GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Microelectronic Programmable Systems, PG_00048107
Field of study	Electronics and Telecommunications

Date of commencement of studies	October 2024	Academic year of realisation of subject	2027/2028
Education level	first-cycle studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	4	Language of instruction	Polish
Semester of study	7	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	exam

Conducting unit	Department of Microelectronic Systems -> Faculty of Electronics, Telecommunications and Informatics

Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Marek Wójcikowski
	Teachers	dr hab. inż. Marek Wójcikowski

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	E-learning hours included: 0.0						

Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
	Number of study hours	30	3.0	42.0	75

Subject objectives	Introduction to the design and capabilities of microelectronic programmable systems, built on an FPGA programmable circuits. The students will be taught how to create a full microprocessor system with a processor, buses, peripherals, and storage systems within a single FPGA. Introduction to methods of debugging of such systems.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U04] can apply knowledge of programming methods and techniques as well as select and apply appropriate programming methods and tools in computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study	can write basic low-level software and drivers for hardware blocks of programmable microelectronic systems;	[SU1] Assessment of task fulfilment
	[K6_W32] Knows the parameters, functions and methods of analysis, design and optimization of analogue and digital circuits and electronic systems	knows the construction of digital programmable microelectronic systems; knows processors and peripheral systems implemented in FPGAs; knows the basic methods of starting programmable microelectronic systems;	[SW1] Assessment of factual knowledge
	[K6_W33] Knows programming languages and equipment description languages, as well as methods for the synthesis of combinational and sequential circuits and programmable systems	knows the structure and operation of basic blocks of programmable microelectronic systems;	[SW1] Assessment of factual knowledge
	[K6_U03] can design, according to required specifications, and make a simple device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment	knows how to design a programmable microelectronic system, knows how to add own hardware blocks to a programmable microelectronic system;	[SU1] Assessment of task fulfilment

Subject contents	1. Design of Microelectronic Programmable Systems. Processors in SoC. 2. Various Solutions of Programmable SoC. 3. Overview of Programmable SoCs (Xilinx, Altera, Actel). 4. Processors in ICs from Xilinx. 5. Procesory w układach Altery. 6. Procesor Picoblaze. 7. Busses in Microprocessor Systems from Xilinx. 8. The Procesor Microblaze. 9. The Environment for the Development of a Microelectronic System EDK. 10. Module of a Universal Input-Output Ports for OPB Bus the Structure and Application. 11. Connecting of Custom IP Blocks to OPB Bus. 12. Interrupts in the Processor Microblaze. Interrupt Controller. 13. FLS Interface of the Processor Microblaze. 14. Debugging of Microelectronic Programmable Systems. 15. Connecting of Typical Peripherals to a Microeletronic Programmable System.

Prerequisites and co-requisites	Knowledge of VHDL (or Verilog) and C language is required.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final exam	50.0%	50.0%
	Practical exercise	50.0%	50.0%

Recommended reading	Basic literature	Altera Inc. , www.altera.com Xilinx Inc, www.xilinx.com
	Supplementary literature	No requirements
	eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable