

# Chemistry1

Syllabus Number 1A103  
Basic Major Subjects  
Requisites 2 credit  
YANAGIHARA, Naohisa

## 1. Course Description

All students should obtain a broad technical knowledge and acquire professional skills during their time at university. Since chemistry is the science dealing with the characteristics and structure of all matter, it is pertinent to all students acquiring higher education in every discipline taught at this faculty of science and engineering. Thus, for all students studying at in this faculty, a fundamental knowledge of chemistry is indispensable since it is required to understand advanced subjects in the science all students deal with the matter.

Learning objectives of this course will focus on obtaining an understanding of the fundamental concepts of chemistry by learning about the structure and nature of chemical bonding. This knowledge will allow the student to understand how to deal with matters from the chemical point of view.

This lecture is planned to be in line with the text content while using OHC and board book in combination. In addition, although this class is mainly lecture type, we will shortly discuss questions on exercise problems or lecture contents within the lecture time.

In this lecture, you can acquire knowledge and ability on DP1, DP3, and DP4 of the Department of Mechanical Precision Systems Engineering.

## 2. Course Objectives

- (1) By understanding the atomic structure, you can master the concept of ions and molecules.
- (2) By understanding the fundamentals of chemical bonding, you can acquire knowledge about the properties of substances.
- (3) By understanding the concept of the amount of substance (mol), you can acquire the ability on the chemical stoichiometry.

## 3. Grading Policy

- (1) Attendance confirmation is taken in each time, and students who do not attend more than 2/3 classes are not allowed to take the regular exam.
- (2) Perform grading with the regular test results as the sole evaluation criterion (100%).
- (3) It is planned to answer and explain the exercises in the textbook and handouts, and also to confirm the degree of progress of understanding appropriately.

## 4. Textbook and Reference

Textbook

Hiroyasu Shibahara and Masaharu Saito The Intermediary to the University: General Chemistry

Kagaku Dojin

Reference

Not particularly. We will distribute prints as appropriate.

## 5. Requirements(Assignments)

- (1) Please be sure to enter the room at least within 30 minutes. Students who are late more than 30 minutes are allowed to attend, but will be considered as absent.
- (2) Eating and drinking during lectures and unnecessary entry and exit are not permitted.
- (3) It is prohibited to shoot the content written on the blackboard or taking the video material of PowerPoint with a mobile phone or smartphone.

## 6. Note

## 7. Schedule

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|------|---|
| [1]  | The Basis of Chemistry (1): Simple substances and Compounds |
| [2]  | The Basis of Chemistry (2): The structure of the Atom       |
| [3]  | The Basis of Chemistry (3): Quantum Numbers                 |
| [4]  | The Basis of Chemistry (4): The Atomic Orbitals             |
| [5]  | The Chemical Bond (1): Molecular Orbitals                   |
| [6]  | The Chemical Bond (2): Hybrid Orbitals                      |
| [7]  | The Chemical Bond (3): Ionic Bonds                          |
| [8]  | The Chemical Bond (4): Metallic Bonds                       |
| [9]  | Stoichiometry (1): Concept of The Amount of Substance (mol) |
| [10] | Stoichiometry (2): The Chemical Equation                    |
| [11] | Stoichiometry (3): Stoichiometric Calculation               |
| [12] | The Three States of Matter (1): The Properties of Gases     |
| [13] | The Three States of Matter (2): The Properties of Solids    |
| [14] | The Three States of Matter (3): The Properties of Solutions |
| [15] | Summary and Exams   |