COURSE DESCRIPTION CARD - SYLLABUS

Course name
Microprocessor techniques
Course

Field of study
Mathematics in technology
Area of study (specialization)
Programming in technology
Level of study
Second-cycle studies
Form of study
full-time

Year/Semester
2/3
Profile of study
general academic
Course offered in
polish
Requirements
compulsory

Number of hours

Lecture
30
Laboratory classes
15
Other (e.g. online)

Tutorials
Projects/seminars

Number of credit points
3

Lecturers

Responsible for the course/lecturer:
Dominik Belter PhD, Dsc.

Responsible for the course/lecturer:

Prerequisites
Student has structured and theoretically founded knowledge of the basic algorithms and math for physics, electronic circuits. Student is able to use programming environments and platforms to write, perform and test simple programs for microcontrollers. Student is aware of and understands the importance and impact of non-technical aspects of engineering activity and the associated responsibility for decisions..

Course objective
Description of the concepts that underlie microcontrollers with examples that pertain to the most popular ones, including: STM32, ATMega, PIC, 8051.

Course-related learning outcomes

Knowledge

1. has an theoretical knowledge about computer science, including numerical methods; has detailed knowledge of at least one software package or programming language [KW_05]

2. has an extended knowledge of the latest trends in the development of scientific disciplines and in the field of engineering and technical sciences [KW_09]

3.has an advanced knowledge of the principles of ergonomics, health and safety at work and industrial risks etc. [KW_11]

Skills

1. is able to select appropriate sources of knowledge and obtain necessary information from them, make a critical analysis and evaluation of solutions to complex and unusual engineering tasks or simple research problems and propose their improvement [KU_06].

2. is able to measure selected physical quantities with the use of appropriate measuring equipment or sensors or transducers, using familiar measurement methods and systems; is able to perform critical analysis of obtained measurement results [KU_07].

3. is able to operate equipment, tools, etc. in accordance with the general requirements and technical documentation; is able to apply the principles of health and safety at work [KU_09].

4. is able to use the specific knowledge acquired and appropriate methods and tools to solve typical engineering tasks or simple research problems [KU_10].

5. is able to design, construct and test a complex device, object, system, etc., or carry out a project using appropriate methods, techniques, tools and materials [KU_11].

Social competences

1. is aware of the role and importance of knowledge in solving problems of a practical nature, typical for professions and workplaces related to the studied field; is aware of the need to deepen and broaden knowledge [KK_02].

2. is aware of his social role as a graduate of a technical university, is ready to communicate popular science content to the public and to identify and solve basic problems related to the field of study [KK_05].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures: written tests, pass criterion of 50.1% points.

Laboratory: tests, evaluation of completed projects and reports

Programme content

Lecture: uC architectures, digital and analog input and outputs, USART, SPI, I2C, 1-wire, RS-232, RS-485, digital to analog converters, analog to digital converters, USB, SD cards

Laboratory: digital and analog input and outputs, USART, SPI, I2C, 1-wire, RS-232, RS-485, digital to analog converters, analog to digital converters, USB, SD cards using STM32F407

Teaching methods

Lecture conducted in an interactive way with formulation of questions to a group of students or to indicated specific students including: numerical systems, architecture and construction of microprocessors, I/O systems, USART, SPI, I2C, 1-wire interfaces, RS-232, RS-485 standards, digital-to-analogue converters, analog-to-digital converters, USB communication, SD card support

Bibliography

Basic

1. M. Galewski, STM32. Aplikacje i ćwiczenia w języku C, Wydawnictwo BTC, Legionowo 2011

2. R. Pełka, Mikrokontrolery, Mikrokontrolery. Architektura, programowanie, zastosowania, Wydawnictwa Komunikacji i Łączności, Warszawa, 2001
3. Geoffrey Brown, Discovering the STM32 Microcontroller, Indiana University, 2016

Additional

1. K. Paprocki, Mikrokontrolery STM32 w praktyce, Wydawnictwo BTC, Legionowo 2011

2. P. Borkowski, AVR i ARM7. Programowanie mikrokontrolerów dla każdego, Helion, 2010
3. D. Belter, K. Walas, A Compact Walking Robot - Flexible Research and Development Platform, Recent Advances in Automation, Robotics and Measuring Techniques, vol. 267, R. Szewczyk, C. Zielinski, M. Kaliczynska (Eds.), pp. 343-352, 2014

Breakdown of average student's workload

	Hours	ECTS
Total workload	90	3,0
Classes requiring direct contact with the teacher	60	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	30	1,0

1 delete or add other activities as appropriate