

Topics for the examination for the course “Design and applications with FPGA”

1. Basics of digital electronics. Synthesis of combinational devices
2. Basics of digital electronics. Synthesis of sequential devices
3. Implementation of sequential devices. Critical path. Pipelining
4. Programmable logic devices. Classification, architectures
5. FPGA. CLBs, routing resources, embedded modules
6. VHDL. Alphabet, entity and architecture declarations
7. VHDL. Signals, variables, processes
8. VHDL. Concurrent statements
9. VHDL. Sequential statements
10. VHDL. Instantiation operator
11. Binary arithmetic. Fixed point and floating point formats
12. Arithmetic devices. FPGA implementation. DSP48(A)
13. CORDIC algorithm
14. NCO implementation in FPGA
15. Metastability effect. Its influence on digital devices, methods of mitigation
16. Crossing clock domains effects, clock skew.
17. Clock resources in FPGAs. DCMs, PLLs
18. Configuration of FPGAs
19. Power system of FPGAs
20. I/O resources of FPGA, termination