



Department of Kinesiology

KIN 6015 - Biomechanical and Neurological Basis of Human Movement

3 Units

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Spring 2026 | Quad 1

January 12 - March 8, 2026

In-Person

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**Meeting Days:** Tuesday / Thursday

**Meeting Times:** 5:30 - 8:00 pm

**Meeting Location:** BAL 150 + Biomechanics Lab

**Final Exam: (Day/Time):** Final Exam, March 8, 2026

**Instructor:** [Arnel Aguinaldo, PhD, ATC, CPSS, FACSME \("Dr. A"\)](#)

**Email:** [aaguinal@pointloma.edu](mailto:aaguinal@pointloma.edu)

**Office Hours:** [Appointment Book](#)

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### 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.

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### Course Description

This class focuses on various kinematic, kinetic, and neuromuscular concepts and how they are used in the qualitative and quantitative analysis of human movement. This course is designed for advanced study in 3D motion analysis and electromyography techniques. The intent of this course is to provide students with an extensive knowledge concerning quantitative analysis of human motion and the

concepts and equipment to collect objective quantifiable data to be used for clinical or research purposes.

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### **Course Learning Outcomes**

1. You will apply the basic principles of kinematics in quantifying and describing joint movement.
  2. You will identify the concepts of linear and angular kinetics and their effects on human movement.
  3. You will demonstrate knowledge of basic neuromuscular mechanisms relevant to joint motion and ways to evaluate them through electromyographic (EMG) methods.
  4. You will implement proper techniques involved in the set-up, data collection, data analysis, and interpretation of 3D motion analysis.
  5. You will implement proper techniques involved in the set-up, data collection, data analysis, and interpretation of surface electromyography (EMG).
  6. You will communicate effectively through written and oral formats the quantitative analysis of selected movement tasks through biomechanical and EMG analysis.
  7. You will demonstrate a comprehensive understanding of human movement through kinematic, kinetic, and EMG analysis.
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### **Program Learning Outcomes**

The Point Loma Nazarene University MS-KIN graduate will be able to:

1. Appraise current research data in Kinesiology and integrate it into professional practice to solve relevant problems and make effective decisions.
  2. Work independently and with a team to persuasively communicate essential information in their discipline.
  3. Demonstrate appropriate breadth of knowledge of the background and principle research in their specialization in order to conduct an independent research project.
  4. Serve various populations, integrating compassionate care and the Christian faith with their professional practice.
  5. Pursue an active and growing involvement in their discipline by achieving advanced certification and/or membership in a related professional organization.
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### **Institutional Learning Outcomes**

**1. Learning, Informed by our Faith in Christ**

Students will acquire knowledge of human cultures and the physical and natural world while developing skills and habits of the mind that foster lifelong learning.

**2. Growing, in a Christ-centered Faith Community**

Students will develop a deeper and more informed understanding of others as they negotiate complex professional, environmental, and social contexts.

**3. Serving, in a Context of Christian Faith**

Students will serve locally and/or globally in vocational and social settings.

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**Required Texts and Recommended Study Resources**

**REQUIRED RESOURCES**

- [Uchida, T. & Delp, S. \(2020\). \*Biomechanics of Movement\*. Cambridge, MA: The MIT Press.](#)
- [QAcademy training videos and guides](#) (Qualisys, Göteborg, Sweden)
- [Theia3D guides](#) (Theia Markerless, Kingston, ON)
- *Trigno EMG System User's Guide* (Delsys, Natick, MA)
- Coding Interface: [Google Colab](#)
- Visual3D Tutorials
- Handouts will be provided throughout the quad via Canvas.

**RECOMMENDED RESOURCES**

- Cleather, D. (2021). *Force: The Biomechanics of Training*. Prague, Czech Republic: KMA Press
- Enoka, R. (2015). *Neuromechanics of Human Movement*. Fifth Edition. Champaign, IL: Human Kinetics.
- Lieber, R. (2010). *Skeletal Muscle Structure, Function, and Plasticity*. Baltimore, MD: Williams & Wilkins.
- Perry, J. (1992). *Gait Analysis: Normal and Pathological Function*. Thorofare, NJ: Slack Incorporated.
- Robertson, et al. (2014). *Research Methods in Biomechanics. Second Edition*. Champaign, IL: Human Kinetics.

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This course also utilizes the following online tools (free of charge for students) to facilitate student engagement and enhance your learning experience:

- - Zoom video conferencing will be used for synced meetings and virtual office hours

*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. All supplemental materials posted on this course site (including articles, book excerpts, or other documents) are provided for your personal academic use. These materials may be protected by copyright law and should not be duplicated or distributed without permission of the copyright owner.*

Note: Students are responsible for having the required textbooks prior to the first day of class. Students are also encouraged to begin reading the books in preparation for the class as soon as possible.

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### **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 3-unit class delivered over 8 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 112.5 total hours meeting the course learning outcomes. The time estimations are provided below and in the Canvas modules.

It is anticipated that students will spend a minimum of 50 participation hours per credit hour on their course work. As a graduate course, students can expect the work in this class to be significant, and students should plan on spending 18-22 hours a week engaged in the course. The estimated time expectations for this course are shown below:

### **Course Credit Hours**

| <b>Assignments</b>                                       | <b>Pre-Course Hours</b> | <b>Course Hours</b> | <b>Post-Course Hours</b> |
|--|-------------------------|---------------------|--------------------------|
| <b>Online Participation in discussions, groups, etc.</b> | --                      | <b>50</b>           | --                       |
| <b>Writing</b>   | --                      | <b>50</b>           | --                       |
| <b>Other assignments and learning activities</b>         | <b>1</b>                | <b>40</b>           | <b>1</b>                 |
| <b>Exams and Quizzes</b>                                 | --                      | <b>8</b>            | --                       |

|                           |            |
|---------------------------|------------|
| <b>Total Course Hours</b> | <b>150</b> |
|---------------------------|------------|

### **COURSE ASSIGNMENTS**

**In-Video Quizzes:** There will be multiple in-video quizzes worth 5 points each to be scheduled throughout the quad using Canvas Studio. These quizzes will vary in difficulty depending on the readings covered in class but they gauge your knowledge of the material to be discussed in class.

**Mid-Term Exam:** A mid-term exam will be administered via Canvas in Week 5 and will consist of multiple choice, T/F, and essay type questions, covering the fundamentals of linear and angular biomechanics of motion as well as muscle mechanics.

**Final Exam:** A “take-home” comprehensive exam will be administered on the scheduled final exam date consisting of multiple-choice, T/F, and essay type questions, addressing material covered over the entire course. The exam will be available the week before it is due.

**Lab Reports:** There will be 6 labs total throughout the course. These sessions will give you hands-on experience in using state-of-the-art motion analysis, force plate, and surface EMG systems. Your performance in each lab will be assessed with a one-page report to be submitted the week after the lab, worth 10 points each.

**Team Pilots:** You will be assigned to a team of 6-7 students, with whom you will collaborate on discussions and a research pilot throughout the course. The pilot will involve collecting data with the systems in the Biomechanics Lab (one team is physically allowed in the lab at a time at designated times) as well as data analysis, interpretation, and write-up. Topics may include, but not limited to, gait analysis, throwing, footwear testing, and kicking. This pilot is a great opportunity to test out the methods to be implemented for your thesis or capstone project. Each team will be required to submit a written manuscript and present a brief talk on your pilot.

**Participation:** Included as part of this grade are live in-class discussions as well as the three discussion boards (weeks 2, 4, 6) related to your group's pilot study.

### **Assessment and Grading**

#### *Weighted Grades*

Each assignment/assessment category below is worth a certain percentage of the total grade (100%) for the course, as specified in the following table:

#### **Course Assignments**

| <b>ASSESSMENT</b> | <b>PERCENTAGE OF TOTAL GRADE</b> | <b>COURSE OBJECTIVES</b> |
|-------------------|----------------------------------|--------------------------|
|-------------------|----------------------------------|--------------------------|

|                         |            |                  |
|-------------------------|------------|------------------|
| <b>In-Video Quizzes</b> | <b>15</b>  | <b>1,2,3,7</b>   |
| <b>Mid-Term Exam</b>    | <b>15</b>  | <b>1,2,3,</b>    |
| <b>Final Exam</b>       | <b>25</b>  | <b>1,2,3,5,7</b> |
| <b>Lab Reports</b>      | <b>10</b>  | <b>3,4,5</b>     |
| <b>Pilot</b>            | <b>25</b>  | <b>1-7</b>       |
| <b>Participation</b>    | <b>10</b>  | <b>1-7</b>       |
| -----                   | -----      |                  |
| <b>Total</b>            | <b>100</b> |                  |

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The following grading scale will be used for all exams and final course grades:

**Course Grading Schema**

| <b>GRADE</b> | <b>MAX</b>   | <b>MIN</b>      |
|--------------|--------------|-----------------|
| <b>A</b>     | <b>100 %</b> | <b>to 94.0%</b> |

|           |                    |                 |
|-----------|--------------------|-----------------|
| <b>A-</b> | <b>&lt; 94.0 %</b> | <b>to 90.0%</b> |
| <b>B+</b> | <b>&lt; 90.0 %</b> | <b>to 87.0%</b> |
| <b>B</b>  | <b>&lt; 87.0 %</b> | <b>to 84.0%</b> |
| <b>B-</b> | <b>&lt; 84.0 %</b> | <b>to 80.0%</b> |
| <b>C+</b> | <b>&lt; 80.0 %</b> | <b>to 77.0%</b> |
| <b>C</b>  | <b>&lt; 77.0 %</b> | <b>to 74.0%</b> |
| <b>C-</b> | <b>&lt; 74.0 %</b> | <b>to 70.0%</b> |
| <b>D+</b> | <b>&lt; 70.0 %</b> | <b>to 67.0%</b> |
| <b>D</b>  | <b>&lt; 67.0 %</b> | <b>to 64.0%</b> |
| <b>D-</b> | <b>&lt; 64.0 %</b> | <b>to 61.0%</b> |
| <b>F</b>  | <b>&lt; 61.0 %</b> | <b>to 0.0%</b>  |

Students must complete the required program hours in the major (program) from Point Loma Nazarene University with a minimum grade of “C” in each course and an overall 2.00 grade point average. It is important to read the comments posted in the gradebook as these comments are intended to help students improve their work. Final grades will be posted by the due date as posted in the Academic Calendar.

### **Content Warning**

I acknowledge that each of you comes to PLNU with your own unique life experiences. This contributes to the way you perceive various types of information. In this course, all of the class content, including that which may be intellectually or emotionally challenging, has been intentionally curated to achieve the learning goals for this course. The decision to include such material is not taken lightly. These topics include pathological movement, epidemiology, and injury etiology. If you encounter a topic that is intellectually challenging for you, it can manifest in feelings of discomfort and upset. In response, I encourage you to come talk to me or your friends or family about it. Class topics are discussed for the sole purpose of expanding your intellectual engagement in the area of sports medicine, and I will support you throughout your learning in this course.

### **Trigger Warning**

I acknowledge that each of you comes to PLNU with your own unique life experiences. This contributes to the way you perceive several types of information. In this course, we will cover a variety of topics, some of which you may find triggering. These topics include pathological movement, epidemiology, and

injury etiology. Each time this topic appears in a reading or unit, it is marked on the syllabus. The experience of being triggered versus intellectually challenged are different. The main difference is that an individual must have experienced trauma to experience being triggered, whereas an intellectual challenge has nothing to do with trauma. If you are a trauma survivor and encounter a topic in this class that is triggering for you, you may feel overwhelmed or panicked and find it difficult to concentrate. In response, I encourage you to take the necessary steps for your emotional safety. This may include leaving class while the topic is discussed or talking to a therapist at the Counseling Center. Should you choose to sit out on discussion of a certain topic, know that you are still responsible for the material; but we can discuss if there are other methods for accessing that material, and for assessing your learning on that material. Class topics are discussed for the sole purpose of expanding your intellectual engagement in the area of sports medicine, and I will support you throughout your learning in this course.

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### **Incompletes and Late Assignments**

All assignments are to be submitted/turned in by the beginning of the class session when they are due—including assignments posted in Canvas. Incompletes will only be assigned in extremely unusual circumstances.

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### **PLNU Spiritual Care**

#### ***Balboa Campus***

PLNU strives to be a place where you grow as a whole person. To this end, we provide resources for our graduate students to encounter God and grow in their Christian faith. At the Balboa campus, we have an onsite chaplain, Rev. Kevin Portillo, who is available during class break times across the week. If you have questions or a desire to meet or share any prayer requests with Rev. Portillo, you may contact him directly at [KevinPortillo@pointloma.edu](mailto:KevinPortillo@pointloma.edu).

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### **PLNU Copyright Policy**

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### **PLNU Recording Notification**

In order to enhance the learning experience, please be advised that this course may be recorded by the professor for educational purposes, and access to these recordings will be limited to enrolled students and authorized personnel.

Note that all recordings are subject to copyright protection. Any unauthorized distribution or publication of these recordings without written approval from the University (refer to the Dean) is strictly prohibited.

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### **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.

For all student appeals, faculty and students should follow the procedures outlined in the University Catalog. See [Graduate Academic and General Policies](#) for definitions of kinds of academic dishonesty and for further policy information.

During the first week of class, you will be asked to submit an Academic Honesty Verification Statement. Submitting the statement is a requirement of this course. By submitting the Academic Honesty Verification Statement, you will be verifying all assignments completed in this course were completed by you. Carefully review the Academic Honesty Statement below.

Statement: "In submitting this form, I am verifying all the assignments in this course will be completed by me and will be my own work."

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### **Artificial Intelligence (AI) Policy**

You are allowed to use Artificial Intelligence (AI) tools (e.g., ChatGPT, Gemini Pro 1.5, GrammarlyGo, Perplexity, etc) to generate ideas, but you are not allowed to use AI tools to generate content (text, video, audio, images) that will end up in any work submitted to be graded for this course. If you have any doubts about using AI, please gain permission from the instructor.

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### **PLNU Academic Accommodations Policy**

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities in accordance with the Americans with Disabilities Act (ADA). Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center (EAC@pointloma.edu or 619-849-2533). Once a student's eligibility for an accommodation has been determined, the EAC will work with the student to create an Accommodation Plan (AP) that outlines allowed accommodations. Professors are able to view a student's approved accommodations through Accommodate.

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. Accommodations are not retroactive so clarifying with the professor at the outset is one of the best ways to promote positive academic outcomes.

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. Students cannot assume that because they had accommodations in the past, their eligibility at PLNU is automatic. All determinations at PLNU must go through the EAC process. This is to protect the privacy of students with disabilities who may not want to disclose this information and are not asking for any accommodations.

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### **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.

If you (or someone you know) have experienced other forms of discrimination, you can find more information on reporting and resources at [PLNU's Nondiscrimination webpage](#).

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### **Sexual Misconduct and Discrimination**

Point Loma Nazarene University faculty are committed to helping create a safe learning environment for all students. 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 help and support are available through the [Title IX Office](#). Please be aware that under Title IX of the Education Amendments of 1972, it is 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 via our [Sexual Harassment and Discrimination Policy](#).

If you (or someone you know) have experienced other forms of discrimination or bias, you can find more information on reporting and resources via our [Nondiscrimination and Anti-harassment Policy](#).

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### **PLNU Attendance and Participation Policy**

Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. Therefore, regular attendance and participation in each course are minimal requirements.

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.

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. Acceptance of late work is at the discretion of the instructor and does not waive attendance requirements.

Refer to [Academic Policies](#) for additional details.

### ***Synchronous Attendance/Participation Definition***

For synchronous courses that have specific scheduled meeting times (including in-person, hybrid, and synchronous online courses), absences are counted from the first official meeting of the class regardless of the date of the student’s enrollment. For courses with specific attendance requirements, those requirements are outlined in the course syllabus.

Note: For synchronous courses with an online asynchronous week, refer to the Online Asynchronous Class Attendance policy listed below.

### ***Online Asynchronous Attendance/Participation Definition***

Students taking online courses with no specific scheduled meeting times are expected to actively engage throughout each week of the course. Attendance is defined as participating in an academic activity within the online classroom which includes, but is not limited to:

- Engaging in an online discussion
- Submitting an assignment
- Taking an exam
- Participating in online labs
- Initiating contact with faculty member within the learning management system to discuss course content

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

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## **Course Modality Definitions**

1. Online Courses: These are courses with class meetings where all instruction and interaction are fully online.
  1. Synchronous Courses: At least one class meeting takes place at a designated time.

2. Asynchronous Courses: All class meetings are asynchronous.
  2. Hybrid Courses: These are courses with class meetings that take place both in the classroom and online synchronously and/or asynchronously.
  3. In-Person Courses: These are courses that meet in person with the instructor and students in a physical classroom setting. With approval by the area dean, this may include up to 25% of qualified class interactions through a Learning Management System (such as Canvas).
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### Use of Technology

In order to be successful in the online or hybrid 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, microphone, or webcams compatible with their computer available to use. Please note that any course with online proctored exams requires a computer with a camera (tablets are not compatible nor allowable) to complete exams online.

Problems with technology do not relieve you of the responsibility of participating, turning in your assignments, or completing your class work.

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### GPS Academic Resources

PLNU offers the following free academic resources virtually for Graduate Professional Studies (GPS) Students. Visit myPLNU through the links below for more information.

- [The GPS Writing Center](#) offers:
  - **Zoom Writers Workshops offered each quad on a variety of helpful topics**
  - **One-to-one appointments with the Writing Coach**
  - **Microlearning YouTube Video Library for helpful tips anytime**
- [Research Help Guide](#) to help you start your research
  - The physical office is located on the third floor of the [Mission Valley Regional Center](#) off the student lounge
- [Academic Writing Resources Course](#): Found on your Canvas Dashboard, this course is non-credit with 24/7 access, no time limits, and self-paced content. [Watch a quick video run-through](#) and take time now to explore!
- [Grammarly](#): Students have unlimited FREE access to Grammarly for Education, a trusted tool designed to help enhance writing skills by providing real-time feedback, identifying areas for improvement, and providing suggestions. Grammarly's Generative AI is NOT available with our student accounts.

- **Tutoring**: Students have access to 24/7 live or scheduled subject tutoring through Tutor.com, including a Paper Drop-Off Service with feedback within 12 hours.