CS-206  Parallelism and concurrency  
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Cursus    Sem.    Type
HES - IN    E    Obl.
Informatique    BA4    Obl.
Systèmes de communication    BA4    Opt.

Language     English
Credits     4
Session     Summer
Semester     Spring
Exam     During the semester
Workload     120h
Weeks     14
Hours     4 weekly
Lecture     1 weekly
Exercises     1 weekly
Project     2 weekly

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
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, exercises

Assessment methods
With continuous control

Resources
Notes/Handbook
Lecture notes, copies of the slides