科目ナンバリング	U-LAS13 10004 LE60				
授業科目名<英訳>	Basic Physical Chemistry (thermodynamics)-E2 Basic Physical Chemistry (thermodynamics)-E2	担当者所属職名・氏名	工学研究科　講師　Nguyen Thanh Phuc		
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・後期	曜時限	水1	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]

Physical chemistry is the discipline that studies the basic concepts and principles of the formation of molecules and substances, the nature and characteristics of chemical bonds and molecular structures, chemical equilibrium, and reaction rates.
This course is designed as introductory physical chemistry, specifically aims to learn and understand the principles and applications of thermodynamics. The knowledge learned from this course will be the foundation for learning all areas of chemistry, including advanced-level physical chemistry, organic chemistry, and inorganic chemistry.

[到達目標]

- To understand important thermodynamic quantities including the entropy and the free energies
- To understand the laws of thermodynamics
- To understand the phases of substances and the associated phase transitions
- To be able to apply thermodynamics to physical and chemical equilibria

[授業計画と内容]

The following topics will be covered. The order of topics and subtopics and the number of weeks allocated to each topic is subject to change, depending on the students' understanding.

1. Introduction to thermodynamics [1 week]
2. Basic concepts of thermodynamics [1~2 weeks]
The system, the surrounding, thermodynamic states, state functions, work, heat, heat capacities, enthalpy
3. Gas, ideal and real gases [1~2 weeks]
4. Spontaneous processes and thermodynamic equilibrium [2~3 weeks]
The second law of thermodynamics, entropy, the Gibbs free energy
5. Phase and phase transitions [1~2 weeks]
6. Thermodynamics of chemical equilibrium [2~3 weeks]
7. Examples of chemical equilibrium [2~3 weeks]
8. Chemical Kinetics [1 week]
9. Final paper (report)
10. Feedback [1 week]
Total：14 classes, 1 Feedback session

[履修要件]

特になし

[成績評価の方法・観点]

The evaluation will be based on a final paper (report) (86 points) and class attendance and active participation (14 points).

Basic Physical Chemistry (thermodynamics)-E2(2)へ続く↓↓↓

Basic Physical Chemistry (thermodynamics)-E2(2)

[教科書]

使用しない

[参考書等]

（参考書）

D. W. Oxtoby, H. P. Gillis, L. J. Butler 『Principles of Modern Chemistry, 8th Edition』（Cengage Learning）
ISBN:1305079116

P. Atkins, J. D. Paula, J. Keeler 『Atkins' Physical Chemistry, 11th Edition』（Oxford University Press）
ISBN:0198769865

[授業外学修（予習・復習）等]

Students are responsible for the preparation and review of each class.

[その他（オフィスアワー等）]

It is advisable to ask questions and make comments willingly during the class.

Instructor: Nguyen Thanh Phuc (email: nthanhphuc@moleng.kyoto-u.ac.jp)

Office hour: appointment by email (Katsura campus, A4-205)

[主要授業科目（学部・学科名）]

理学部