

CS-206

**Parallelism and concurrency**

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Cursus	Sem.	Type
Communication systems	BA4	Opt.
Computer science	BA4	Obl.
HES - IN	E	Obl.

Language of teaching	English
Credits	4
Session	Summer
Semester	Spring
Exam	During the semester
Workload	120h
Weeks	14
<b>Hours</b>	<b>4 weekly</b>
Courses	1 weekly
Exercises	1 weekly
Project	2 weekly
<b>Number of positions</b>	

**Summary**

The course introduces parallel programming models, algorithms, and data structures, map-reduce frameworks and their use for data analysis, as well as shared-memory concurrency.

**Content**

See <https://lara.epfl.ch/w/parcon17:top>  
 Parallel programming & execution models  
 Functional parallelism  
 Data-level parallelism  
 Threads and fork/join parallelism  
 Synchronization  
 Threads and Shared Memory in Java  
 Futures  
 Large-Scale Parallel programming using Apache Spark

**Keywords**

Parallelism, threads, synchronization, locks, memory models.

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

- Functional programming (CS-210)
- Algorithms (CS-250)
- Computer Architecture (CS-208)

**Recommended courses**

System oriented programming (CS-207)

**Important concepts to start the course**

Functional programming and functional data structures  
 Algorithms and data structures

**Learning Outcomes**

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

- Construct parallel software.
- Perform tuning parallel software.

### **Teaching methods**

Ex cathedra, labs, exercices

### **Assessment methods**

With continuous control

### **Resources**

#### **Notes/Handbook**

Lecture notes, copies of the slides