POINT LOMA NAZARENE UNIVERSITY

Biology Department

BIO1004 – Biotechnology & Society

4 Units

Fall (Quad I) 2021

Office Hour days: Thursday	**Instructor title and name:** Dr. Pieter Baker
Office Hour times: 11 AM	**Phone:** 760.670.5130
Meeting location: Prof. Baker's Zoom Room	**E-mail:** pbaker1@pointloma.edu
Final Exam: 2/12/2020	**Additional info:**

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

This course is an introduction to foundational concepts in biology with examination of current topics in biotechnology as they impact society, bioethics, and sustainable living. Course addresses the questions "What is biotechnology?", "How does it work?", and "How does it affect our lives?" Topics include genetic engineering, gene therapy, DNA fingerprinting, cloning, genetically modified organisms, antibiotic resistance, and biotechnologies related to SARS-CoV2/COVID-19 (e.g. mRNA vaccine technology and monoclonal antibody therapy). This course approach emphasizes the process of science, critical thinking, active learning, social relevancy, and building connections between case studies and general concepts of biology.

COURSE LEARNING OUTCOMES

Upon completing the course, you should be able to:

1. Articulate and synthesize ideas and information to others through written communication
2. Access and cite scientific information as well as evaluate the logic, validity, and relevance of information from a variety of sources
3. Examine and critique scientific information in order to arrive at reasonable conclusions
4. Solve problems that are quantitative in nature
5. Describe the function of DNA in the cell and how it is regulated, processed and synthesized
6. Explain various methods utilized in biotechnology and understand how scientific methods can be applied to improve the health of individuals and sustain our environment

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 8 weeks. Specific details about how the class meets the credit hour requirement can be provided upon request.

REQUIRED TEXTS AND RECOMMENDED STUDY RESOURCES

1. Text: *Biology: Science for Life with Physiology* ***along with MasteringBiology Access Card****.* Sixth Edition. Colleen Belk and Virginia Borden Maier, Pearson, 2019.
2. Plus Modified MasteringBiology with eText -- Access Card Package, Sixth Edition (Links to an external site.).

NOTE: This text is available as print or e-text. Be sure to acquire the ACCESS code through the Pearson website:

STATE AUTHORIZATION FOR ONLINE COURSES

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 using the below link to view which states allow online (distance education) outside of California. https://www.pointloma.edu/offices/office-institutional-effectiveness-research/disclosures

ASSESSMENT AND GRADING

Assessment	Total Points	% of Final Grade	Due Date(s)
Homework (10 points x 10)	100	10%	(8/31,9/3, 9/3, 9/10, 9/17, 9/17, 9/24, 10/1, 10/8, 10/15)
Life Application Assignments (10 points x 7)	70	7%	(9/1, 9/8, 9/15, 9/22, 9/29, 10/6, 10/13)
Current Events (50 points x 2)	100	10%	(9/8, 9/22)
Quizzes (10 points x 10)	100	10%	(8/31, 9/3, 9/3, 9/10, 9/17, 9/24, 10/1, 10/7, 10/15)
Discussion Activities (20 points x 6)	120	12%	(9/3, 9/10, 9/17, 9/24, 10/1, 10/8)
COVID-19 Peer Teaching Assignment	140	14%	(9/1, 9/29, **10/8**, 10/15)
Exam 1	100	10%	(9/13)
Exam 2	120	12%	(10/4)
Final Exam	150	15%	(10/18)
Total	1000		

Grade Distribution	
A=93-100	C=73-76
A-=92-90	C-=70-72
B+=87-89	D+=67-69
B=83-86	D=63-66
B-=80-82	D-=60-62
C+=77-79	F=0-59

INCOMPLETES AND LATE ASSIGNMENTS

All assignments are to be submitted/turned in by 11:59 PM PST (unless noted otherwise) on the date when they are due —including assignments posted in Canvas. Incompletes will only be assigned in extremely unusual circumstances.

FINAL EXAMINATION POLICY

Successful completion of this class requires taking the final examination **on its scheduled day (10/18/2021)**. The final examination schedule is posted on the Canvas site. Requests for early examinations or alternative days may not be approved.

NOTE: The following policies are to be used without changes:

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.

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.

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 (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.

PLNU ATTENDANCE AND PARTICIPATION POLICY

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 can file 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.

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.

Note: Fully online courses

Students taking online courses are expected to attend each week of the course. Attendance is defined as participating in an academic activity within the online classroom which includes posting in a graded

activity in the course. (Note: Logging into the course does not qualify as participation and will not be counted as meeting the attendance requirement.)

Students who do not attend at least once in any 3 consecutive days will be issued an attendance warning. Students who do not attend at least once in any 7 consecutive days may be dropped from the course retroactive to the last date of recorded attendance.

Students who anticipate being absent for an entire week of a course should contact the instructor in advance for approval and make arrangements to complete the required coursework and/or alternative assignments assigned at the discretion of the instructor.

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.

COURSE SCHEDULE AND ACTIVITIES

Readings and Lecture Videos - Selected readings from the textbook will be supplemented by video lectures and other instructional course materials to be posted on Canvas. All course materials are delivered asynchronously. Students are expected to review reading and lecture materials for that week on the days indicated on the course schedule (typically Monday/Tuesday). Each week, a detailed overview of selected readings, lectures and all assignments for the week will be posted on Canvas.

Homework (100 points) – All homework assignments are due by 11:59 PM PST on the scheduled due date. All homework prompts will be posted on Canvas, including links to the Pearson MasteringBiology assignment.

Life Application Assignments (70 points) – These weekly assignments involve a brief reading (scripture, poem, etc) and an introspective reflection by the student. They are designed to encourage thoughtful exploration of one's own faith and lived experiences within the context of the course. All life application discussions are conducted on Canvas and due by 11:59 PM PST each week on Wednesdays.

Current Events (100 points) - These one-page write ups are worth 50 points each. You can find any recent article from a reputable newspaper or media publication (NY Times, LA Times, Scientific American, JAMA, STATnews, etc.) which addresses an issue in biotechnology. The questions you should address in your write up are posted on Canvas. These submissions are to be done on Canvas and are due by 11:59 PM PST on the corresponding due dates (9/8, 9/22)

Quizzes (100 points) - You will have an opportunity to answer a few multiple choice questions related to the course material (n=10, 10 points each), an initial state authorization verification survey, and a final quiz on the peer-teaching projects. The quizzes are open note and are to be conducted on Canvas with a time limitation and completed by 11:59 PM PST on the due date (typically Fridays).

Discussion Activities (120 points) - These weekly small group discussion activities involve group work related to the course material and problem solving to be conducted on Canvas discussion boards. Discussion activities (n=6, 20 points each) typically involve an original post due on wednesday (10 points each) and engagement/responses to other student posts by Friday of that week (10 points).

COVID-19 Peer Teaching Assignment (140 points) - You will work in groups to examine a specialized topic related to COVID-19 and relevant biotechnologies and present to the rest of the class teaching them this specialized topic. You will prepare instructional materials (brief lecture with visual aids) to be presented by your discussion group on Canvas (100 points). Your own learning and their learning will be assessed in a quiz taken at the conclusion of your discussion (20 points). Additionally, your peer teaching participation will be evaluated by your group members via a peer teaching assessment form (20 points). Thorough instructions can be found on Canvas. Topics are all related to COVID-19 and include: mRNA vaccines, tests for identifying SARS-CoV2, monoclonal antibody therapies, etc. Brief (~10 min) one-on-one meetings (via zoom) between each student group and the instructor will be held between (10/5 – 10/7) to provide instructor support and feedback for students as they develop their peer teaching materials. The peer teaching presentation is due by Friday, 10/18 and the peer teaching quiz and assessments are due by Friday, Oct 15 by 11:59 PM PST.

Exams (370 points) – All exams will be conducted on Canvas, are open note and cumulative. You can expect 100 points to be based upon the new material, and the remainder of the points to be based upon previous material. Exam 1 (9/13) is worth 100 pts, Exam 2 (10/4) is worth 120 pts and the Final Exam (10/18) is worth 150 pts.

Extra Credit – Extra Credit assignments will be made available throughout the course. Completion of relevant chapter study modules from the textbook will earn extra credit points toward the exam. Additional extra credit opportunities covering topics in biotechnology and society will be made available throughout the course to earn extra credit points towards the final grade. All extra credit opportunities will be completed on Canvas by 11:59 PM PST on the assigned due date

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	8/29/2021	8/30/2021	8/31/2021	9/1/2021	9/2/2021	9/3/2021	9/4/2021
Week 1			History of Biotech and the Process of Science State Authorization Verification Intro to MasteringBiology	Listen to your life Peer Teaching Group Selection	Office Hours	Quiz - History of Biotechnology HW - History of Biotech Quiz - Process of Science HW - MasteringBiology (CH1)	
			Group Discussion: Art of Observation				
	9/5/2021	9/6/2021	9/7/2021	9/8/2021	9/9/2021	9/10/2021	9/11/2021
Week 2		Labor Day Holiday	Life at the Cellular, Molecular, and atomic level	Psalm 61:1,2 Current Event #1	Office Hours	Quiz - H20, Biochem & Cells HW - MasteringBiology (CH2,3)	
			Group Discussion: Designing a Concept Map				
	9/12/2021	9/13/2021	9/14/2021	9/15/2021	9/16/2021	9/17/2021	9/18/2021
Week 3		Exam 1 Ch 1/2 Study Module Animal v Bacteria Cell Worksheet EC - Animations of Unseeable Biology	DNA, Cell Division & Cancer (Ch 6)	Phantom Tollbooth Peer Teaching Outline/Bibliography	Office Hours	Quiz - DNA synthesis, Mitosis HW - MasteringBiology (CH6,7) Cell Structure Hierarchy	
			Group Discussion: TBD Meiosis/Mitosis Problems				
	9/19/2021	9/20/2021	9/21/2021	9/22/2021	9/23/2021	9/24/2021	9/25/2021
Week 4		Mendelian Genetics & DNA Profiling EC - Henrietta Lacks		CS Lewis Current Event #2	Office Hours	Quiz - Genetics HW - MasteringBiology (CH8,9)	
		Group Discussion: Coin Toss Meiosis					
	9/26/2021	9/27/2021	9/28/2021	9/29/2021	9/30/2021	10/1/2021	10/2/2021
Week 5		Genetically Modified Organisms EC - Epigenetics		Mary Oliver Peer Teaching Quiz Questions Due	Office Hours	Quiz - Cloning HW - MasteringBiology (CH10)	
		Group Discussion: CRISPR to treat Zika Virus					
	10/3/2021	10/4/2021	10/5/2021	10/6/2021	10/7/2021	10/8/2021	10/9/2021
Week 6		Exam 2 EC - 6,8,10 study modules	Natural Selection, infections & Abx Resistance	Wendell Berry's Manifesto	Office Hours	Quiz - Antibiotic resistance HW - MasteringBiology (CH12)	
			Group Discussion: COVID Peer Teaching Project - Meetings with Instructor			**Peer Teaching Presentations Due**	
	10/10/2021	10/11/2021	10/12/2021	10/13/2021	10/14/2021	10/15/2021	10/16/2021
Week 7		COVID-19 Presentations EC - Infections & Society Peer Teaching Presentations		COVID Life Application Peer Teaching Assessments	Office Hours	COVID Assignment Peer Teaching Quiz Due	
	10/17/2021	10/18/2021	10/19/2021	10/20/2021	10/21/2021	10/22/2021	10/23/2021
Week 8		Final Exam EC - ch 12 study module Old EC (1/2 credit)	END OF QUAD I				

Key (Activity Type)	Point Distribution
Read/Watch	
Homework	10%
Life Application	7%
Group Discussion	12%
Quiz	10%
Peer Teaching Project	14%
Extra Credit	
Exams	38%
Office Hours	

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