

CS-210

**Functional programming**

Kuncak Viktor, Odersky Martin

Cursus	Sem.	Type
Communication systems	BA3	Opt.
Computer science	BA3	Obl.
HES - IN	H	Obl.

Language of teaching	English
Credits	5
Session	Winter
Semester	Fall
Exam	During the semester
Workload	150h
Weeks	14
<b>Hours</b>	<b>4 weekly</b>
Courses	2 weekly
Exercises	2 weekly
<b>Number of positions</b>	

**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  
 Expressions and functions  
 Classes and objects  
 Evaluation by rewriting  
 Pattern matching  
 Polymorphism  
 Evaluation strategies  
 Domain-specific languages  
 Constraint programming  
 Language interpretation  
 An interpreter for Lisp  
 An interpreter for Prolog

**Learning Prerequisites****Required courses**

Introduction to the programming objet  
 Theory and practice of programming

**Important concepts to start the course**

Compiler Construction  
 Foundations of Software

**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

### **Transversal skills**

- 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**

- [Structure and Interpretation of Computer Programs / Abelson](#)

#### **Websites**

- <http://Lampwww.epfl.ch/teaching>