

<b>Course number</b>	U-LAS70 10002 SE50					
<b>Course title (and course title in English)</b>	ILAS Seminar-E2 :Discussions in Biomechanics and Biophysics ( バイオメカニクス・生物物理セミナー ) ILAS Seminar-E2 :Discussions in Biomechanics and Biophysics		<b>Instructor's name, job title, and department of affiliation</b>	Institute for Life and Medical Sciences Assistant Professor,KIM, Young Kwan		
<b>Group</b>	Seminars in Liberal Arts and Sciences		<b>Number of credits</b>	2	<b>Number of weekly time blocks</b>	1
<b>Class style</b>	seminar (Face-to-face course)	<b>Year/semesters</b>	2025・Second semester		<b>Quota (Freshman)</b>	12 (12)
<b>Target year</b>	Mainly 1st year students	<b>Eligible students</b>	For all majors		<b>Days and periods</b>	Wed.5
<b>Classroom</b>	3B, Yoshida-South Campus Academic Center Bldg. North Wing				<b>Language of instruction</b>	English
<b>Keyword</b>	Biophysics / Biomechanics / Functional adaptation / Skeletal physiology					
<b>[Overview and purpose of the course]</b>						
<p>May force be with you. This famous goodbye phrase from Star Wars summarizes the important roles physical forces like gravity and friction play in our daily life. Living systems including our bones, muscles, cells and even proteins in our body depend a lot on physical forces to function properly. For example, why do astronauts become osteoporotic after prolonged stay in space? How do plants orient their position to maximize contact with sunlight? In this seminar, we will discuss some of the ground breaking discoveries and technological advances integrating biology, physics, and chemistry. Specifically, we will explore the mechanisms in which living systems, including the human body, adapt to and utilize physical forces to survive and function normally, and sometimes, abnormally.</p>						
<b>[Course objectives]</b>						
<p>The ultimate goal of this seminar is to help students develop a multidisciplinary approach to scientific discussion and problem solving in life sciences and medicine.</p>						
<b>[Course schedule and contents)]</b>						
<p>Discussions in this seminar will center on the impact of physical forces on living systems, and adaptive responses of such systems to acting forces. Some selected discussion topics are listed below. Topics might be flexibly changed based on our interests.</p> <p>1) Recent exciting discoveries in science (3 weeks) We will begin the discussion series by exploring ground-breaking discoveries in biology, chemistry, physics and/or engineering, and discuss their impacts on the society. Through this session, we will learn how to obtain fundamental knowledges from scientific articles.</p> <p>2) Exploring interconnectivity between physics and biology (3 weeks) Discussions here will explore interesting phenomena involving the interaction between physical forces and living systems. We will discuss how living systems sense and react to physical forces in the environment. Specific examples of adaptations to forces in biology will be drawn from plants, animals, and even from the human body.</p>						
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3) Role of forces in the skeletal system (3 weeks)

Why do astronauts become osteoporotic after prolonged stay in space? This topic will look specifically into the role of physical forces in the skeletal system. We will discuss how bone architecture adapts to the mechanical environment from the perspective of interaction of forces, cells, and even molecules.

4) Biomechanical researches exploring disease treatments (3 weeks)

This topic will focus on the latest biomechanical researches that seek to understand disease development, and propose treatment strategy. Through this topic, we will discuss the role of multidisciplinary approaches in the advancement of life sciences and medicine, helping to develop a mindset to tackle complex problems in science with multidisciplinary solutions.

5) Student presentations and lecture review (2 weeks)

6) Feedback (1 week)

**[Course requirements]**

None

**[Evaluation methods and policy]**

Attendance and class participation: 60%, Discussions and presentations: 40%

**[Textbooks]**

Not used

**[References, etc.]**

( References, etc. )

Handouts may be given out.

**[Study outside of class (preparation and review)]**

Prior reading of scientific papers on topics to be discussed is recommended to enhance understanding.

**[Other information (office hours, etc.)]**

Office hours will be announced during class hours.