

# Mathematical Logic

Syllabus Number 4B103  
Basic Major Subjects  
Requisites 2 credit  
WATANABE, Ryuji

## 1. Course Description

This course covers basic mathematics necessary in the following study of computer science. The items are as follows: Set, mapping, relation, propositional logic, and predicate logic.

The lessons from the first to the 5th are based on self-learning given by LMS, and the lessons from the 6th to the 15th will be given in the classroom for 2 days.

This subject is related to the clause 1 of the diploma policy of the Department of Information Science Correspondence Course.

## 2. Course Objectives

This course aims to improve the basic knowledge of mathematics for computer scientists and engineers and to enhance students' logical thinking power by working on the practice exercises.

## 3. Grading Policy

The final examination (40%), presentations on homework assignments in the classes (40%) and quizzes prepared on the LMS (20%) will be evaluated.

The acceptance line is the rate of 60% in the above final examination, presentations on homework assignments and quizzes given on the LMS.

## 4. Textbook and Reference

Textbook

R.Watanabe "Guidance Book on Mathematical Logic" (given on the LMS)

Reference

References are introduced in the above guidance book.

## 5. Requirements(Assignments)

Answering the quizzes prepared on the LMS for the first five lessons is required before the 2 days classes. Also, answering the practice exercises prepared in the guidance book as the homework assignments is required. Attendance at the classes is strictly required.

Preparation of the sets and proposition on a high school level is highly recommended.

## 6. Note

Students are asked to download the guidance book from the LMS, to print it and to bring it to the 2 days classes.

## 7. Schedule

- [1] Set(LMS) : Definition and expression of set, Operation of set
- [2] Set(LMS) : Law of operation of set, Direct product
- [3] Mapping (LMS) : Definition of mapping, Epimorphism and injection, Inverse mapping, Composite mapping
- [4] Relation (LMS) : Definition and expression of relation, Composition and Inverse relation, Union and intersection of relation
- [5] Relation (LMS) : Law of relation, Equivalence relation and equivalence class, Order relation
- [6] Set, Mapping (first half) : Practice
- [7] Mapping (last half), Relation : Practice
- [8] Propositional logic : Definition of proposition, Truth value and propositional variables, Logical operation
- [9] Propositional logic : Propositional logic expression, Law of logical operation
- [10] Propositional logic : Inference, Proof and technique of proof
- [11] Propositional logic : Practice
- [12] Predicate logic : Predicate logic, Predicate, Function
- [13] Predicate logic : Quantifier, Predicate logic expression, Law of predicate logic operation
- [14] Predicate logic : Practice
- [15] Review, Term-end examination