# Functional programming

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## Cursus

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## Summary

Understanding of the principles and applications of declarative programming, the fundamental models of program execution, application of fundamental methods of program composition, meta-programming through the construction of interpreters and advanced programming techniques.

## Content

- Introduction to programming in Scala
- Functions and Evaluation
- Higher-Order Functions
- Data and Abstraction
- Types and pattern matching
- Lists
- Collections
- Lazy evaluation
- For expressions, generators and monads
- Functions and State
- Lambda calculus and Lisp
- Interpreting Functional Languages

## Learning Prerequisites

**Required courses**

- Introduction to the programming objet
- Theory and practice of programming

## Learning Outcomes

By the end of the course, the student must be able to:

- Create functional programs
- Design robust and readable software
- Formalize program correctness
- Interpret programs automatically
- Prove correctness using induction
- Construct software
- Demonstrate a capacity for creativity.
- Use a work methodology appropriate to the task.
• Set objectives and design an action plan to reach those objectives
• Give feedback (critique) in an appropriate fashion.

Teaching methods
MOOC. Ex Cathedra. Exercises and projects

Assessment methods
Continuous and written test at the end of the course

Resources
Bibliography
Abelson/Sussman : Structure and Interpretation of Computer Programs. MIT Press

Ressources en bibliothèque
• Programming in Scala (Third Edition) / Odersky
• Structure and Interpretation of Computer Programs / Abelson

Websites
• https://www.scala-lang.org/
• http://Lampwww.epfl.ch/teaching
• https://courseware.epfl.ch/courses/course-v1:EPFL+progfun1+2018_T1/about
• https://www.artima.com/shop/programming_in_scala
• https://courseware.epfl.ch/courses/course-v1:EPFL+progfun2+2018_T1/about