

## Parallel Computing Architectures

### 1. SYLLABUS INFORMATION

#### 1.1. Course title

Parallel Computing Architectures

#### 1.2. University

Pázmány Péter Catholic University

#### 1.3. Semester

1<sup>st</sup> year, 1st semester

### 2. COURSE DETAILS

#### 2.1. Course nature

Compulsory

#### 2.2. ECTS Credit allotment

3

#### 2.4. Faculty data

Dr. Szolgay Péter Norbert

### 3. COMPETENCES AND LEARNING OUTCOMES

#### 3.1. Course contents

Computing models Basics of computer architectures, physical limits.

Neuman architecture, Harvard architecture, integration of sensors.

Digital signal processors - fixed point implementations; floating point architectures Fast buses and processing, SCSI processors, FPGA-based processor implementations, Parallel processor architectures, instruction types of parallel processing. Instruction Level Parallel processors, Pipeline processors, Design case study - Design of an emulated digital CNN chip Data-parallel processors Structure of a cell processor Systolic architectures Vector architectures MIMD architecture.

#### 3.2. Course bibliography

F.P.Prosser, D.E. Winkel, The Art of Digital Design, Prentice -Hall Int. Ed. Englewood Cliffs, New Jersey, 1987

D.Sima ,P. Kacsuk, Advanced Computer Architectures, Adison Wesly, 1997; I.East, Computer Architecture and Organization, Pitman Publishing C., London 1990

A.J.van de Goor, Computer Architecture and Design, Addison Wesley Publishing Comp. Wokingham, 1994; Lattice User's manual; XILINX user's manual.

Recommended literature:

T.Roska, G.Bárfai, P.Szolgay, T.Szirányi, A.Radványi, T.Kozek, Zs.Ugray and A.Zarándy, ""A Hardware Accelerator Board for Cellular Neural Networks: CNN-HAC"", Proc. of the IEEE CNNA-90 pp.160-168. 1990.

#### **4. EVALUATION**

Exam