Załącznik nr 2 do Zarządzenia Nr 915 z 2019 r. Rektora PB

**COURSE DESCRIPTION CARD**

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| **Bialystok University of Technology** | | | | | | | | | | |
| **Field of study** | **Electrical and Electronic Engineering** | | | | | | | **Degree level and programme type** | **Bachelor’s degree** | |
| **Specialization/ diploma path** | **-** | | | | | | | **Study profile** | **General-academic** | |
| **Course name** | **Digital Systems** | | | | | | | **Course code** | **IS-FEE-10040W** | |
| **Course type** | **Elective** | |
| **Forms and number of hours of tuition** | **L** | **C** | **LC** | **P** | **SW** | **FW** | **S** | **Semester** | **winter** | |
| **15** |  | **30** |  | **15** |  |  | **No. of ECTS credits** | **5** | |
| **Entry requirements** | **-** | | | | | | | | | |
| **Course objectives** | **Teaching a variety of problems related to contemporary digital systems based on micro-controllers and FPGA devices. Student will explain principles of operation of a variety of digital subsystems related to industrial digital systems and design simple digital subsystems.** | | | | | | | | | |
| **Course content** | **Lecture: Topics address electrical principles, semiconductor and integrated circuits, digital fundamentals, microcomputer systems based on microcontrollers and FPGA devices, serial interfaces for local communication.**  **Laboratory classes: Practical exercises in programming and designing digital systems based on microcontrollers and FPGA and softcore processors.** | | | | | | | | | |
| **Teaching methods** | **Lecture, laboratory classes, individual consultations, mini projects** | | | | | | | | | |
| **Assessment method** | **Lecture – set of reports**  **Laboratory classes– set of exercises and reports, SW – project evaluation** | | | | | | | | | |
| **Symbol of learning outcome** | **Learning outcomes** | | | | | | | | **Reference to the learning outcomes for the field of study** | |
| **LO1** | **Student recognizes and understands wiring diagrams related to digital systems** | | | | | | | |  | |
| **LO2** | **Student identifies various data buses and interfaces from the wiring diagrams** | | | | | | | |  | |
| **LO3** | **Student determines function and operation of the various modules and sensors and has a good knowledge of how they are used in the management of the digital system** | | | | | | | |  | |
| **LO4** | **Student distinguishes between various functions that are part of an industrial digital system** | | | | | | | |  | |
| **LO5** | **Student uses suitable programming tools** | | | | | | | |  | |
| **L06** | **Student uses application notes and data sheets** | | | | | | | |  | |
|  |  | | | | | | | |  | |
| **Symbol of learning outcome** | **Methods of assessing the learning outcomes** | | | | | | | | **Type of tuition during which the outcome is assessed** | |
| **LO1** | **written report on lecture content** | | | | | | | | **L** | |
| **LO2** | **written report on lecture content** | | | | | | | | **L** | |
| **LO3** | **written report on lecture content** | | | | | | | | **L** | |
| **LO4** | **written report on lecture content** | | | | | | | | **L** | |
| **LO5** | **evaluating the student's laboratory reports** | | | | | | | | **LC, SW** | |
| **LO6** | **evaluating the student's laboratory reports** | | | | | | | | **LC, SW** | |
| **Student workload (in hours)** | | | | | | | | | **No. of hours** | |
| **Calculation** | lecture attendance | | | | | | | | **15** | |
| participation in classes, laboratory classes, etc. | | | | | | | | **30** | |
| preparation for a written test related to the lecture | | | | | | | | **25** | |
| preparation for a written test related to the classes, laboratory classes etc. | | | | | | | | **15** | |
| reports preparation related to the lecture, laboratory classes, project etc. | | | | | | | | **30** | |
| participation in student-teacher sessions related to the lecture, classes, laboratory classes, project etc. | | | | | | | | **10** | |
| **TOTAL:** | | | | | | | | **125** | |
| **Quantitative indicators** | | | | | | | | | **HOURS** | **No. of ECTS credits** |
| **Student workload – activities that require direct teacher participation** | | | | | | | | | **55** | **2** |
| **Student workload – practical activities** | | | | | | | | | **85** | **3** |
| **Basic references** | **1. Ronald J. Tocci: Digital Systems: Principles and Applications, 2014.**  **2. William J. Dally: Digital Design: A Systems Approach, 2012.**  **3. Elliot Williams: AVR Programming: Learning to Write Software for Hardware, 2014.**  **4. Donzellini, G., Oneto, L., Ponta, D., Anguita, D.: Introduction to Digital Systems Design, Springer, 2019.**  **5. Joseph Yiu: The Definitive Guide to ARM® Cortex®-M3 and Cortex®-M4 Processors, 2014.** | | | | | | | | | |
| **Supplementary references** | **1. Barrett S.: Embedded Systems Design with the Atmel AVR Microcontroller, Morgan & Claypool Publishers, 2009.**  **2. Barrett S.: Atmel AVR Microcontroller Primer: Programming and Interfacing, Morgan & Claypool Publishers, 2007.**  **3. AgusKurniawan: Getting Started With STM32 Nucleo Development, 2015.** | | | | | | | | | |
| **Organisational unit conducting the course** | **Department of Automatic Control and Robotics** | | | | | | | | **Date of issuing the programme** | |
| **Author of the programme** | **Wojciech Wojtkowski, Ph.D.** | | | | | | | | **2021-03-02** | |

**L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work,S – seminar**