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学部・大学院区分 Undergraduate / Graduate	理学部
時間割コード Registration Code	0681210
科目区分 Course Category	専門基礎科目 Basic Specialized Courses
科目名【日本語】 Course Title	量子化学1
科目名【英語】 Course Title	Quantum Chemistry I
コースナンバリングコード Course Numbering Code	
担当教員【日本語】 Instructor	PHUNG Quan manh ○
担当教員【英語】 Instructor	PHUNG Quan manh ○
単位数 Credits	2
開講期・開講時間帯 Term / Day / Period	春 月曜日 1 時限 Spring Mon 1
授業形態 Course style	講義 Lecture
学科・専攻 Department / Program	G30 Chemistry
必修・選択 Compulsory / Selected	See the "Course List and Graduation Requirements for your program for your enrollment year."

授業の目的 【日本語】 Goals of the Course(JPN)	
授業の目的 【英語】 Goals of the Course	"What exactly is so special about Quantum Mechanics?" The purpose of this course is to introduce quantum mechanics. It begins with an introduction to elementary quantum mechanics and builds up to convey a thorough theoretical understanding of atomic electronic structure.
到達目標 【日本語】 Objectives of the Course(JPN)	
到達目標 【英語】 Objectives of the Course	The goal is to lay the foundation of Quantum Theory and see how it helps explain the atomic and molecular structure and chemical bond and reactivity.
授業の内容や構成 Course Content / Plan	1 From Classical to Quantum Mechanics (Ch. 1) 2 Wave Packets and the Schrodinger Equation (Ch. 2) 3 The Quantum Mechanical Postulates (Ch. 3) 4 The Particle in the Box 1 (Ch. 4) 5 The Particle in the Box 2 (Ch. 5) 6 Commuting and Non-commuting Operators and the Uncertainty Principle (Ch. 6) 7 Review and Midterm evaluation 8 Quantum Mechanical Model for the Vibration and Rotation of Molecules - 1 (Ch. 7) 9 Quantum Mechanical Model for the Vibration and Rotation of Molecules - 2 (Ch. 7) 10 The Vibrational and Rotational Spectroscopy of Diatomic Molecules - 1 (Ch. 8) 11 The Vibrational and Rotational Spectroscopy of Diatomic Molecules - 2 (Ch. 8) 12 The Hydrogen Atom (Ch. 9) 13 Many-electron Atoms - 1 (Ch. 10) 14 Many-electron Atoms - 2 (Ch. 10) 15 Review and Final evaluation
履修条件 Course Prerequisites	Fundamentals of Chemistry I and II, Fundamentals of Physics I and II, Calculus I, Linear Algebra I and II, or permission of the instructor
関連する科目 Related Courses	Quantum Chemistry I and II
成績評価の方法と基準 Course Evaluation Method and Criteria	Students will be evaluated based on one midterm exam (25% weight), one final exam (comprehensive, 45% weight), and homework (30% weight). Homework will be given at the end of each class. Homework must be submitted before the next class starts. The penalty for homework submitted late should be 10% of the maximum mark per day late. Both midterm and final exams will be written.  Grade evaluation will be according to the GPA System at Nagoya University. Students who enrolled AY2020 and onward: "A+": 100-95%, "A": 95-80%, "B": 80-70%, "C": 70-65%, "C-": 65-69%, "F": 60-0%. Students who enrolled before AY2020: "S": 100-90%, "A": 90-80%, "B": 80-70%, "C": 70-60%, "F": 60-0%.  To receive a passing grade, a score of at least 60% is required.
不可(F)と欠席(W)の基準 Criteria for "Fail (F)" & "Absent (W)" grades	The course will be graded "Fail (F)" if less than 60% of the points are obtained. The course will be graded as "Absent (W)" as stated in "Conditions for Course Withdrawal".
参考書 Reference Book	David W. Ball: Physical Chemistry, 2nd Ed., Cengage Learning, 2015 P. Atkins, J. de Paula, and J. Keeler: Atkins' Physical Chemistry, 11th Ed. Oxford University Press, 2018 D. A. McQuarrie and J. D. Simon "Physical Chemistry A Molecular Approach"
教科書・テキスト Textbook	T. Engel: Quantum Chemistry and Spectroscopy, 3rd Ed. (International edition), Pearson, 2014
課外学習等 (授業時間外学習の指示) Study Load(Self-directed Learning Outside Course Hours)	Homework is crucial for mastering new material and developing skills in applying concepts. Weekly homework will be electronic. A general guideline says an average of 2 hours of study time per week (assignments and reviews) is necessary for each 1 credit hour.
注意事項 Notice for Students	It is essential to sit in the exams during the scheduled class time. There will be NO make-up exam. In the event of a missed exam due to a serious illness, accident, or family emergency, compelling written documentation of the reason for the absence will be required. If the reason is accepted, the final grade will be calculated from the appropriately weighted average from the homework and/or the other exam. If the reason is deemed insufficient, the absence will be unexcused, and zero points will be awarded for the missed exam.
他学科聴講の可否 Propriety of Other department student's attendance	
他学科聴講の条件 Conditions for Other department student's attendance	
レベル Level	
キーワード Keyword	
履修の際のアドバイス Advice	
授業開講形態等 Lecture format, etc.	Face-to-face and real-time online lectures combined. The records of the lectures will be provided on Microsoft Teams.
遠隔授業(オンデマンド型)で行う場合の追加措置 Additional measures for remote class (on-demand class)	

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