POINT LOMA NAZARENE UNIVERSITY	***Biology** ***BIO3045 and BIO3045L: Genetics and Genetics Lab** ***4 units (3 units lecture + 1 unit lab)**
Fall 2020	

Meeting days: **Lecture: MWF** **Lab: M or T**	**Instructor:** **Dr. Dawne Page, Professor & Chair of Biology**
Meeting times: **Lecture: 12:15 – 1:15 pm (when delivered synchronously)** **Lab: Mon, 2:45 – 4:45 pm** **Tue, 9:00 – 11:00 am** **Tue, 1:30 – 3:30 pm** **(The times for lab apply when delivered synchronously.)**	**Phone: 619-849-2204**
Meeting location: Zoom	**Email: dawnepage@pointloma.edu**
Final Exam: Mon, 11/30, 10:30 am – 1:00 pm	**Office location and hours: Zoom, MWF 12:15-1:15 pm or by 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 3045 (3): The study of the inheritance, organization, expression and variability of genes. Prerequisite(s): BIO 2010. A grade of "C" or better in BIO 2010 or instructor consent. Corequisite(s): BIO 3045L

BIO 3045L (1): An inquiry-based laboratory that is a co-requisite for BIO 3045. Letter graded. Corequisite(s): BIO 3045

COURSE LEARNING OUTCOMES

Genetics students will be able to

1. apply the basic principles of Genetics, including Gene Expression, Eukaryotic Genetics, Prokaryotic Genetics, Cancer Genetics, Population Genetics, and Molecular Evolution, to solving Genetics problems.
2. conduct laboratory investigations in genetics.
3. analyze data, formulate conclusions, and design a follow-up experiment for each lab investigation.
4. analyze and discuss different viewpoints concerning social issues that relate to genetics, including diverse viewpoints within the Christian community.

REQUIRED TEXTS

Genetics: Analysis & Principles, 6th ed., by Robert J. Brooker (2018).

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 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 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 Drs. Page and Lineback and may not be shared with other individuals or groups outside of the students registered for the BIO3045, Fall, 2020 sections.

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.

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	

This course will consist of a total of 1000 points. Please note that your grade for BIO3045 and BIO345L will be calculated together, and the same grade will be given for both courses since they are intertwined. Note that the following dates and times may be changed, as determined by the instructors.

630 Points: Exams

Exam I – Review of transcription & translation (100 pts), 8/28: Friday, 12:15 – 1:15 pm
Exam II– 165 points, 9/14: Monday *evening* (7:00 – 9:00 pm)
Exam III– 165 points, 10/19: Monday *evening* (7:00 – 9:00 pm)
Final Exam – 200 points, 11/30, Monday, 10:30 am – 1:00 pm

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

NOTE: All exams will be delivered via Honorlock in Canvas. No cell phones, iPods/MP3 players, computers, or other electronic devices/smart technology may be used during an exam. For all exams, except the one on Friday, 8/28, you may use your lecture notes, your homework problems, and a calculator to take the exam.

172 Points: Problem Sets, Online Quizzes, Lab Quizzes, & Paper Analysis

End of Unit Problem Sets (96 pts): Each "unit" we discuss in class will have an associated set of problems for you to work out. The assignments will be posted on Canvas and available to you once we begin the unit. Problem sets are due on the class day following the end of each unit. (So, if we finish the chapter on Friday, your problem set will be due on Monday.) We will drop the 4 lowest grades from the problem sets.

Online Quizzes (56 points): For many of our classes, you will be required to read the material in advance or watch an online lecture and then take a quiz on Canvas. We will drop the 2 lowest grades from these assignments.

Lab quizzes (12 pts): You can expect a brief quiz at the beginning of some of the lab periods. We will drop the 2 lowest grades from the lab quizzes.

Paper Analysis (8 pts): We will read and analyze a research paper.

160 Points: Lab Reports

The purpose of lab reports is to help you develop the skills of data analysis, interpretation, and communication. There will be 4 lab reports over the semester, each worth 40 points.

9/4 (Lab 1) – Group Lab Report
10/9 (Lab 2) – Group Lab Report
10/14 (Lab 3) – Individual Lab Report
11/16 (Lab 4) – Group Lab Report

38 Points: Class and Lab Participation (participation in group lab reports)

Attendance at the required synchronous lecture sessions will be recorded. There are 13 synchronous lecture sessions, and you may miss two of them for any reason. Absences beyond two will require a doctor's note.

Attendance at all synchronous lab sessions is required, unless excused by a doctor's note.

Extra Credit: Up to 20 points of extra credit will be available.

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

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.

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.

ASSIGNMENTS AT-A-GLANCE

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

Proposed Genetics Lecture/Lab Schedule

Date	Topic	Reading	Labs	HW/Exam/LR
Mon, 8/17	DNA Structure (S)	**Ch. 10:** Fig 10.7 & 10.17	Mutagenesis: 1	
Wed, 8/19	DNA Replication (J/D)	***Ch 11**: p 252-67, 270-2		
Fri, 8/21	How do mutations affect proteins? (D)	***Ch 4**: p 78-79		DNA Replication HW
Mon, 8/24	Types of mutations (J)	**Ch 19**: p 461-464,465-468	Mutagenesis: 2 (S) (Group LR)	
Wed, 8/26	Mutations in biochemical pathways (S)	***Ch 13**: p 306-309		
Fri, 8/28	**EXAM 1: Transcription/Translation (S)**			**EXAM 1 – (in class)**
Mon, 8/31	How are mutations repaired? (J)	**Ch 19:** p 470-475,481-484	Drosophila: 1	Pathway HW
Wed, 9/2	Meiosis (D)	***Ch 3**: p 46-62		Mutation HW
Fri, 9/4	Principle of Segregation (S)	***Ch 2**: p 18-26		**LR 1- Mutagenesis**
Mon, 9/7	Principle of Independent Assortment (D)	***Ch 2**: p 26-35	**No Lab (extra time to study for exam)**	Meiosis HW
Wed, 9/9	Hypothesis Testing (D)	**Ch 2**: p 36-38		Mendel HW
Fri, 9/11	Genes on Sex Chromosomes (J)	**Ch 3**: p 64-70; **Ch 4**: p 86-88		
Mon, 9/14	EXAM REVIEW (S)		Drosophila: 2 (S)	**Exam 2**
Wed, 9/16	How is gender determined (S)	**Ch 3:** p 66-68; **Ch 5:** p 106-110		
Fri, 9/18	What Mendel didn't know (J)	**Ch 4**: p 81-86, 90		Hypothesis Testing HW
Mon, 9/21	Complementation (S)	***Ch 4**: p 92-93	Yeast: 1 (S)	Sex-linked HW
Wed, 9/23	Gene Interaction (D)	***Ch 4**: p 92-95		
Fri, 9/25	Evidence for Linked Genes (D)	**Ch 6**: p 127-8		Ext. of Mendel HW
Mon, 9/28	Mapping of 2 Linked Genes (J)	***Ch 6**: p 129-135	Yeast: 2 (S) (Group LR)	
Wed, 9/30	Mapping of 3 Linked Genes (S)	**Ch 6**: p 135-141		
Fri, 10/2	Mapping of 3 Linked Genes (J/D)	**Ch 6**: p 135-141		
Mon, 10/5	Microorganisms in biotechnology (J)	***Ch 22**: p 539-542	Drosophila: 3 (S) (Individual LR)	Mapping HW
Wed, 10/7	Genetically modified organisms (S)	***Ch 22**: p 542-546, 551-552		
Fri, 10/9	Stem cells & gene therapy (S)	**Ch 22**: p 546-551, 555-558		**LR 2 – Yeast**
Mon, 10/12	How do chromosomes mutate? (D)	**Ch 8**: p 177-184	**No Lab (extra time to study for exam)**	Biotech HW
Wed, 10/14	Clinical analysis of inversion (D)	**Ch 8**: p 187-192		**LR 3- Drosophila**
Fri, 10/16	How do chromosomal #s change? (J)	**Ch 8**: p 192-201		
Mon, 10/19	EXAM REVIEW (S)		**No Lab**	**Exam 3**
Wed, 10/21	How is the cell cycle regulated? (J)	***Ch 25**: p 624-631		
Fri, 10/23	What genes cause cancer? (S)	***Ch 25**: p 624-634		Chromosome HW
Mon, 10/26	How is cancer treated? (D)	**Ch 25**: p 634-636	Population Genetics: 1	
Wed, 10/28	Mitochondria and Human Disease (D)	***Ch 5**: p 116-121		Cancer HW
Fri, 10/30	Mitochondria &Human Migration (S)	**Supplement**		Mito HW1
Mon, 11/2	Population Genetics: Overview (J)	***Ch 27**: p 675-680	Population Genetics: 2(S) (Group LR)	
Wed, 11/4	Alleles in populations (S)	**Ch 27**: p 675-680		Mito HW2
Fri, 11/6	Predicting allele frequency in pops (J)	**Ch 27**: p 680-2, 685-686		
Mon, 11/9	Populations undergoing selection (D)	**Ch 27**: p 680-2, 685-686	HIV article (S- optional)	
Wed, 11/11	How is a phylogeny constructed? (J)	**Ch 29**: p 738-746		Population HW
Fri, 11/13	Gene Trees (S)	**Ch 29**: p 746-747		
Mon, 11/16	How are molecular clocks used (D)	***Ch 29**: p. 746-755	**No Lab (extra time to study for final exam)**	**LR 4 – Population Genetics**
Wed, 11/18	Human genomic data (S)	**Supplement**		
Fri, 11/20	Extra Credit			Molecular HW
Mon, 11/23	Thanksgiving Break Day Off	Happy Thanksgiving!		Extra Credit
Sun, 11/29	Review Session for Final Exam (S)			

* Quiz on Canvas

(S) synchronous session

(D) lecture by Dr. Dawne Page

(J) lecture by Dr. Jen Lineback