Course Name: Parallel image processing and pattern recognition
Instructor: László Kovács
Course Number: ILMMM0210-17,
Course Type: Lecture and Practice
Course mode: Full-time training
Sessions per week: 0 + 2
Credits: 2
Term grade: Term grade

Examination method:

All students have to work on own identical project involving high performance computing tools during the term involving image processing field. At the end of the term the output of the project (massively parallelized algorithmic solution) have to be presented and defended during exam.

Other expectations:

The maximum number of non-attendance is 3.

Syllabus:

- Image processing computing tools: pre-processing, object detection, transformations, noise reduction, classification, machine learning, feature extraction, decision support, segmentations, texture extraction, moving detection,
- Introduction the parallel programming tools for shared memory multiprocessor architectures (OpenMP, pthread, Threading Building Blocks).
- Introduction the parallel solutions for Grid Computing (OpenMPI, PVM, Grid Engine, SLURM)
- Introduction how to work and use the Clustered Systems and Supercomputers (Visiting HPC of Debrecen) equipped with Coprocessors (NVidia, Intel Phi)
- Introduction the massive parallelization with OpenCL involving CPU and GPU cores
- Parallel compilers: Intel, PGI
- Introduction the CUDA Toolkit
    - NEW Classroom Material: GPUTeachingKit
    - Case studies: image processing

Ethical standards:

The ethical standards are predefined in the CODE OF CONDUCT OF THE UNIVERSITY OF DEBRECEN:

http://www.unideb.hu/portal/hu/node/47
http://www.unideb.hu/media/17_217.pdf