Course Manual PAP

Parallel Programming

Version: 2 | Last Change: 01.10.2019 15:54 | Draft: 0 | Status: vom verantwortlichen Dozent freigegeben

━ General information

Long name	Parallel Programming
Approving CModule	PAP_MaMT, PAP_MaTIN
Responsible	Prof. Dr.-Ing. Arnulph Fuhrmann Professor Fakultät IME
Valid from	summer semester 2021
Level	Master
Semester in the year	summer semester
Duration	Semester
Hours in self-study	78
ECTS	5
Professors	Prof. Dr.-Ing. Arnulph Fuhrmann Professor Fakultät IME
Requirements	The exercises require programming knowledge and the use of console-oriented programs in Linux-based operating systems.
Language	German, English if necessary
Separate final exam	Yes

Literature

P. Pacheco: An Introduction to Parallel Programming, Morgan Kaufmann, 2011

T. Rauber, G. Rünger: Parallele Programmierung, Springer, 2012

T. Rauber, G. Rünger: Multicore: Parallele Programmierung, Springer, 2007

R. Oechsle: Parallele und verteilte Anwendungen in Java, Hanser, 2011

B. Goetz, J. Bloch, J. Bowbeer, D. Lea, D. Holmes, T. Peierls: Java Concurrency in Practice, Addison-Wesley Longmanm 2006

Jason Sanders: CUDA by Example: An Introduction to General-Purpose GPU Programming, Addison-Wesley Longman, 2010

Aaftab Munshi: OpenCL Programming Guide,♂Addison-Wesley Longman, 2011

Final exam

Details	In a final examination (written, optional oral), the students demonstrate their knowledge and competences summarily. The examination includes exemplary parts of the course.
Minimum standard	Achieving the individual minimum score per exam, typically 50% of the maximum score.
Exam Type	EN Klausur

− Lecture / Exercises

Learning goals

Goal type	Description
Knowledge	- Basic concepts, models and technologies of parallel processing (parallelism, concurrency, SISD, SIMD, MISD, MIMD, loose- and closely coupled systems, distributed systems) - Parallel performance measures (speedup, efficiency) - Architecture of GPUs - Parallel Algorithms for GPUs

Special requirements

Accompanying material	Lecture notes (slides)
Separate exam	No

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Lecture	2
Tutorial (voluntary)	0

⊟ Practical training

Learning goals

Goal type	Description
Skills	- Analyze and structure tasks related to programming parallel programs, assign relevant parallel hardware architecture and transfer to parallel design - Implement parallel programs (multicore hardware with threads and GPUs) - Analyze parallel programs using suitable tools and present results in a comprehensible way - Estimate and analyze performance of parallel programs - Derive information from original English sources and standards

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Practical training	2
Tutorial (voluntary)	0

Special requirements

Accompanying material	Exercises, server systems, GPU systems
Separate exam	Yes

Separate exam

Exam Type	EN Übungsaufgabe mit fachlich / methodisch eingeschränktem Fokus lösen
Details	The principles, models, methods, technologies and tools conveyed in the lecture will be deepened and practiced in the practical course on the basis of current tasks in the context of media-based and/or interactive systems. The students work independently on the exercises.
Minimum standard	80% of the exercise tasks has been successfully completed.