

Name: Advanced Computer Architectures I		NEPTUN-code: NIXKA1EBNE	Number of periods/week: full-time: 2 lec + 0 sem + 2 lab
Credit: 4 Requirement: exam		Prerequisite: NIESA1EBNE Introduction to Computer Architectures	
Responsible: Dezsó SIMA, DSc.	Position: professor emeritus	Faculty and Institute name: John von Neumann Faculty of Informatics Institute of Applied Informatics	
Way of assessment: - written mid-term, written exam			
Competences			
Course description:			
<p>The lectures provide an overview about main classes of parallel architectures such as: pipeline, superscalar and VLIW processors, and its system architectures. The material presented is based on the design space approach. Case studies and the identification of major trends concerning the evolution enhance the lectures.</p> <p>Major topics include: Levels of the utilized parallelism. Flynn's and an updated classification of architectures. Data, control and resource dependencies and basic methods of their handling. Preserving sequential consistency. Pipelined processors. Superscalar processors of 1st, 2nd and 3rd generation. ISA enhancements (MMX, SSE, etc.). Layout alternatives of caches, 2-3 level cache-hierarchies, optimum size of caches, cache coherency, trends, examples. Evolution of transistor technology development. VLIW and EPIC architectures. Performance issues of processors. Basics of power management. Thread-level parallel, fine, coarse-grained, and SMT architectures. Process-level parallel architectures. Processor-level virtualization support. Motherboards.</p>			
Literature			
<p>Sima, Fountain, Kacsuk: Modern Computer Architectures, Szak Kiadó, 1998 (in Hungarian) Computer Architecture by J.L. Hennessy and D. A. Patterson, 5th ed, Elsevier, 2011 Computer Organization and architecture by W. Stallings, 10th ed, Pearson, 2016 Digital Design and Computer Architecture by S.L. Harris, D.M. Harris, ARM Edition, Elsevier, 2016 Computer Organization and Design by J.L. Hennessy and D. A. Patterson, ARM ed, Elsevier, 2016</p>			