

 <p><b>POINT</b><sup>19</sup>  <b>LOMA</b><sup>02</sup> NAZARENE UNIVERSITY</p>	<p><b>*Biology</b></p> <p><b>*BIO3090 and BIO3090L: Immunology and Immunology Lab</b></p> <p><b>*4 units (3 units lecture + 1 unit lab)</b></p>
Spring, 2024	

<p><b>Meeting days:</b> Lecture: MWF Lab: F</p>	<p><b>Instructor:</b> Dr. Dawne Page, Professor &amp; Chair of Biology</p>
<p><b>Meeting times:</b> Lecture: 1:30 – 2:25 pm Lab: 2:45 – 5:45 pm</p>	<p><b>Phone: 619-849-2204</b></p>
<p><b>Meeting location: SA120</b></p>	<p><b>Email: dawnepage@pointloma.edu</b></p>
<p><b>Final Exam:</b> Mon, 4/29, 1:30-4:00 pm</p>	<p><b>Office hours:</b> M: 10:30 – 11:30 am (In person, RS 116) W: 12:00 – 1:00 pm (In person, RS 116) F: 12:00 – 1:00 pm (In person, RS 116) <b>Or stop by my office or email for an appointment</b></p>

### 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

**BIO 3090 (3):** 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.

**BIO 3090L (1):** An inquiry-based laboratory that is a co-requisite for BIO3090. Letter graded.

### REQUIRED TEXTS

- 1) The Immune System, 5<sup>th</sup> ed. by Peter Parham
- 2) Case Studies in Immunology, 7<sup>th</sup> ed. by Rosen & Geha

## 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.

## LAB TECHNIQUES LEARNED AND APPLIED IN BIO3090L

- Use of micropipettes
- Staining and microscopic identification of blood cells
- Perform a basic ELISA
- Design, execute, and interpret an experiment involving an antigen-capture ELISA
- Analyze and present papers from the primary scientific literature
- Work in teams to collaborate and engage in problem-solving activities
- Write two lab reports

## 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 (3 units lecture, 1 unit lab) delivered over 15 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 200 total hours meeting the course learning outcomes.

## 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 withdrawal date or, after that date, receive an "F" grade.

**Attendance at all labs and exams is required, unless you have a university note excusing you.**

## 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, exams and laboratories are owned by Dr. Page and may not be shared with other individuals or groups outside of the students registered for the BIO3090, Spring, 2024.**

## 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.

NOTE: 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.

## ARTIFICIAL INTELLIGENCE (AI) POLICY

Use of Artificial Intelligence (AI) tools (e.g., ChatGPT, iA Writer, Marmot, Botowski, or any other AI tool) is not permitted, and use of these tools will be treated as plagiarism.

## PLNU ACADEMIC ACCOMMODATIONS POLICY

Pursuant to Section 504 of the Rehabilitation Act and other applicable laws, PLNU prohibits discrimination and harassment against a qualified individual with a disability. While all students are expected to meet the minimum standards for completion of each course as established by the instructor, students with disabilities may request academic adjustments, modifications or auxiliary aids/services. The PLNU Educational Access Center (EAC), located in the Bond Academic Center ([EAC@pointloma.edu](mailto:EAC@pointloma.edu) or 619-849-2533), is the point of contact for disability issues for all PLNU undergraduate and graduate students, including students enrolled at the Mission Valley Campus and College of Extended Learning students enrolled in PLNU courses at Community College satellite campuses. Current and prospective students seeking an accommodation must follow the reasonable accommodation procedures which may be found on the [EAC website](#).

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 EAC 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 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.

## **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. If you find yourself scheduled for three (3) or more final examinations on the same day, you are authorized to contact each professor to arrange a different time for one of those exams. However, unless you have three (3) or more exams on the same day, no requests for alternative final examinations will be granted.

## **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 your professor or the [Office of Spiritual Life and Formation](#).

## **LANGUAGE AND BELONGING**

Point Loma Nazarene University faculty are committed to helping create a safe and hospitable learning environment for all students. As Christian scholars we are keenly aware of the power of language and believe in treating others with dignity. As such, it is important that our language be equitable, inclusive, and prejudice free. Inclusive/Bias-free language is the standard outlined by all major academic style guides, including MLA, APA, and Chicago, and it is the expected norm in university-level work. Good writing and speaking do not use unsubstantiated or irrelevant generalizations about personal qualities such as age, disability, economic class, ethnicity, marital status, parentage, political or religious beliefs, race, gender, sex, or sexual orientation. Inclusive language also avoids using stereotypes or terminology that demeans persons or groups based on age, disability, class, ethnicity, gender, race, language, or national origin. Respectful use of language is particularly important when referring to those outside of the religious and lifestyle commitments of those in the PLNU community. By working toward precision and clarity of language, we mark ourselves as serious and respectful scholars, and we model the Christ-like quality of hospitality.

You may report an incident(s) using the [Bias Incident Reporting Form](#).

## **SEXUAL MISCONDUCT AND DISCRIMINATION**

In support of a safe learning environment, if you (or someone you know) have experienced any form of sexual discrimination or misconduct, including sexual assault, dating or domestic violence, or stalking, know that accommodations and resources are available through the Title IX Office at [pointloma.edu/Title-IX](http://pointloma.edu/Title-IX). Please be aware that under Title IX of the Education Amendments of 1972, faculty and staff are required to disclose information about such misconduct to the Title IX Office.

If you wish to speak to a confidential employee who does not have this reporting responsibility, you can contact Counseling Services at [counselingservices@pointloma.edu](mailto:counselingservices@pointloma.edu) or find a list of campus pastors at [pointloma.edu/title-ix](http://pointloma.edu/title-ix).

## ASSESSMENT AND GRADING

Grades will be based on the following:

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

**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 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.)

60 Points: Reading Assignment Homework (Due at 1:30 pm) (The lowest 2 grades will be dropped.)

25 Points: Case Study Homework Quizzes (Due at 1:30 pm)

40 Points: Special Case Study Assignments

15 Points: Lab Quizzes

180 Points: Lab Reports, Lab Assignments, & Research Presentation

Late work policy: Late Reading Assignment Homework and Case Study Quizzes will be accepted at all, since it is specific to that day's material. **They are due at 1:30 pm.** For other assignments, 10% will be deducted from the final grade for work that is one day late, and 20% will be deducted from the final grade for work that is two days late. *Note that late work will not be accepted after a graded assignment has been returned to the class.*

### **Summary of Due Dates:**

- Exams:**
- 1) 2/16 during lab,
  - 2) 3/1 during lab
  - 3) 4/12 during lab
  - 4) 4/29, 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.

- Major Lab Assignments:**
- 1/23 Lab Report 1 (Individual)
  - 3/27 Lab Report 2 (Individual)
  - 4/26 Lab 3 Research Presentation (In Person Group Assignment)

## ASSIGNMENTS AT-A-GLANCE

See the following page for a schedule of content and due dates for the whole semester.

Note 1: These dates and topics are subject to change, as necessarily determined by the instructor.

Note 2: The color coding corresponds to the content for the four major exams: Exam 1, Exam 2, Exam 3, & Final Exam, although the final exam will be partially cumulative.

Date	Lectures	Reading	Labs
1/8	Cells & Organs 1	p. 1-10	
1/10	Cells & Organs 2	p. 10-23, <b>CS25, RA1</b>	
1/12	Cells & Organs 3	p. 23-30, <b>CS30</b>	Lab 1: Cells of Immune System
1/15	<b>Holiday</b>		
1/17	Antibodies 1	p. 97-107, <b>RA2, HW-Ch1</b>	
1/19	Antibodies 2	p. 107-114, <b>RA3</b>	Lab 2: Immune Response, Part I
1/22	Antibodies 3	p. 114-118, <b>RA4</b>	<b>LAB 1 DUE on 1/23</b>
1/24	Antibodies 4	p. 118-125, <b>CS3</b>	
1/26	TCR/MHC 1	p. 129-134, <b>RA5</b>	Lab 2: Immune Response, Part II
1/29	TCR/MHC 2	p. 134-140, <b>CS12</b>	
1/31	TCR/MHC 3	p. 140-150 <b>HW-Ch4</b>	
2/2	TCR/MHC 4	p. 150-158, <b>RA6</b>	Lab 2: Immune Response, Part III
2/5	TCR/MHC 5	<b>CS – kidney</b>	
2/7	B cell development 1	p. 163-177, <b>HW-Ch5</b>	
2/9	B cell development 2	p. 163-177, <b>CS1</b>	Exam Review
2/12	B cell development 3	p. 177-180, <b>RA7</b>	
2/14	B cell development 4	p. 180-185, <b>RA8</b>	
2/16	T cell development 1	p. 191-202, <b>RA9</b>	<b>Exam 1: CH 1,4,5</b>
2/19	T cell development 2	p. 202-206, <b>CS8, HW-Ch6</b>	
2/21	T cell development 3	p. 206-210, <b>CS17</b>	
2/23	T cell development 4	p. 206-210, <b>HW-Ch7quiz</b>	Lab 2: Immune Response, Part IV & Exam review
2/26	T cell Immunity 1	p. 213-220, <b>RA10, HW-Ch7</b>	
2/28	T cell Immunity 2	p. 220-225, <b>CS-kidney</b>	
3/1	T cell Immunity 3	p. 225-230	<b>Exam 2: CH 6,7</b>
3/11	T cell Immunity 4	p. 231-239, <b>CS24/46</b>	
3/13	B cell Immunity 1	p. 245-250, <b>RA11</b>	
3/15	B cell Immunity 2	p. 250-258, <b>CS2, RP#1</b>	Lab 2: Immune Response, Part V
3/18	B cell Immunity 3	p. 258-275, <b>CS – gut, HW-Ch8</b>	
3/20	B cell Immunity 4	p. 37-46, 268-270, <b>CS32</b>	
3/22	Immune Responses 1	p. 53-84, <b>CS27, ELISA Post</b>	Lab 2: Immune Response, Part VI
3/25	Immune Responses 2	p. 84-92, <b>HW-Ch9</b>	
3/27	Memory	p. 305-316	LAB 2 DUE on 3/27
3/31	<b>Easter Break</b>		<b>No lab Easter break</b>
4/1	<b>Easter Break</b>		
4/3	Vacc.; Immundef. 1	p. 317-334, <b>RA12, HW-IR</b>	
4/5	Vacc.; Immundef. 2	p. 384-395, <b>CS5, HW-Ch13</b>	Lab 3: Research Presentation Work
4/8	Vacc.; Immundef. 3	p. 375-382, <b>CS-FLU</b>	
4/10	Vacc.; Immundef. 4	p. 395-406, <b>CS-HIV</b>	
4/12	<b>Exam</b>		<b>Exam 3: CH 2,8-10</b>
4/15	IgE-Med. Imm. Resp. 1	p. 411-425, <b>RP#2</b>	
4/17	IgE-Med. Imm. Resp. 2	p. 425-435, <b>CS47</b>	
4/19	Transplantation	Ch 15, <b>CS-transplant</b>	Lab 3: Research Presentation Work
4/22	Autoimmune Disease 1	Ch 16, <b>CS18, CS-RF, HW-Ch14</b>	
4/24	Autoimmune Disease 2	Ch 16, <b>CS38/42</b>	
4/26	Cancer	Ch 17, <b>HW-Ch16</b>	RESEARCH PRESENTATION (POSTER)