

## IS1350

### Logic for computer sciences

**Professor:** Pascale Le Gall

**Language of instruction:** French – **Number of hours:** 36 – **ECTS:** 3

**Prerequisites:** None

**Period:** S8 Elective 12 March to June IN28IE5, SEP8IE5

#### Course Objectives

Discrete modeling of a given problem for its implementation and understanding of the formal tools useful for analyzing discrete models.

#### On completion of the course, students should be able to

understand the foundations underlying tools related to the design of reliable software such as proof assistants (eg prover COQ), tools for the design of computer systems (Method B), constraints solver, prototyping languages, the analysis of code, or test case generation tools ...

#### Course Contents

Automatic Demonstration

- ✧ Propositional logic and predicate (syntax, semantic, demonstration, Church Theorem, Gödel)
- ✧ Semi-decision algorithm (Herbrand model)
- ✧ Automatic Demonstration (Gentzen sequent calculus, cut elimination)

Evaluation or symbolic computation

- ✧ Equational logic
- ✧ Algebraic Reasoning
- ✧ Algebraic Rewriting
- ✧ Rapid Prototyping
- ✧ Extensions (rewriting graphs, cellular automata)

Logic Programming

- ✧ Clauses
- ✧ Resolution
- ✧ Prolog: Logic Programming
- ✧ Constraint solving
- ✧ Constraint Logic Programming

#### Course Organization

Lectures and pcs.

#### Teaching Material and Textbooks

Course handout (in French).

#### Evaluation

Evaluation will be performed by means of a 3-hr final examination. Documents are allowed.

A personal homework under the form of a project, exercises or an article reading can be requested.