WSB University						
Field of study: Computer Science						
Course: Architecture of mobile devices and mobile operating systems						
Educational profile:						
Education level: I cycle studies						
Number of hours per semester	1		2		3	
	I	**II**	**III**	**IV**	**V**	VI
Full -time studies (L/C/lab/pr/e)				16		
Part-time studies (L/C/lab/pr/e)						
CLASS LANGUAGE	English					
LECTURER	Dr hab. Inż. Dariusz Badura, prof. AWSB					
FORM	Lecture					
COURSE OBJECTIVES	The aim of the course is to get acquainted with the architecture of mobile devices and systems, including: getting to know the constituent elements of architecture: cores, transmission systems and energy management systems, various solutions and the use of mobile devices. learning the basic principles of programming and running programs on mobile devices.					

Reference to learning outcomes		**Description of learning outcomes**	**Verification of learning outcomes**
Field-related learning outcome	**PQF**		
Knowledge			
INF_W01	P6S_WG	know the principles of construction and operation of cores and processors as well as the principles of programming and running programs at assembler level.	Open test
INF_W05	P6S_WG	has knowledge of: programming, operating systems, wireless network technologies, and security of embedded systems.	
Skills			
INF_U07	P6U_UW	should have the skills to choose a programming platform to create and run programs.	An elaboration on the selected processor / core and its application in mobile devices or technology / network standard.
INF_U09	P6U_UU	has the ability to follow the development of mobile technologies in the field of architecture, operating systems, programming techniques and communication of mobile devices	
Social competences			
INF_K01	P6U_KK	should understand the reliability aspects of computer systems and the power consumption savings of embedded devices	Discussion at the lecture
INF_K04	P6U_KO	understand the need for continuous expansion of knowledge and sharing in the field of embedded device architecture	

Students' own workload (in didactic hours 1h did.=45 minutes)**	
Full- time Participation in lectures = 16h Participation in classes =	**Part-time** Participation in lectures = Participation in classes =

Preparation to classes = Preparation to lectures = 4h Preparation to an examination = 2h Project tasks = Consultations = e-learning = 4h Credit/examination = others (own work) = **TOTAL: 34h** **ECTS points:** **Including practical classes:**	Preparation to classes = Preparation to lectures = Preparation to an examination = Project tasks = Consultations = e-learning = Credit/examination = others (own work) = **TOTAL:** **ECTS points:** **Including practical classes:**

PREREQUISITES	**Basic knowledge of computer architecture, transmission and wireless networks and operating systems.** **Programming skills in the scope of C or Java**
COURSE CONTENT **(Division into contact hours and e-learning)**	Content delivered in face-to-face format: (contact hours): 1. Architecture of selected processors and cores (4h) 1.1. ARM core: architecture, ARM command lists, Thumb, Thumb-2, Jazele 1.2. Atom processor 1.3. Core Silvermont - Bay Trail (Intel) 2. Multiprocessing (2h) 2.1. Multi-core and multi-block systems 2.2. Multithreading in multi-core systems 3. Issues related to the mobility of computer devices: (2h) 3.1. Power 3.2. Memory 4.Wireless communication (Wifi, Bluetoth, telecommunication systems, LTE and other standards) (8h) 4.1. WiFi standard 4.2. Bluetooth LoPan, HaLow standards 5. Overview of operating system architectures 5.1. Android (4h) 5.2. iOS (2h) 5.3. Windows Mobile / Windows Phone (1h) 6. Trends in the development of mobile devices (1/2 h) 7. Programming of mobile systems: languages and system support (1/2h) 8. Summary for Architecture of mobile device operating systems (1h) 8.1. System classification 8.2. selected examples of systems along with a description of the application's life Content delivered in e-learning form: ----------
LITERATURE (compulsory reading)	1. Andrew S. Tanenbaum: Strukturalna organizacja systemów komputerowych; Wydanie V ; ISBN: 83-246-0238-0; Wydawnictwo: HELION; Data wydania: 03/2006; Andrew S. Tanenbaum:Structured Computer Organization (5th Edition), ISBN 83-246-0238-0, 8324602380 2. Łukasik E., Skublewska-Paszkowska M. iOS application development - Lublin : Polish Information Processing Society, 2016. 3. ARM Ltd.: ARM Architecture Reference Manual. 1996-2000, wyd. E.;
OPTIONAL LITERATURE	1. Ahmed Jerraya; Wayne Wolf "Multiprocessor Systems-on-Chips", Morgan Kaufmann, 2004 2. Dave Mark, Jack Nutting, Jeff LaMarche: Programowanie aplikacji na iPhone 4 [tł. Robert

(including at least two items in English, either books or articles)	Górczyński]. - Gliwice : "Helion", cop. 2012. 3. Wantoch Rekowski: Android w praktyce. Projektowanie aplikacji; PWN 2014;
SCHOLARLY PUBLICATIONS BY PERSONS WHO CONDUCT CLASSES, WHICH ARE RELATED TO THE MODULE SUBJECT	1. K. Bąk, D. Badura: ”Symulacja uszkodzeń pamięci typu NAND FLASH”, Internet w społeczeństwie informacyjnym, Nowoczesne systemy informatyczne i ich bezpieczeństwo”, Wydawnictwo WSB. 2. K. Bąk, D. Badura: „Condition of stopping the burn-in procedure”, Elektronika –Konstrukcje Technologie Zasosowania, Kwiecień 2016, pp 33 – 38. 3. K. Bąk, D. Badura: „The data retention control in NAND FLASH memory type”, Elektronika – Konstrukcje Technologie Zasosowania, Lipiec 2016, pp. 101-106.
TEACHING METHODS (Division into contact hours and e-learning)	In face-to-face form: • Slide show, and traditional method with an array • Student statements as part of the announced topics In the form of e-learning: • Presentation of slides and electronic documents • Discussion on the e-learning forum • Implementation of the project task
TEACHING AIDS	• Computer with integrated microprocessor system and startup system installed
PROJECT (if implemented in the framework of a classes module)	**e-learning:** **tests and elaborations**
FORM AND CONDITIONS OF ASSESSMENT (Division into contact hours and e-learning)	**Overall assessment is made given the amount of complete exercises at the e-learning platform**

** L-lecture, C- classes lab- laboratory, pro- project, e- e-learning*