科目ナン	バリン	グ U-J	LAS12 10030 LE57												
授業科目 <英訳>	名 Elem Elem	Elementary Course of Physics B-E2 Elementary Course of Physics B-E2						当者所属 日・氏名 工学研究科			科	諸師 Arseniy Aleksandrovich , Kuzmin			
群	自然科学科目群				<b>}野(</b> 分類)							使用言語 英語			
旧群	B群	単位数	2単位		週コマ数	1 =	זר	マ 授業		形態	講員	講義(対面授		業科	·目)
開講年度・ 開講期	2024・後期		曜時限!	火2			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]

This course is oriented for those who did not learn physics in high school. This course follows the "Elementary Course of Physics A".

This course aims to teach the basics of physics and its methods. Some mathematical constructs are introduced from a simple physical picture. This course consists of two main topics: Thermodynamics and Electrostatics.

In Thermodynamics, ideas of heat, pressure, temperature, and order-disorder (entropy) are explained. For instance, some everyday experience, such as using an air conditioner, heating and cooling the air in the room, can be understood through thermodynamics.

In Electricity, electric charges and their interaction is explained. Have you experienced static electricity when taking off a sweater? Probably yes, then you've experienced the interaction between electric charges. Charging a smartphone does involve a flow of electric charges. In this part for the course you will get familiar with such phenomena.

# [到達目標]

Understanding of the main ideas in Thermodynamics and Electricity will give the listener the ability to make basic calculations and estimations of various phenomena surrounding us in the everyday life.

The main goal is to introduce students to the scientific method and physical thinking.

### [授業計画と内容]

The following topics are explained in this course:

- 1. Introduction to temperature and heat.
- 2. Heat conductance: why metals feel cool to touch, while plastics do not?
- 3. Microscopic view on the gas parameters: pressure, temperature, density.
- 5. How does order or disorder affects heat and temperature? Entropy and the second law of thermodynamics.
- 6. Machines based on heating and cooling: understanding how air conditioner and fridge work.
- 7. What is an electric charge?
- 8. The force of the interaction of charges: Coulomb law.
- 9. How to use vectors to explain interaction of charges: electric field.
- 10. Gauss' law: how not to do difficult calculations, but get an idea about the electric field.
- 11. Flow of charges: electric current.

14 lectures in total and one feedback class.

Elementary Course of Physics B-E2(2)へ続く

#### Elementary Course of Physics B-E2(2)

# [履修要件]

This course is for those students who did not select physics as the entrance examination subject.

[成績評価の方法・観点]

Evaluation will be based on: 10% attendance and participation 20% homework 20% quiz 50% final exam

### [教科書]

Halliday & Resnick <sup>F</sup>Fundamentals of physics (Wiley, 2014) ISBN: 978-1-118-23072-5 I. V. Savelyev <sup>F</sup>Physics, a general course, volume 1 ISBN:5-03-000900-0 I. V. Savelyev <sup>F</sup>Physics, a general course, volume 2 ISBN:5-03-000900-0

# [授業外学修(予習・復習)等]

Preparation for lectures will include revision of class materials and homework assignments. Detailed instructions will be given during the class.

[その他(オフィスアワー等)]