# COMPUTER ARCHITECTURES

(exam topics: Electrical Engineering BSc speciality, full-time department)

1. Basic operation principle of computers. Logic machine (Turing-machine structure).
2. Neumann-principles. Block-diagram of Neumann-computer, structure, tasks of its units.
3. Instruction execution steps of Neumann-machine.
4. Opportunity of classification of computers (based on performance and number of handled processes). Computer generations.
5. Languages, levels and virtual machines. Block-diagram of a multilevel machine.
6. Modern multilevel computers I. (digital logic level, microarchitecture level, instruction set architecture level). Microprogrammed operation control principle. Block-diagram of a six-level computer.
7. Modern multilevel computers II. (operating system machine level, assembly language level, problem-oriented language level). Block-diagram of a six-level computer.
8. Development of multilevel computers.
9. Moore's law. Computer product range (disposable computers, embedded computers, game computers, personal computers, servers, supercomputers).
10. Parameters of Pentium 4 processor.
11. Parameters of UltraSPARC processor.
12. Structure of bus-based computer.
13. Neumann-computer data path. Instruction execution.
14. RISC and CISC processors. RISC design principles. Comparison of RISC and CISC processors.
15. Processor performance enhancement. Instruction-level parallelism (pipeline-technique, superscalar architecture).
16. Processor-level parallelism (array computers, multiprocessors, multicomputers).