POINT 1902 LOMA NAZARENE UNIVERSITY	***Biology** ***BIO3090 and BIO3090L: Immunology and Immunology Lab** ***4 units (3 units lecture + 1 unit lab)**
Fall 2020	

Meeting days: **Lecture: MWF** **Lab: F**	**Instructor:** **Dr. Dawne Page, Professor & Chair of Biology**
Meeting times: **Lecture: 1:30 – 2:25 pm** **Lab: 2:45 – 5:45 pm**	**Phone: 619-849-2204**
Meeting location: SA120	**Email: dawnepage@pointloma.edu**
Final Exam: **Monday, Jun 7, 1:30 – 4:00 pm**	**Office hours will be by Zoom or in the lab** **M: 10:30 – 11:30 am** **W: 12:00 – 1:00 pm** **Or email for an 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

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 repertories, 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, 4th ed. by Peter Parham

2) Case Studies in Immunology, 6th 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.

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 delivered over 14 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 150 total hours meeting the course learning outcomes.

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, 2021.

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.

Attendance at all labs and exams is required, unless you have a doctor's note excusing you.

While San Diego County is in purple tier restrictions, all lectures will be remote. Some will occur synchronously over Zoom, whereas others will be asynchronous. The synchronous (S) vs. asynchronous (A) lecture schedule is shown on the last page of the syllabus. In general, we will try to cover the difficult material in the synchronous sessions. The Friday lecture will be asynchronous as we will be using the lecture time for lab.

Labs in purple tier (and red tier) will be face-to-face. Half of the students will meet for lab from 1:30–3:30 pm (Group A) and the other half will meet for lab from 3:45–5:45 pm (Group B). We will assign Groups A and B during the first week of classes. You will also be assigned the same lab partner for the entire semester.

We anticipate that San Diego County will move into red tier restrictions in March or April. At that point we will move into a hybrid format with Group A attending lecture in person one day a week, and Group B attending lecture in person a different day of the week. When one group is attending in person, the rest of the class will attend via Zoom.

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.

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.

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 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 (Due at midnight)

(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 (Due at midnight) / Research Presentation

Late work policy: Late Reading Assignment Homework and Case Study Quizzes will not 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) **4/9** during lab,

2) **4/23** during lab

3) **5/21** during lab

4) **6/7**, 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: **3/16** Lab 1 (Individual)

5/18 Lab 2 (Individual)

6/4 Lab 3 Research Presentation (Group)

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.

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.

ASSIGNMENTS AT-A-GLANCE

See the following page for a schedule of content and due dates for the whole semester. This schedule may be changed as needed.

Note that we will move to a hybrid format as soon as San Diego moves into the red tier, in which case the synchronous and asynchronous lectures won't apply to Monday and Wednesday anymore, as described above.

Date	Lectures	Reading/Assignment	Labs
3/1	Cells & Organs 1 (S)	p. 1-8	
3/3	Cells & Organs 2 (S)	p. 8-17, **CS25, RA1**	
3/5	Cells & Organs 1 (A)	p. 18-26, **CS30**	Lab 1: Cells of Immune System
3/8	Antibodies 1 (S)	p. 81-91, **RA2, HW-Ch1**	
3/10	Antibodies 2 (S)	p. 91-98, **RA3**	
3/12	Antibodies 3 (A)	p. 98-101, **RA4**	Lab 2: Immune Response, Part I
3/15	Antibodies 4 (S)	p. 101-107, **CS3**	**Lab 1 DUE on 3/16**
3/17	TCR/MHC 1 (S)	p. 113-120, **RA5**	
3/19	TCR/MHC 2 (A)	p. 120-125, **CS12**	Lab 2: Immune Response, Part II
3/22	TCR/MHC 3 (S)	p. 125-135, **HW-Ch4**	
3/24	TCR/MHC 4 (S)	p. 135-140, **RA6**	
3/26	TCR/MHC 5 (A)	p. 140-145, **CS – kidney**	Lab 2: Immune Response, Part III
3/29	B cell development 1(S)	p. 149-163,**HW-Ch5**	
3/31	**Break – no class**		
4/1	B cell development 2(A)	p. 149-163, **CS1**	Lab 3: Research Presentation, PartI (A)
4/5	B cell development 3(S)	p. 163-166, **RA7**	
4/7	B cell development 4(Ha)	p. 167-172, **RA8**	
4/9	T cell development 1 (Hb)	p. 177-188, **RA9**	**Exam 1: CH 1, 4, 5 (In person)**
4/12	T cell development 2 (Ha)	p. 188-192, **CS8, HW-Ch6**	
4/14	T cell development 3 (Hb)	p. 192-194, **CS17**	
4/16	T cell development 4 (A)	p. 192-194, **HW-Ch7quiz**	Lab 2: Immune Response, Part IV
4/19	T cell Immunity 1(Ha)	p. 199-206, **RA10, HW-Ch7**	
4/21	T cell Immunity 2 (Hb)	p. 206-211, **CS-kidney**	
4/23	T cell Immunity 3 (A)	p. 211-227	**Exam 2: CH 6,7 (In person)**
4/26	T cell Immunity 4 (Ha)	p. 211-227, **CS24/48**	
4/28	B cell Immunity 1 (Hb)	p. 31-39, 255-258,**CS33**	
4/30	B cell Immunity 2 (A)	p. 231-236, **RA11**	Lab 2: Immune Response, Part V
5/3	B cell Immunity 3 (S)	p. 236-245, **CS2, HW-Ch8**	
5/5	**Break – no class**		
5/7	B cell Immunity 4 (A)	p. 245-255, **CS - gut**	Lab 2: Immune Response, Part VI
5/10	Immune Responses (Ha)	Sect 3-1 to 4, 3-7 to 10, 3-13 to 15, **CS27,HW-Ch9**	
5/12	Memory (Hb)	p. 295-307	
5/14	Vacc.; Immundef. 1 (A)	p. 308-325, **RA12, HW-IR**	Lab 2: Work on lab reports (S)
5/17	Vacc.; Immundef. 2 (Ha)	p. 375-386, **CS5,HW-Ch13**	**Lab 2 DUE on 5/18**
5/19	Vacc.; Immundef. 3 (Hb)	p. 365-375, **CS-FLU**	
5/21	**Review Session (S)**		**EXAM 3: CH 2,8-10 (In person)**
5/24	Immunodef.-HIV (Ha)	**CS-HIV**	
5/26	IgE-Med. Imm. Resp. (Hb)	p. 401-416, **CS49/50**	
5/28	Transplantation (A)	p. **CS-transplant**	Lab 3: Work on Research Present. (S)
5/31	Autoimm. Disease 1(Ha)	Ch 16, **CS18/40,HW-Ch14**	
6/2	Autoimm. Disease 2 (Hb)	Ch 16, **CS37/44**	
6/4	Cancer (S)	Ch 17, **HW-Ch16**	Lab 3: Research Presentation (S)

The color coding corresponds to the material for the four exams, although the final exam will be partially cumulative.
S = Synchronous Zoom Session
A = Asynchronous
Ha = Hybrid Lecture in SA 120: Group A in-person, Group B on Zoom
Hb = Hybrid Lecture in SA 120: Group B in-person, Group A on Zoom
All exams are in person; labs are in person unless otherwise noted (A or S).