

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Embedded systems		Code 1010331551010334962
Field of study Information Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 3 / 5
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 15 Classes: - Laboratory: 15 Project/seminars: -		No. of credits 3
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences		ECTS distribution (number and %) 3 100%
Responsible for subject / lecturer: dr inż. Ewa Idzikowska email: ewa.idzikowska@put.poznan.pl tel. 61 665 35 31 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	K_W03 K_W06
2	Skills	K_U01 K_U03 K_U08
3	Social competencies	K_K02
Assumptions and objectives of the course: The aim of the course is to familiarize students with basic terms concerning embedded systems, including design and testing of simple embedded systems, and also with problems related to usage of embedded systems.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. x - [K_W03]		
2. x - [K_W16]		
Skills:		
1. x - [K_U19]		
2. x - [K_U07]		
Social competencies:		
1. x - [K_K04]		
Assessment methods of study outcomes		
Lecture: written exam. More than 50% of all points is necessary for positive result.		
Laboratory: tests, exercises assessment, reports assessment.		
Course description		

<p>Lecture. VHSIC Hardware Description Language (VHDL), basic structures. VHDL concurrent and sequential statements. Structural and functional models of logic circuits. Peculiarity of embedded systems. Computer ? a control device; microcontrollers. Software for embedded systems. Real-time operating systems. Protocols in embedded systems. Security and reliability of embedded systems. Testing of embedded systems.</p> <p>Lab. Preparation of design environment. Getting acquainted with the editor and simulator ? Active-HDL. Compilation and simulation of sample code. Components usage. Structural and functional models of logic circuits. Control circuits ? design, modeling, simulation (Active-HDL, functional models). Test pattern generation, comparison of output sequences of faultless and faulty circuits. Testing of the designed circuits.</p>		
<p>Basic bibliography:</p> <ol style="list-style-type: none"> 1. Język VHDL projektowanie programowalnych układów logicznych, Skahill K., Wyd. Naukowo-Techniczne, Warszawa, 2001 2. Projektowanie układów cyfrowych z wykorzystaniem języka VHDL, Zwoliński M., Wydawnictwa Komunikacji i Łączności, Warszawa, 2002 3. Mikrokontrolery - architektura, programowanie, zastosowania, Pełka R., WKŁ, Warszawa, 2000 		
<p>Additional bibliography:</p> <ol style="list-style-type: none"> 1. VHDL język opisu i projektowania układów cyfrowych, Wrona W., WPKJS, Gliwice, 1998 2. Embedded System Design, Kluwer Academic Publishers, Marwedel P., Kluwer Academic Publishers, Boston, 2003. 		
<p>Result of average student's workload</p>		
<p>Activity</p>	<p>Time (working hours)</p>	
1. Lecture	15	
2. Laboratory	15	
3. Preparation to laboratory	15	
4. Preparation of laboratory reports	15	
5. Preparation to test	10	
6. Consultations	10	
<p>Student's workload</p>		
<p>Source of workload</p>	<p>hours</p>	<p>ECTS</p>
Total workload	80	3
Contact hours	45	2
Practical activities	40	2