Course nu	ımber	U-I	U-LAS13 10006 LE60										
Course title (and course title in English)	Basic F)-E2 Basic I theory)	Basic Physical Chemistry (quantum th -E2 Basic Physical Chemistry (quantum heory)-E2					^y Instructor's name, job title, and department of affiliation			Graduate School of Engineering Senior Lecturer,PARK, Jaehong			
Group N	atural S	Sciences	5	Field(Classification)			Che	Themistry(Foundations)					
Language of instruction	English			Old group Group E				Number of credits 2					
Number of weekly time blocks	1		Class sty	'le Le (F	cture ace-to-face course)			Ye	Year/semesters		2025 • First semester		
Days and periods	Tue.3	Tue.3		Target year Mai		inly 1st & 2nd year students		Eli	Eligible students		For science students		
[Overview and purpose of the course]													

Physical chemistry is a discipline that aims to reveal 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 an introductory physical chemistry, specifically aims to learn and understand the principles and applications of quantum theory. The knowledge learned from this course will be a foundation for learning all areas of chemistry, including advanced-level physical chemistry, organic chemistry and inorganic chemistry, which are available in grades 2-4.

[Course objectives]

In this course, we learn the fundamental principles of the formation of atoms and molecules using basic quantum chemistry knowledge. Through this course, students will be able to equip knowledge and techniques to interpret and explain logically the natural phenomena of molecules and substances.

[Course schedule and contents)]

Contents will be discussed in the class. (The number does not mean the number of classes) The course schedule is subject to change, depending on the student's understanding. (Each item will be covered by 1-2 weeks.)

- 1. Atoms and their physical structures
- 2. Basic definitions useful for modern chemistry
- 3. Wave & light
- 4. Bohr model
- 5. Wave-particle duality
- 6. Schrodinger equation
- 7. Particle-in-a-box models
- 8. Hydrogen atom
- 9. Shell model, Aufbau principle, electron configuration, atomic orbital
- 10. Chemical bond
- 11. Molecular orbital
- 12. Valence bond theory
- 13. Molecular orbital theory
- 14. Linear-combination of atomic orbitals

Continue to Basic Physical Chemistry (quantum theory)-E2(2)

Basic Physical Chemistry (quantum theory)-E2(2)

[Course requirements]

None

[Evaluation methods and policy]

One final exam (60%), 6 tasks ($30\% = 6 \times 5\%$; quiz, homework, or report), attendance and class participation (10%)

[Textbooks]

D. W. Oxtoby and H. P. Gillis ^PPrinciples of Modern Chemistry, 8th ed. ISBN:978-1305079113 (Optional, other elementary-level chemistry books are OK.)

[References, etc.]

(References, etc.)

Atkins and J. de Paula ^PPhysical Chemistry, 9th ed. (Oxford University Press) ISBN:9780199697403 (Another edition is also fine)

[Study outside of class (preparation and review)]

Basic mathematical knowledge such vector, integration, and differentiation is necessary, but most of them will be introduced in the class or in supplementary materials, or office-hours. Students are responsible for reviewing each class and preview.

[Other information (office hours, etc.)]

Instructor: Jaehong Park (email: j.park@moleng.kyoto-u.ac.jp)

Course meeting: (Yoshida South campus, TBD), 1 session/week, 90 mins/session

Office hour:

Option 1- At Katsura campus(A4-205), any date could be possible, but appointment by email. Option 2- At Yoshida campus, on Tuesday appointment by email.

[Essential courses]