

IDENTIFICATION

Course code : ESI-SPI-CI-IN4-S7-UE3-EC2
ECTS : 1

DURATION

Lectures : 4
Tutorial classes : 10
Labs : 10
Total : 24

Project :
Personnal work :

ASSESSMENT

At least two continuous assessments, practical work, and a project.

TEACHING MATERIALS

Slides, directed work sheets, and practical work sheets.

LANGUAGE

English

CONTACT

This course introduces the formal foundations of programming languages : how to describe, recognize, and transform a language, and what the intrinsic limits of computation are. It aims to understand the mechanisms underlying the design of compilers and interpreters, to evaluate the expressiveness of different models (automata, grammars, Turing machines), and to assess the algorithmic complexity of problems.

UE : UE7-DEV

COURSE : Theory of Languages

SCOPE OF THE COURSE

OBJECTIVES

COMPETENCE AND SKILLS

- Master the fundamental paradigms of programming, languages, and algorithms to design and develop applications for any type of environment.
- Identify and classify problems according to their complexity (P, NP, NP-complete) and select appropriate algorithmic strategies.

PROGRAM

- Foundations (Alphabet, word, language, Chomsky hierarchy, finite automata, etc.) and regular languages
- Context-free languages (Context-free grammars, pushdown automata, etc.), lexical and syntactic analysis
- Computability and complexity (Turing machines, undecidability and complexity, etc.)

BIBLIOGRAPHY

“Michael Sipser — *Introduction to the Theory of Computation* — Cengage Learning
John Hopcroft — *Introduction to Automata Theory, Languages, and Computation* — Pearson”

REQUIREMENTS

System and Network modules and Development modules from previous semesters.