

科目ナンバリング											
授業科目名 ＜英訳＞		Equilibrium and Energy-E2 :A Macroscopic Perspective of Chemistry Equilibrium and energy-E2 :A Macroscopic Perspective of Chemistry				担当者所属 職名・氏名		理学研究科 准教授 THUERMER , Stephan			
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	2024・前期		曜時限	月3		配当学年	主として1・2回生	対象学生	理系向		
【授業の概要・目的】											
There is a reason why your tea gets cold after a while or water boils at a defined temperature. Energy is the principal driving force of chemical reactions in nature, industrial processes, and of course your daily life. As it turns out, energy comes in many different forms, and follows fundamental laws of exchange and transformation, but never creation. In this course, we will study these laws, learn about the efficiency of energy exchange processes, and understand how energy is used to propel all the important processes in your daily life by considering concrete examples.											
【到達目標】											
After this course, students will have good understanding of the most basic thermodynamic laws and will be ready to proceed to more advanced studies on chemical kinetics and statistical mechanics. Students will also be able to understand the English terminologies and scientific expressions.											
【授業計画と内容】											
The course will cover the following topics, each in a 3 week time span: 1) The big picture: Introduction to thermodynamic systems and their states, and phases. We learn how processes in nature are controlled by a few simple properties, like pressure and temperature. 2) It gets hot: Temperature and its scales We ask “ What is temperature? ” and answer this question from various viewpoints. 3) Order and disorder: Phases, the phase diagram, and mixtures We discuss the changes substances undergo when varying thermodynamic properties. 4) One-way flow: Forms of energy, energy conservation and transformation We learn about different forms of energy, laws for energy flow and their application in daily life.											
【履修要件】											
特になし											
【成績評価の方法・観点】											
Preparing the homework (40%) Two short test during the lecture (20%) Final examination (40%)											
【教科書】											
使用しない No textbook is used. Lecture notes will be provided during class.											
【参考書等】											
（参考書） Peter Atkins, Julio de Paula 『Physical Chemistry』（Oxford University Press）ISBN:9780199697403（											
----- Equilibrium and Energy-E2 :A Macroscopic Perspective of Chemistry(2)へ続く -----											

(Topics from Part 1 - Thermodynamics) Always a good book to have for learning concepts in physical chemistry)

Horia Metiu 『Physical Chemistry: Thermodynamics』 (Taylor & Francis) ISBN:9780815340911 (Good book for learning to how to apply formulas to real problems and how to calculate properties)

Peter Atkins 『The Laws of Thermodynamics: A Very Short Introduction』 (Oxford University Press) ISBN:9780199572199 (A short and easy to understand book about general concepts)

Georg Job, Regina Rueffler 『Physical Chemistry from a Different Angle』 (Springer) ISBN:978-3-319-15666-8 (A good book for getting an intuitive introduction into thermodynamics)

[授業外学修 (予習・復習) 等]

Students are expected to review the lecture handouts after each class and look up unknown English terms themselves. Homework assignments need to be prepared before the next lecture. It is also encouraged to refer to additional sources of information (books, websites) for the specific topics. If something is unclear or difficult, the instructor can be asked at any time.

[その他 (オフィスアワー等)]

The lectures will be held in English, but some supporting material and explanations are also given in Japanese. Students are welcome to ask questions in English or Japanese during and after the class. Office hours are flexible. Appointments can be made directly or via email.