GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Microelectronic Embedded Systems, PG_00064071						
Field of study	Electronics and Telecommunications						
Date of commencement of studies	February 2025		Academic year of realisation of subject		2025/2026		
Education level	second-cycle studies		Subject group		Optional subject group Specialty 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	1		Language of instruction		Polish		
Semester of study	2		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	15.0	0.0	45
	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	45		6.0		24.0	75
Subject objectives	To become acquainted with the structure and capabilities of microelectronic embedded systems.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W03] knows and understands, to an increased extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum	knows the structure and operation of selected real-time operating systems	[SW1] Assessment of factual knowledge
	[K7_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, making assessment and critical analysis of the prepared software as well as a synthesis and creative interpretation of information presented with it	configures the real-time operating system in designed embedded systems	[SU1] Assessment of task fulfilment
	[K7_U03] can design, according to required specifications, and make a complex 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	designs and runs embedded systems based on programmable systems,	[SU1] Assessment of task fulfilment
	[K7_W04] knows and understands, to an increased extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or other elements or programmable devices specific to the field of study, and organization of work of systems using computers or such devices	knows the structure, properties and applications of embedded systems;	[SW1] Assessment of factual knowledge

Subject contents		
	1	Embedded systems definitions.
	2	Embedded systems internals hardware.
	3	Microprocessors and microcontrollers in embedded systems.
	4	FPGAs in embedded systems.
	5	Memories in embedded systems.
	6	Buses in embedded systems.
	7	Input/output circuits in embedded systems.
	8	Analog circuits in embedded systems.
	9	Embedded systems diagnostics.
	11	Embedded systems internals software.
	12	Programming languages for embedded systems.
	13	Operating systems used for embedded systems.
	14	Linux as an operating system for embedded systems.
	15	Linux kernel configuration.
	16	Linux system bootloaders.
	17	Linux device drivers.
	18	File systems in Linux.
	19	Tools and methods for embedded Linux configuration.
	20	Programmer's tools for embedded Linux.
	21	Linux as a real-time operating system.
	22	Description of some commercial real-time operating systems.
	23	Compilator configuration.
	24	Linker configuration.
	25	Compilation process automation.
	26	Wishbone bus.

	27 System on Chip technology.
	29 Network on Chip technology.
	30 Importance of power consumption reduction in embedded systems.
	31 Hardware power consumption reduction methods.
	32 Software power consumption reduction methods.
	33 Reliability of embedded systems.

Prerequisites and co-requisites	Knowlege of VHDL (or Verilog) and C/C++ language. Recommended knowledge of Microelectronic Programmable Systems.

Assessment methods and criteria			
	Subject passing criteria	Passing threshold	Percentage of the final grade
	Seminar	50.0%	20.0%
	Laboratory	50.0%	40.0%
	Examination	50.0%	40.0%

Recommended reading	Basic literature	T. Noergard, Embedded Systems Architecture, Elsevier 2005
		J. Ganssle, The Art of Designing Embedded Systems, Elsevier, 2008.
		Xilinx, www.xilinx.com
		J. Catsoulis, Designing Embedded Hardware, OReilly Media, 2005.
	Supplementary literature	No requirements.
	eResources addresses	Adresy na platformie eNauczanie:

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

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