1, HW-5 p. 149-163	Exam 1: CH 1,4,5
2/17 2/19 2/21	T cell development	p. 163-166, RA7 p. 167-172, RA8 p. 177-188, RA9	Lab 2: Immune Response, Part IV Lab 3: Research Presentation, Part I
2/24 2/26 2/28		p. 188-192, CS8, HW-6 p. 192-194, CS17 p. 192-194, HW-7quiz	Lab 2: Immune Response, Part V
3/2 3/4 3/6	T cell Immunity	p. 199-206, RA10, HW-7 p. 206-211, CS-kidney p. 211-227	EXAM 2: CH 6,7
3/16 3/18 3/20	B cell Immunity	p. 211-227, CS24/48 p. 31-39, 255-258, CS33 p. 231-236, RA11	LAB 2 DUE Lab 4: Relative Expression, Part I Lab 3: Research Presentation, Part II
3/23 3/25 3/27	Immune Responses	p. 236-245, CS2, HW-8 p. 245-255, CS - gut Sect 3-1-4, 3-13 -14, CS27	Lab 4: Relative Expression, Part II & III
3/30 4/1 4/3	Vaccination; Immunodef.	Sect 3-7-12, 3-15-21, CS26, HW-9 p. 295-307 p. 308-325, RA12, HW-IR	Lab 4: Relative Expression Lab 3: Research Presentation, Part III
4/6 4/8 4/10	Easter Break	p. 375-386, CS5, HW-13 p. 365-375, CS-FLU	Holiday – No Lab
4/13 4/15 4/17	Easter Break IgE-Mediated Imm. Resp.	CS-HIV p. 401-416	EXAM 3: CH 2,8-10
4/20 4/22 4/24	Transplantation	p. 416-429, CS49/50 p. 433-440, 458-467, HW-14 p. 440-457, CS-transplant	RESEARCH PRESENTATION (POSTER)
4/27 4/29 5/1	Autoimmune Disease Cancer	Ch 16, CS18/40 Ch 16, CS37/44 Ch 17, HW-16	RELATIVE EXPRESSION (PRESENT)