GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Programming Microcomputers, PG_00047696
Field of study	Automatic Control, Cybernetics and Robotics

Date of commencement of studies	October 2020	Academic year of realisation of subject	2022/2023
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 Automatic Control -> Faculty of Electronics, Telecommunications and Informatics

Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Paweł Raczyński
	Teachers	dr inż. Krzysztof Cisowski
		dr inż. Paweł Raczyński

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	The main aim of the subject is to know basic techniques for assembly programming

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	The student knows the programming principles in various programming languages, including low-level programming. Knows the construction and organization of typical computer interfaces and peripherals. He knows the rules of their program support. Knows the principles of cooperation between user programs and system software.	[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	The student knows how to create software or its time-dependent fragments using low-level languages. The student knows how to use assembler language compilers and linkers in practice. The student knows how to put into practice the techniques of using program memory and disk memory and is able to implement software support for various devices using register programming techniques. The student knows how to use the techniques of combining assembler with programs written in C and PASCAL languages. The student knows how to use PC computers and the BIOS program module in practice.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment

Subject contents	1. Simple assembler, syntax, key words, name dictionary, operations on the name dictionary 2. Simple assembler directives 3. Assembly process, example 4. Macro assembler, condition assembly, macroinstructions and subroutines 5. Name attributes, multi file projects, team working 6. Linking process, examples 7. Programming techniques in assembler –TASM and MASM compilers 8. Memory addressing modes and its assembler implementation 9. Memory models and their effect on program construction techniques 10. Static memory and dynamic memory allocation techniques 11. Input and output service in assembler 12. Interrupt service routines in assembler 13. Effective data transfer commands 14. Stack, buffers, cyclic buffers – organization and application 15. Arithmetic commands, number formats, long number calculations 16. Logical commands, flags and its applications 17. Jump commands and its applications in different memory models 18. Functions and procedures, parameter exchange techniques 19. Interface into high level languages (C, C++, PASCAL) 20. File system and file handling techniques 21. Screen monitor, and screen service techniques 22. Basic of graphics programming techniques in assembler, graphic files, basic of data compression techniques 23. Keyboard, mouse - service techniques 24. BIOS, structure and application 25. Operating system, functions and services 26. Debugger idea and applications 27. Selected algorithms and its assembler implementations
Prerequisites and co-requisites	No requirements

Assessment methods and criteria			
	Subject passing criteria	Passing threshold	Percentage of the final grade
	Practical exercise	51.0%	60.0%
	Midterm colloquium	51.0%	40.0%

Recommended reading	Basic literature	A. Pyrchla, B. Danowski, BIOS. Przewodnik, Helion 2007 E. Wróbel, Asembler Praktyczny kurs asemblera, Helion 2004 J. Hollingworth, D. Buttrtfield, B. Swart, J. Allsop, C++ Builder 5 vademecum profesjonalisty tom 1 i 2, Helion 2001 K. R. Irvine, Asembler dla procesorów Intel vademecum profesjonalisty, Helion 2003 S. Kruk, Turbo asembler idee, polecenia, rozkazy procesora Pentium, Mikom 2000 V. Pirogow, Asembler Podręcznik programisty, Helion 2005 Zasoby Internetu
	Supplementary literature	No requirements
	eResources addresses	Adresy na platformie eNauczanie: Oprogramowanie mikrokomputerów - 2022-2023 - Moodle ID: 24985 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=24985

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