GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Interfaces of Electronic Systems, PG_00048080		
Field of study	Electronics and Telecommunications		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2025/2026
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	3	Language of instruction	Polish
Semester of study	6	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Metrology and Optoelectronics -> Faculty of Electronics, Telecommunications and Informatics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Grzegorz Lentka	
	Teachers	dr hab. inż. Grzegorz Lentka	

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	2.0	18.0	50

Subject objectives

Getting familar with categories and topologies of intefaces, inteface model based on interface and device functions. Description of the examples of popular interfaces. Pratice with configuring, programming and diagnostics of the common interfaces.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_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	Student explains paradigms of electronic systems construction. Classifies intefaces as buss, star or loop configuration and presents their properties. Interprets inteface model based on interface function, interface messages, device functions and device messages on the example of GPIB. Explains generalized protocol of asynchronous transfer negotiation (handshake).	[SW1] Assessment of factual knowledge
[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	Organises system on the basis of the selected interfaces. Connects hardware layer and selects drivers and protocol. Uses methods and devices for conversion of interfaces and protocols.	[SU4] Assessment of ability to use methods and tools

Subject contents	1. Introduction: course outline, course grading, references. 2. Characteristic of electronic systems. The need of the interface in system. 3. Paradigms of electronic systems construction: modularity, hierarchiety, structuralism, connectivity 4. Topologies of the systems: star, loop, bus. 5. System classification based on scale: microsystem (SoC), classical systems (IaC, laboratory, industrial), distributed systems 6. Interface model based on interface functions, interface messages, device functions and device messages on the example of GPIB 7. Asynchronous interface system: bus, single-line interface messages 8. Set of interface functions as a functional description of the interface. GPIB functions set. 9. Generalized protocol of asynchronous transfer negotiation. Transmission of interface and device messages (3-wire handshake). 10. Multi-line interface messages on GPIB, basic control procedures. 11. Connecting hardware interface to software layers on the example of IEEE-488.2 and SCPI. 12. Autonomous interfaces in embedded controllers. 13. Microinterfaces similar to SMI (SPI, Microwire, etc.) Communication protocol used. 14. I2C interface and implementations. 15. RS-family of interfaces – application in development and diagnostics of systems. 16. CAN interface – node model. 17. CAN interface – basic protocol, distributed network construction. LIN subsystem. 18. Review of industry standards: EIB, Profibus, DeviceNet, J1850. 19. Review of computer interfaces: USB, FireWire. 20. Integration of interface systems. Hardware and software converters of interfaces. Expanders.
Prerequisites and co-requisites	No requirements
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Lab exercises	0.0%	28.0%
Tests during semester	50.0%	72.0%

Recommended reading	Basic literature	1. J. Bogusz: Lokalne interfejsy szeregowe w systemach cyfrowych, BTC 2004 2. W. Mielczarek: Szeregowe interfejsy cyfrowe, Helion 1994 3. W. Mielczarek: USB uniwersalny interfejs szeregowy, Helion 2005 4. W. Nawrocki: Komputerowe systemy pomiarowe, WKiŁ 2006
	Supplementary literature	No requirements
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	