

Introduction to language theory and compiling

Lecturer

Gilles GEERAERTS (Coordinator)

Course mnemonic

INFO-F403

ECTS credits

5 credits

Language(s) of instruction

English

Course period

First term

Campus

Plaine

- > Ex-cathedra lectures
- > practicals
- > a project that consists in 3 parts

References, bibliography and recommended reading

- > J. E. Hopcroft, R. Motwani, and J. D. Ullman ; Introduction to Automata Theory, Languages, and Computation, Second Edition, Addison-Wesley, New York, 2001.
- > Alfred V. Aho, Ravi Sethi, and Jeffrey D. Ullman, Compilers : Principles, Techniques and Tools", Addison-Wesley, 1986
- > John R. Levine, Tony Mason, Davy Brown. Lex et YACC, O'Reilly ed, 1992.

Course notes

Podcast, Université virtuelle and Syllabus

Course content

Formal Languages and grammars. Chomsky classification. Regular expressions. Automata (finite pushdown, Turing machine). Compiler, lexical analyser, parser. Descending and ascending parsers: LL(k), LR(k), LALR(k). Semantic analysis, typing systems and code generation.

Objectives (and/or specific learning outcomes)

The learning outcomes are:

- 1 to master basic language theory (language, automata, grammars, non-determinism, associated algorithms)
- 2 to be able to explain those notions in an intuitive manner, but also using the adequate mathematical formalism
- 3 to master the basics of compilers
- 4 to understand and to be able to justify Chomsky hierarchy
- 5 to master the theory behind top-down and bottom-up parsers (including LL and LR grammars)
- 6 to be able to apply all the theoretical notions by specifying and writing a small compiler that interfaces with the internal language of LLVM

Pre-requisites and co-requisites

Course having this one as co-requisite

MEMO-H504 | Mémoire de fin d'études en Informatique | 20 crédits

Teaching method and learning activities

The learning activities are:

Other information

Place(s) of teaching

Plaine

Contact(s)

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Evaluation method(s)

written examination and Project

Evaluation method(s) (additional information)

The exam is normally a written exam, testing the students' skills regarding the "language theory" part of the course (the "compiler" part is tested by the project). If the sanitary situation does not allow a written exam on site in January or August, it will be moved online (and maybe replaced by an oral exam).

Determination of the mark (including the weighting of partial marks)

Project: 8 points out of 20

Exam: 12 points out of 20

Main language(s) of evaluation

English

Programmes

Programmes proposing this course at the faculty of Sciences

MA-INFO | **Master in Computer science** | finalité Professional/unit 1

Programmes proposing this course at the Brussels School of Engineering

MA-IRIF | **Master of science in Computer Science and Engineering** | finalité Professional/unit 1

