GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Programming of Real-Time Systems, PG_00048385
Field of study	Electronics and Telecommunications, Biomedical Engineering, Biomedical Engineering, Biomedical Engineering

Date of commencement of studies	February 2024	Academic year of realisation of subject	2024/2025
Education level	second-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	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 Marine Electronic Systems -> Faculty of Electronics, Telecommunications and Informatics

Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Jan Schmidt
	Teachers	dr inż. Jan Schmidt

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	The aim of the course is introducing students with the programming techniques real-time systems.Discussion of issues concerning the development of software in multiprocess, multithreaded systems . Introducing students with the mechanisms of resource sharing in real-time systems. Presentation of the specifics of programming systems based on industry standards VMEbus, cPCI, PC104, PC104-PLUS. Introducing students with the specific programming systems based on DSP processors.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W04] Knows and understands, to an advanced extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, and organisation of systems using computers or such devices	The student knows and understands the advanced programming techniques of multi-process and multi-threaded real-time systems and systems based on signal processors.	[SW1] Assessment of factual knowledge

Subject contents	1. Introduction. Definitions. Basic concepts. 2. Review of real-time operating systems. 3. Real-time systems concepts and elements. 4. Kernel and his environment in RT systems. 5. Processes manager, resources manager, name space management. 6. Memory management in RT systems. 7. Processes and threads. 8. Threads scheduling in RT systems. 9. Threads synchronization methods in RT systems. 10. Inter-process communication in RT systems. 11. Hardware interrupts handling in RT systems. 12. Hardware programmnig in RT systems. 13. Communication devices based on VMEBus with environment. 14. Tools support RT systems programming. 15. Application debugging and testing in RT systems.
Prerequisites and co-requisites	

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	50.0%	40.0%
	Project	50.0%	30.0%
	Practical exercise	50.0%	30.0%

Recommended reading	Basic literature	http://www.qnx.com/developers/docs/6.5.0/index.jsp?topic=%2Fcom.qnx.doc.momentics%2Fbookset.html https://docs.microsoft.com/en-us/previous-versions/windows/embedded/ee504812(v=winembedded.60) https://wiki.linuxfoundation.org/realtime/start R. Chassaing, Digital Signal Processing and Applications with C6713 and C6416 DSK, John Wiley&Sons. 2005 S. A. Tretter, Communication System Design Using DSP Algorithms. Spronger 2008
	Supplementary literature	No requirements
	eResources addresses	Adresy na platformie eNauczanie:

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