

Study programme(s): Computer Science (CS)			
Level: bachelor			
Course title: Digital Circuits (CS617)			
Lecturer: Zoran M. Mijatović			
Status: elective			
ECTS: 6			
Requirements: none			
Learning objectives The main objective of this course is to cover the basic digital components of information processing systems and learn to use modern methods of analysis and synthesis of combinatorial and sequential systems using languages such as VHDL.			
Learning outcomes <i>Minimal:</i> At the end of this course the student must be able to understand basics of digital electronics, use the main logic and arithmetic devices of information processing systems, use modern methods of synthesis and simplification of combinatorial and sequential systems and use a language such as VHDL for the synthesis of complex elements. <i>Desirable:</i> Beside the above mentioned knowledge and skills, it is expected that a successful student also shows ability to explain the modes of representation of combinatorial and sequential systems, select components and synthesis methods to design a complex digital system and develop complex digital systems.			
Syllabus <i>Theoretical instruction</i> Theoretical classes cover the following chapters: signals, semiconductors and integrated circuits. Transistors and logical circuits, adders, flip flops and counters, combinatorial synthesis technology, sequential machines, programmable circuits and VHDL language for the synthesis of digital systems <i>Practical instruction</i> Experimental exercises with operational amplifier and basic logic circuits. TTL and CMOS decoder. RS and the D flip-flop. Individual work on an example of a digital system built using VHDL.			
Literature 1. W. J. Dally and R. C. Harting, Digital design : A systems approach, Cambridge University Press, 2012 2. J. Wakerly, Digital design (4th edition), Prentice Hall, 2005 4. A. Kumar, Fundamentals of Digital Circuits (3 rd edition), Prentice Hall, 2014. 3. P. J. Ashenden, The student's guide to VHDL (2nd edition), Morgan Kaufmann, 2008			
Weekly teaching load			Other: 0
Lectures: 2	Exercises: 2	Other forms of teaching: 0	Student research: 0
Teaching methodology During theoretical classes classical methods of teaching with the use of a projector are used to present stated topics. On practical classes, classical methods of teaching with the use of a projector are used to analyze case studies and practically master the skills of usage of suggested tools. Students expand their knowledge by investigating every stated topic and test it through two colloquia that are related to the work on an individual case study.			
Grading method (maximal number of points 100)			
Pre-exam obligations	points	Final exam	points
Two colloquia	25, 25	Oral exam	50