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	Written
Workload	120h
Weeks	14
Hours	**4 weekly**
Courses	1 weekly
Exercises	1 weekly
Project	2 weekly
Number of positions	

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

Programming assignments (30%); final exam in August (70%)

Resources

Notes/Handbook

Lecture notes, copies of the slides