科目ナンバリング	U-LAS12 10003 LE57						
授業科目名 <英訳>	Fundamental Physics A-E2 Fundamental Physics A-E2			担当者所属 職名・氏名	医生物学研究所 助教　　金　英寛		
群	自然科学科目群			分野(分類)	物理学(基礎)	使用言語	英語
旧群	B群	単位数	2単位	週コマ数	1コマ	授業形態	講義（対面授業科目）
開講年度・開講期	2026・前期	曜時限	水4	配当学年	主として1回生	対象学生	理系向

[授業の概要・目的]

Focusing on classical mechanics, this lecture will introduce basic but important concepts in physics which are widely applied in other fields of natural sciences. Although prior knowledge of high school level physics will be advantageous, it is not absolutely necessary. Basic concepts and laws of classical mechanics will be introduced and expanded upon systematically.

[到達目標]

1) To understand basic concepts of Newtonian mechanics and how to apply them to various physical phenomena.
2) To nurture problem-solving skills in physics.
3) To develop abilities to relate classroom knowledge to observations in their daily physical phenomena.

[授業計画と内容]

In dealing with the following topics, particular attention will be given to their application in different fields of natural sciences and engineering.

1) KINEMATICS (3 weeks)
In this lecture, we will learn about vector description of motion, and how to systematically derive differential equations (including kinematic equations) of motions. Focus will be on kinematic description of representative motions such as projectile and circular motions without considering the masses, forces and energies involved.

2) NEWTON'S LAWS OF MOTION (3 weeks)
Newton's laws of motion form the core of classical mechanics and are the foundation of modern physics. As such, in this topic, we will dive into classical Newtonian mechanics, which is based on Newton's laws of motion. We will learn how to apply them to solve common problems related to representative force problems in nature.

3) MOMENTUM, WORK AND ENERGY (3 weeks)
This chapter will dig deeper into important concepts in physics, such as linear momentum, work-energy theorem, conservative/nonconservative forces, and potential energy. We will learn principles of conservation of linear momentum and energy by extending the Newton’s laws. Touching on specific examples, emphasis will be placed on systematic derivation and application of these important concepts.

4) GRAVITATION (2 weeks)
One of the goals of physics is to understand the gravitational force. Newton’s law of gravitation and gravitational potential energy will be explained and applied to relevant examples in dynamics. We will obtain deeper understanding of gravitation that we take for granted.

5) ROTATIONAL MOTION (3 weeks)

Fundamental Physics A-E2(2)へ続く↓↓↓

Fundamental Physics A-E2(2)

In this lecture, we will explore rotational motion and dynamics of rigid bodies. We will discuss the relationships between angular variables and translational variables. By introducing a concept of moment of inertia, we will learn rotational kinetic energy and apply Newton’s 2nd law to rotational problems. We will also learn principles of conservation of angular momentum by extending the Newton’s laws.

6) EXAM (1 week)

7) FEEDBACK (1 week)

[履修要件]

Knowledge of high school physics will be advantageous but not a requirement.

[成績評価の方法・観点]

Regular assignments:25%; End-term examination: 75%

[教科書]

使用しない

[参考書等]

（参考書）

David Halliday, Robert Resnick and Jearl Walker 『Fundamentals of Physics 12th Edition』 （Wiley） ISBN:9781119801160 （The eBook is available through Kyoto University's library. To find it, type the ISBN into the KULINE search bar.）

[授業外学修（予習・復習）等]

Students are encouraged to study introductory mathematics textbooks and other materials to ensure that they are comfortable with basic mathematical concepts such as calculus (differentiation and integration) which is useful for deriving equations of motion.

[その他（オフィスアワー等）]

Office hour will be announced during class.

[主要授業科目（学部・学科名）]

理学部