**Nazwa przedmiotu:**

Introduction to Microprocesor Systems

**Koordynator przedmiotu:**

Przemysław Szulim, PhD

**Status przedmiotu:**

Obowiązkowy

**Poziom kształcenia:**

Studia I stopnia

**Program:**

Electric and Hybrid Vehicles Engineering

**Grupa przedmiotów:**

Obowiązkowe

**Kod przedmiotu:**

1150-00000-ISA-0390

**Semestr nominalny:**

3 / rok ak. 2022/2023

**Liczba punktów ECTS:**

2

**Liczba godzin pracy studenta związanych z osiągnięciem efektów uczenia się:**

1) Number of contact hours - 22, including:
a) lecture - 10 hours;
b) laboratory - 10 hours;
c) consultations - 2 hours

2. Student's own work - 40 hours, including:
a) 25 hours - ongoing preparation for laboratories and lectures (literature analysis),
b) 5 hours - completing homework assignments,
c) 10 hours - preparing for the colloquium.
3) TOGETHER - 62 hours

**Liczba punktów ECTS na zajęciach wymagających bezpośredniego udziału nauczycieli akademickich:**

1 ECTS point - 22 hours including:
a) lecture - 10 hours;
b) laboratory - 10 hours;
c) consultations - 2 hours;

**Język prowadzenia zajęć:**

angielski

**Liczba punktów ECTS, którą student uzyskuje w ramach zajęć o charakterze praktycznym:**

1.2 ECTS points - 30 hours, including:
a) 15 hours - Laboratory exercises;
b) 10 hours - preparing for laboratory exercises;
c) 5 hours - completing homework.

**Formy zajęć i ich wymiar w semestrze:**

|  |  |
| --- | --- |
| Wykład:  | 15h |
| Ćwiczenia:  | 0h |
| Laboratorium:  | 15h |
| Projekt:  | 0h |
| Lekcje komputerowe:  | 0h |

**Wymagania wstępne:**

Basic knowledge of the C programming language.

**Limit liczby studentów:**

in accordance with the Rector's order

**Cel przedmiotu:**

The aim of the course is to learn the principles of programming and software architecture of controllers used in mechatronic systems.

**Treści kształcenia:**

Lecture:
Selected microprocessor architectures. Principle of operation and programming of microprocessor systems. Counter systems in embedded systems. Work with A / C and C / A converters and analog peripherals. Communication ports UART, CAN. Creating simple user interfaces. Modern tools supporting the work of a programmer.
Lab:
Programming environment and hardware - introduction to tools. Microcontroller configuration - introduction to work on registers. I / O ports. Counters. Communication ports. A / C converters. Introduction to interrupts.

**Metody oceny:**

Lecture: Marks obtained for computer programs (homework) and / or tests.
Laboratory: Examination of knowledge in form of a short test before each exercise, evaluation of the quality of software written during classes. The final grade from the laboratory is the average grade for all exercises.
Overall mark: average mark from lecture and laboratory.

**Egzamin:**

nie

**Literatura:**

brak

**Witryna www przedmiotu:**

Brak

**Uwagi:**

Auxiliary materials placed on the course web page

## Efekty przedmiotowe

### Profil ogólnoakademicki - wiedza

**Efekt 1150-00000-ISA-0390\_W1:**

The student has a basic knowledge of the components of the microcontroller

Weryfikacja:

Verification of knowledge takes place in writing by answering the question posed. Verification of knowledge is also carried out in writing at the beginning of each laboratory exercise, where the student must solve the task assigned to him.

**Powiązane efekty kierunkowe:** K\_W06

**Powiązane efekty obszarowe:** T1A\_W03

**Efekt 1150-00000-ISA-0390\_W2:**

The student understands the essence of the microcontroller's operation and the flow of information in it.

Weryfikacja:

Verification of knowledge takes place in writing by answering the question posed. Verification of knowledge is also carried out in writing at the beginning of each laboratory exercise, where the student must solve the task assigned to him.

**Powiązane efekty kierunkowe:** K\_W06

**Powiązane efekty obszarowe:** T1A\_W03

**Efekt 1150-00000-ISA-0390\_W3:**

 The student has a basic knowledge of engineering tools for programming.

Weryfikacja:

Verification of the student's knowledge takes place during laboratory classes by assessing the progress of the exercises

**Powiązane efekty kierunkowe:** K\_W07

**Powiązane efekty obszarowe:** T1A\_W02, T1A\_W04

### Profil ogólnoakademicki - umiejętności

**Efekt 1150-00000-ISA-0390\_U1:**

The student is able to accomplish the task in the form of a program for a selected peripheral microcontroller module.

Weryfikacja:

Verification of student's acquired skills takes place during laboratory classes during their implementation. The basis for passing the exercise is correct preparation of the program in accordance with the instructions attached to the exercise.

**Powiązane efekty kierunkowe:** K\_U11, K\_U12

**Powiązane efekty obszarowe:** T1A\_U08, T1A\_U09, T1A\_U07, T1A\_U08

**Efekt 1150-00000-ISA-0390\_U2:**

 The student is able to use selected engineering tools for programming and observation of program execution by the microcontroller.

Weryfikacja:

Verification of skills takes place in laboratory classes through the implementation of tasks indicated in the instructions attached to each exercise.

**Powiązane efekty kierunkowe:** K\_U07, K\_U10

**Powiązane efekty obszarowe:** T1A\_U08, T1A\_U09, T1A\_U07, T1A\_U08, T1A\_U09

**Efekt 1150-00000-ISA-0390\_U3:**

 The student can present the results and formulate conclusions from the exercise.

Weryfikacja:

The ability to formulate correct conclusions is assessed through an individual interview at a computer station where the student has a chance to present the results and conclusions from the observation of the program.

**Powiązane efekty kierunkowe:** K\_U04

**Powiązane efekty obszarowe:** T1A\_U03, T1A\_U04