

# Quantum Physics

Syllabus Number

3F336

Special Subjects

Elective 2 credit

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## 1. Course Description

Quantum mechanics describes the fact that material is actually a wave, which is far from common sense. However, current technologies have already included quantum mechanics such as lasers. In the class we will learn the fundamentals of this quantum mechanics.

This course corresponds to DP3 and DP4E.

## 2. Course Objectives

Quantum mechanics began from the experimental result that the particles are particles as well as waves. Quantum mechanics is a very mysterious discipline. In recent years, the topic of quantum computers has often been found in many media. In this class, students will be able to use quantum mechanics starting from its history

## 3. Grading Policy

Evaluation will be based on small tests and reports (50%) and results of final exams (50%).

## 4. Textbook and Reference

Textbook

Masato Ito 量子力学がわかる (ファーストブック)

Technical Review Company

## 5. Requirements(Assignments)

Please always prepare and review for the class by using textbook (about 1.5 hour each).

The contents of the class are in accordance with the chapters and contents of the textbook.

## 6. Note

Knowledge of calculus is an essential subject.

We will also use partial differentials and differential equations, so please review and attend the lecture.

## 7. Schedule

- [1] The way to quantum mechanics
- [2] From classical theory to quantum theory
- [3] Principle of quantum mechanics
- [4] Schrödinger equation
- [5] Infinitely deep well type potential
- [6] Well-type potential of finite depth
- [7] One-dimensional scattering problem and tunnel effect
- [8] Harmonic oscillator
- [9] Schrödinger equation of central force field potential
- [10] Quantization of angular momentum
- [11] Hydrogen atom (1)
- [12] Hydrogen atom (2)
- [13] Hydrogen atom (3)
- [14] Approximate solution of Schrödinger equation
- [15] Summary and test