Study programmes: Bachelor studies - Mathematics

Course name: RM15 - Computer architecture 1

Lecturers: Milan Banković and other teachers from Department of Computer Science

Status: Compulsory

ECTS: 5

Attendance prerequisites: RM03

Course aims: Acquiring general and specific knowledge in the field of computer organization and architecture, building components of a computer system and their interconnecting.

Course outcome: After the course is finished, the student should have basic knowledge about logical circuits and fundamental functional components of a computer system. The student should understand the way these components are interconnected. The student should know the functional units of a processor, understand how a processor works and how it communicates with the memory.

Course content:

- Logical fundamentals of data processing. Boolean functions. Combinatorial and sequential circuits. Basic building blocks of a computer (logic gates, flip-flops, adders, counters, decoders, multiplexers, demultiplexers, registers, ROM, PLA). Organization, structure, instruction formats and machine-level language of a Von-Neumann computer.
- Structure of modern digital computers: central processing unit (CPU), interrupts, internal and external memories, input/output subsystem.
- Structure of a central processor. Arithmetic-logic unit (ALU). Registers. Control unit and its implementation. Machine instructions and their formats. Microprogrammed organization of a control unit.
- Memory systems. Memory hierarchy. Internal memory and its characteristics. Address decoding. Cache memory.
- Input/Output subsystem of a computer.

Literature:

1. Andrew S. Tanenbaum: Structured Computer Organization (fifth edition). Prentice Hall. 2005.
2. Sivarama P. Dandamudi: Fundamentals of Computer Organization and Design. Springer. 2002.
(a teacher may also choose other contemporary literature)

Number of hours: 4	**Lectures: 2**	**Tutorials: 2**	**Laboratory: -**	**Research: -**

Teaching and learning methods: Frontal, Group, Exercises.

Assessment (maximal 100 points)

Course assignments	**points**	**Final exam**	**points**
Lectures	5	Written exam	-
Exercises / Tutorials	-	Oral exam	-
Colloquia	35	Written-oral exam	60
Essay / Project	-		