



**Department of Kinesiology**  
**KIN 3027 Applied Biomechanics**  
**2 Units**

**Fall 2019 (Quad II)**

<b>Meeting days:</b> T TR	<b>Instructor:</b> Arnel Aguinaldo, PhD, ATC
<b>Meeting times:</b> 10:00AM-11:45AM (Section 1) 12:30PM-2:15PM (Section 2)	<b>Phone:</b> 619-849-3007
<b>Meeting location:</b> KIN 1	<b>E-mail:</b> arnelaguinaldo@pointloma.edu
<b>Prerequisites:</b> KIN 325	<b>Office hours:</b> R 3:00-5:00PM 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 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**

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This class is designed to provide students with a mix of theoretical concepts and applied problem-solving in various biomechanical applications in human movement. Through the core math, physics, kinesiology, and anatomy classes students have taken to this point, you have been provided a breadth of information that will serve you in learning the basic concepts of kinematics and kinetics of whole body and joint movement.

**COURSE LEARNING OUTCOMES**

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1. Students will use the vocabulary, principles and relationships unique to the disciplines of applied biomechanics.
2. Students will apply the basic principles of kinematics in quantifying and describing joint movement.
3. Students will identify the concepts of linear and angular kinetics and their effects on human movement.
4. Students will be exposed to various technology and methods employed to quantitatively measure joint kinematics and kinetics
5. Students will use biomechanical techniques to evaluate joint movement in clinical-decision making and analyzing human performance
6. Students will qualitatively apply the fundamental principles of biomechanics in identifying the movement patterns in basic clinical applications.
7. Students will collaborate in biomechanics laboratory sessions.

## REQUIRED TEXTS AND RECOMMENDED RESOURCES

- McLester, J., St. Pierre, P. (2019). *Applied Biomechanics. Concepts and Connections*. (2<sup>nd</sup> Edition). Burlington, MA: Jones & Bartlett Learning.
- Handouts will be provided throughout the quad via Canvas.
- *CourseKey* Student Response app (web: <http://thecoursekey.com>): This class will be using *CourseKey*, which is a classroom communication and management system that will be used for regular attendance, in-class assessments and polls, activities, and constructive dialogue. Please download the *CourseKey* iOS or Android application (recommended) or use it through your web browser on any smartphone, tablet, or laptop. To add this class, please search for your professor's name or by adding our Course Join Code.

## ASSESSMENT AND GRADING

- **Assignments:** There will be three assignments worth 10 points each to be scheduled throughout the quad. These assignments will vary in difficulty depending on the unit covered in class but they provide an excellent review for the exams. Problems from each assignment will be discussed in class on the respective due date. (30 pts total)
- **Mid-Term Exam:** A mid-term exam will be administered via Canvas on November 21, 2017 and will consist of multiple choice and T/F questions, covering the fundamentals of linear and angular biomechanics of motion. (60 pts total)
- **Final Exam:** A comprehensive exam will be administered on the scheduled final exam date consisting of multiple choice and T/F questions, addressing material covered the entire quad. (120 pts total)
- **Lab Report:** A gait analysis lab session will be held in Week 8 in which students will have the opportunity to perform a basic gait analysis using the 3D motion analysis system in the Kinesiology Biomechanics Lab. A lab guide will be posted on Canvas in Week 7. (60 pts total)
- **Participation:** Participation in both online and in-class discussions is paramount to learning the material and for engagement with the class. The *CourseKey* survey app will be used for this class. A maximum of 30 points can be earned from *CourseKey* participation. Each student receives one *CourseKey* point for each question answered and an additional point for the correct answer. At the end of the quad, points are normalized to the maximum of 30 points. For example, if the total points for *CourseKey* and Discussion participation at the end of the quad is 150, a student who earns 125 *CourseKey* points will receive 25 participation points ( $125/150 \times 30 = 25$  points). If you do not attend class, you receive 0 participation points for that day. (30 pts total)

ASSESSMENT	POINTS	COURSE OBJECTIVES
Mid-Term Exam	60	1,2,3
Final Exam	120	1,2,3,4,5,6
Assignments	30	1,2,3,5,6
Lab Report	60	1-7
Participation	30	1,2,3,6,7
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Total	300	

POINTS	GRADE	POINTS	GRADE
278-300	A	224-232	C
269-277	A-	215-223	C-
260-268	B+	206-214	D+

251-259	B	197-205	D
242-250	B-	188-196	D-
233-241	C+	0-187	F

## **PLNU ATTENDANCE AND PARTICIPATION**

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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. If the date of de-enrollment is past the last date to withdraw from a class, the student will be assigned a grade of W or WF consistent with university policy in the grading section of the catalog. Although attendance will be rarely taken, there is a strong negative correlation between number of absences and grade percentage in this class.

## **INCOMPLETES AND LATE ASSIGNMENTS**

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- All assignments are to be submitted/turned in via Canvas by the beginning of the class session when they are due.
- Late work (turned in any time after the due date and time) may be turned in until the last day of class, for a maximum of 50% credit (this is still a failing grade but is better than zero points).
- Missed exams may ONLY be made up with a legal, written excuse. A missed exam for an approved reason MUST be completed prior to returning to the next class meeting.

## **PLNU ACADEMIC DISHONESTY**

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Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. As stated in the university catalog, "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. Such acts include plagiarism, copying of class assignments, and copying or other fraudulent behavior on examinations. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for a) that particular assignment or examination, and/or b) the course." See [Academic Policies](#) in the undergrad student catalog.

## **PLNU ACADEMIC ACCOMMODATIONS POLICY**

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While all students are expected to meet the minimum academic standards for completion of this course as established by the instructor, students with disabilities may require academic accommodations. At Point Loma Nazarene University, students requesting academic accommodations must file documentation with the [Disability Resource Center](#) (DRC), located in the Bond Academic Center. Once the student files documentation, the Disability Resource Center will contact the student's instructors and provide written recommendations for reasonable and appropriate accommodations to meet the individual needs of the student. See [Academic Policies](#) in the undergrad student catalog. 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.

## **FERPA POLICY**

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In compliance with federal law, neither PLNU student ID nor social security number should be used in publically posted grades or returned sets of assignments without student written permission. This class will meet the federal requirements by (each faculty member choose one strategy to use: distributing all grades and papers individually; requesting and filing written student permission; or assigning each student a unique class ID number not identifiable on the alphabetic roster.). Also in compliance with FERPA, you will be the only person given information about your progress in this class unless you have designated others to receive it in the "Information Release" section of the student portal. See [Policy Statements](#) in the undergrad student catalog.

## **FINAL EXAMINATION POLICY**

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Successful completion of this class requires taking the final examination **on its scheduled day**. No requests for early examinations or alternative days will be approved.

## **PLNU COPYRIGHT POLICY**

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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.

## **USE OF TECHNOLOGY**

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Point Loma Nazarene University encourages the use of technology for learning, communication, and collaboration. It is the responsibility of the student to confirm access to the essential applications needed for the class such as Excel as well as standard online research tools.

## COURSE SCHEDULE AND ASSIGNMENTS

Updated 10/15/2019 (schedule is subject to change depending on students and instructor's needs)

MODULE	DATE	TOPIC	MATERIALS	DUE
1	10/29 11/1	Introduction to Biomechanics System and Motion Description	Canvas: Math Review Videos, Physics Review Videos <b>Module 1 Discussion</b> Text: pp. 1-17, 22-51	
2	11/5 11/7	Qualitative Motion Analysis Quantitative Motion Analysis Vector Resolution	<b>Module 2 Discussion</b> Text: pp. 60-83	<b>Discussion 1</b>
3	11/12 11/14	Linear Motion Newtonian Mechanics Linear Motion: Kinematics & Kinetics	Text: pp. 103-110 <b>Assignment 1: Linear Motion</b> Text: pp. 130-134, 145-153 Canvas: Acceleration module	<b>Discussion 2</b> <b>Assignment 1</b> (submit before class)
4	11/19 11/21	Angular Motion: Kinematics & Kinetics Angular Motion Review	Text: pp. 182-202 <b>Assignment 2: Angular Motion</b>	
5	<b>11/26</b>	<b>Mid-Term Exam (Canvas)</b>		<b>Assignment 2</b>
	<b>11/28</b>	<b>No Class</b>	<b>Happy Thanksgiving!</b>	
6	12/3 12/5	Projectiles Work-Energy	Canvas: Projectile Module Text: pp. 161-168, 309-328 Canvas: Energy module <b>Assignment 3: Projectiles, Energy</b>	
7	12/10 12/12	Gait Analysis Movement Analysis Lab Review	Text: pp. 109, 242 Canvas: Gait Analysis module, Lab report template	<b>Assignment 3</b> (submit before class)
	12/17 12/19	<b>Final Exam (section 1)</b> <b>Final Exam (section 2)</b>		<b>Lab Report</b>

**HAVE A BLESSED CHRISTMAS & A HAPPY NEW YEAR!**