

GDAŃSK UNIVERSITY

Subject card

Subject name and code	System Software, PG_00053912							
Field of study	Informatics							
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	5		ECTS credits			3.0		
Learning profile	general academic profile		Assessment form			assessment		
Conducting unit	Department of Computer Architecture -> Faculty of Electronics, Telecommunications and In					ions and Inforn	natics	
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Tomasz Dziubich					
	Teachers		dr inż. Tomasz Dziubich					
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	oject Seminar		SUM
of instruction	Number of study hours	30.0	0.0	0.0	15.0	0.0		45
	E-learning hours included: 0.0							
Learning activity and number of study hours	Learning activity	Participation in classes includ plan	n didactic led in study	Participation i consultation h	n Iours	Self-study		SUM
	Number of study hours	45		6.0		24.0		75
Subject objectives	Understanding of low	-level software	develop proce	ss (OS service	s and d	rivers)		
Learning outcomes	Course outcome		Subject outcome			Method of verification		
	[K6_W03] Knows and understands, to an advanced 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		Student will become familiar with hardware support for operating systems (i.e memory management) and basic functions of moderns operating systems (file systems, multitasking, memory managme, cooperation with external devices). Student will implement basic device driver.			[SW1] Assessment of factual knowledge		
	[K6_U05] can plan and conduct experiments related to the field of study, including computer simulations and measurements; interpret obtained results and draw conclusions		Student will become familiar with hardware support for operating systems (i.e memory management) and basic functions of moderns operating systems (file systems, multitasking, memory managme, cooperation with external devices). Student will implement basic device driver.			[SU1] Assessment of task fulfilment		
Subject contents	1. Introduction 2. System software basis for control and management of the computer system 3. Generation of executable code: compilation, linking, loading direct and relocatable, static and dynamic libraries 4. Structure of compiled and linked files i 16- and 32-bit modes (public symbols, memory models) 5. Object and executable file formats (a.out, ELF, OMF, DOS EXE, COFF, NE, PE) 6. Low level processor mechanizms supporting OS developer 12. API as abstraction layer between application and operating system kernel, API as a virtual machine definition 13. API level structure, classifying of Win32 API functions, implementation with dynamic link libraries 14. Memory management problems, allocation and deallocation of memory, fragmentation, protecting 15. Structure of process memory (code, static data, stack, heap) 16. Chained file allocation method in MS Windows (file allocation table, directories) 17. Indexed file allocation method in Linux system (i-node, file handle tables); files and processes 18. Files reading and writing with API functions in Linux and MS Windows systems 19. Directory search methods (opendir, readir) 20. API functions process management, parent and child process 21. Multithreading processing with API functions) 23. Signal and its properties, signal service, reliable and unreliable signals 24. Signal receiving technique 25. Peripheral drivers in Linux operating system 26. Peripheral drivers in MS Windows operating system (WDM)							

Prerequisites and co-requisites	knowledge of assembler and C language, computer architecture and concurrent processing					
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade			
	Midterm colloquium	40.0%	50.0%			
	Project	50.0%	50.0%			
Recommended reading	Basic literature	M. Russinovich D. Solomon, A. Ionescu: Windows Internals: Including Windows Server 2008 and Windows Vista, 5th Ed. Microsoft Press, 2009 W. Oney: Programming the Microsoft Windows Driver Model, 2th Ed. Microsoft Press, 2002 R. Love: Linux Kernel Development, 3rd Ed., Addison-Wesley Professional, 2010				
	Supplementary literature	No requirements				
	eResources addresses	Adresy na platformie eNauczanie: Oprogramowanie Systemowe 22/23 - Moodle ID: 25003 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=25003				
Example issues/ example questions/ tasks being completed						
Work placement	Not applicable					