Óbuda University John von Neumann Faculty of Informatics			Institute for Cyber-Physical Systems	
Name and code: *Advanced Computer Architectures I (NIXKA1EBNE)* **Credits*: 2*** *Computer Science and Engineering BSc programme* *2022/23 year II. semester*				
Subject lecturers: Zsolt Bringye				
Prerequisites (with code):	Introduction to Computer Architectures (NIESA1EBNE)			
Weekly hours: 2	Lecture: 2	Seminar.: 0	Lab. hours: 0	Consultation: 0
Way of assessment:	written exam			

Course description:

Goal: During the semester the students get to know the design and implementation possibilities of the CPU and GPU level parallel program execution

Course description:

Topics covered in lecture

- Designing a single cycle and a multicycle processor
- Functional parallelism
- Data parallelism
- Classification of parallel architectures
- Basic parallel techniques
- Vector architectures
- SIMD ISA extensions
- GPUs
- Multiprocessor systems (incl. cache coherency and heterogenous systems)
- Motherboards, parts of motherboards

Homework (optional)

To give a deeper understanding of the material the students allowed to form groups of two and create a homework project during the semester which they will present at the end of the semester.

Lecture schedule	
Education week	*Topic*
1.	
2.	A short review (topics from the previous semester)
3.	Designing a single cycle processor
4.	Designing a multicycle processor
5.	Types of parallelism, classification of parallel architectures
6.	Basic parallel techniques
7.	Basic parallel techniques (contd.)
8.	Vector architectures
9.	SIMD ISA extensions
10.	GPUs, comparison of CPU and GPU based code execution
11.	Multiprocessor systems
12.	Multiprocessor systems (contd.)
13.	Motherboards
14.	Presentation of homework

Midterm requirements

n.a.

Final grade calculation methods

Type of exam

Written exam (up to 100 points). The requirement of the pass mark is 51 points.

Type of replacement

References

Mandatory: in the e-learning system (Moodle).

Recommended:

- Advanced Computer Architectures by D. Sima, T. Fountain and P. Kacsuk
- Computer Architecture by J.L. Henessy and D. A. Patterson
- Digital Desing and Computer Architecture by S. L. Harris and D. M. Haris