科目ナンバリング	U-LAS13 10031 LE60						
授業科目名 <英訳>	Chemistry for non-science majors I-E2 Chemistry for non-science majors I-E2			担当者所属 職名・氏名	化学研究所　講師　PINCELLA, Francesca		
群	自然科学科目群			分野(分類)	化学(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	木4	配当学年	全回生	対象学生	文系向

[授業の概要・目的]

As scientist Justus von Liebig used to say "everything is chemistry", therefore a basic understanding of chemistry is indispensable to interact with what surrounds us and to successfully navigate our daily lives. In this module, we will focus on a basic question: what is everything around us made up of?
In addition to learning the fundamentals of the atomic and molecular structure, the students will be introduced to one of the most important tools of the modern scientist, the scientific method. Furthermore, each topic will be followed by a brief discussion on its relevance in our everyday lives.
This course will embrace a "concept development study" where every chemical concept will be developed from the observation and analysis of experimental results followed by critical reasoning. The students are encouraged to actively participate in class and re-discover chemistry.

[到達目標]

This course has multiple goals: most importantly, over the course of the semester, the students will gain a basic knowledge of important chemical concepts using the “concept development study” approach, which is designed to foster the students’ critical thinking and creativity. According to this method, each topic is introduced by showing the experiments and sets of data that allowed various scientists to develop the fundamental laws of chemistry. In order to build the foundational knowledge of chemistry, the students will firstly become acquainted with the scientific method and the basic vocabulary of chemistry and will try to apply this method to develop chemistry concepts. The discussion of the scientific method will not only guide the students’ understanding of the most important discoveries and of the main laws of chemistry, but it will also encourage the students to improve their ability to interpret and discern the reliability of the scientific news and information we gather in our everyday lives. This learning objective will be reinforced by group activities and discussions in class.

[授業計画と内容]

This course consists of 14 lectures, exam and one feedback class.
1. What is chemistry? Why is it important? A basic introduction to the vocabulary of chemistry and the scientific method. (1 week)
2-4. Atomic weight and empirical formulas (3 weeks)
5-7. The atom (3 weeks)
8. Review of basic chemical concepts and mid-term exam (1 week)
9-10. The periodic table of elements: Mendeleev's observations and the periodic law. Properties of the elements. (2 weeks)
11-14. The molecular structure: isomers, chemical bonds, valence bond theory, and molecular orbital theory. (4 weeks)
15. Exam
16. Feedback（1 week）

At the end of each lesson, an "everyday chemistry" topic related to the main topic of the lesson will be introduced. Some of these topics are: natural versus synthetic compounds, sun and sunscreen, cosmetics,

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chemistry of baking, milk, butter and ice-cream, fireworks, and the periodic table of smartphone elements.

[履修要件]

At the beginning of the course, you do not need any specific prior knowledge of the topics of the course. All essential knowledge for the course will be provided as needed in class.

[成績評価の方法・観点]

Evaluation will be based on attendance, active class participation (quizzes and exercises in class, 10%), individual and group assignments ("science in the news" project, 20%), mid-term exam in class (exercises, 30%), and final exam in class (multiple-choice and open questions, 40%).

[教科書]

使用しない

[参考書等]

（参考書）

John S. Hutchinson 『Concept Development Studies in Chemistry』（OpenStax CNX）（https://repository.rice.edu/items/8c32df83-14ec-4bbb-ab49-d7452d95cffe）

Raymond Chang; Jason Overby 『Chemistry』（McGraw-Hill US Higher Ed ISE）ISBN:9781260289022

[授業外学修（予習・復習）等]

The students are encouraged to continuously revise the vocabulary and concepts introduced in previous classes. The students should submit the assignments regularly and take the weekly quizzes (in class) to confirm their progress and understanding.

[その他（オフィスアワー等）]

Office hours: online or in person meetings with the instructor can be requested (appointment by email or on LMS)

[主要授業科目（学部・学科名）]