UNIVERSITY OF PANNONIA

COURSE DATASHEET

Semester:	2016/17/2
Course:	Parallel Programming
Code:	VEMKIR5144P
Responsible department:	Department of Electrical Engineering and Information Systems
Department code:	MIVIR
Responsible instructor:	Dr. Zoltán Juhász

Course objectives:

The aim of the course is to introduce students to the world of multi-processor computers, their role in computing, and the methods and languages available for creating parallel programs. As the chip manufacturing industry unanimously moved on to producing multi-core processors instead of increasing processor frequency, the computing performance of future computing systems can only be increased by exploiting the capability of the hardware to execute different tasks at the same time. Programming multi-processor systems requires a change in programming thinking. Students must learn how to “think in parallel” and move beyond sequential algorithmic techniques. The main objective of the course is to launch the students on the journey into parallel computing

Course content:

The course covers three main topics as the cornerstones of parallel computing; parallel hardware architectures, programming languages and parallel algorithms. Each topic is discussed in relation to the other topics as the performance of parallel systems depends on the successful combination of these segments. The architecture module covers shared-memory and distributed memory archictures, interconnection systems, multi-core processors and limits of scalability. The programming languages module covers parallelisation strategies and paradigms (data versus control parallelism), and introduces shared-memory and message passing programming through the Java and C programming languages using OpenMP, MPI (Message Passing Interface) and NVIDIA’s CUDA. The algorithms module introduces ways of creating parallel algorithms by showing fundamental parallel algorithms for well-known numerical, data processing and graph algorithms. The students will have the opportunity to develop programs in the above languages and execute them on a range of exciting parallel computers including 16-core processors, 64-processor supercomputing class server and a 960-core 4 teraflops performance NVIDIA Tesla unit.

Requirements, evaluation and grading:

The course finishes with a 90 minute written exam in which students need to andwer 5 questions. The questions span the entire curriculum and assess how well the students understood the key issues of parallel computing and their ability to apply this knowledge to solve problems on parallel computers. Provisional marking scale (may change according to actual mark distribution) points final mark above 80 excellent (5) 70-79 good (4) 60-69 medium (3) 50-59 pass (2) below 50 fail (1)

Required and recommended readings:

Ananth Grama, Anshul Gupta, George Karypis, and Vipin Kumar., Introduction to Parallel Computing, (Second Edition), Addison-Wesley, 2003. ISBN 0-201-64865-2. valamint órán kiadott segédanyagok,

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Required and recommended readings:

Interneten elérhető források.