STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Microprocessors technologies		**1010641261010322511**

Field of study	Profile of study (general academic, practical)	Year /Semester
Mechanical Engineering	**(brak)**	**3 / 6**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Mechatronics	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies	**full-time**

No. of hours					No. of credits
Lecture: **1**	Classes: **-**	Laboratory: **1**	Project/seminars: **-**		**2**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**2 100%**
Technical sciences	**2 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge of mathematics, physics, fundamentals of electrical engineering and electronics, including digital.
2	**Skills**	The ability to understand and interpret knowledge transmitted in the classroom. The ability to effectively self-education in a field related to the chosen field of study.
3	**Social competencies**	The awareness of the need to expand their competence, their willingness to cooperate within the team.

Assumptions and objectives of the course:

Thorough knowledge of theoretical and practical problems associated with the construction elements, components and microprocessor systems and the basis of their programming and design.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Student knows the structure and basic internal elements of 8-bit microcontrollers - [K1A_W13]
2. Student knows the basic 8-bit microcontroller orders and knows how the typical microcontrollers operates - [K1A_W13]
3. Student knows how to connect outer elements to the microcontroller - [K1A_W17]
4. Student can write, debug and implement control programs prepared in C language - [K1A_W18]

Skills:

1. Can chose a proper microcontroller to the specific tasks - [K1A_U04]
2. Is able to designa a mechatronic device controller based on 8-bit microcontroller - [K1A_U09]
3. Can prepare in polish and in English a manual and problem solving description about design and control based on 8-bit microcontroller - [K1A_U19]

Social competencies:

1. Demonstrates responsibility and professionalism in solving technical problems - [K1A_K01]
2. Student is aware of the importance and understanding of the non-technical aspects and effects of the engineering engineer's work and its environmental impact and responsibility for the decisions being made - [K1A_K02]
3. Student is aware of responsibility for his own work and willingness to follow the rules of teamwork and responsibility for jointly accomplished tasks - [K1A_K04]

Assessment methods of study outcomes

Lecture:

- assess the knowledge and skills indicated in a written test with microprocessor technology.

Laboratory:

- test and rewarding knowledge necessary for the accomplishment of the problems in the area of laboratory tasks.
- continuous assessment for each course - rewarding the increase in the ability to use principles and methods have met.
- assess the knowledge and skills related to the implementation of the tasks of exercises, evaluation reports performed exercise.

Get extra points for activity in the classroom, and in particular for:

- proposing additional discuss aspects of the subject,
- effectiveness of applying knowledge when solving a given problem,
- the ability to work within a team practically performing the task detailed in the laboratory,
- comments relating to the improvement of teaching materials,
- aesthetic diligence reports and jobs - in the framework of self-study.

Course description

Bit Operations, coding, review of the logic. Microprocessors, microcontrollers components: interfaces, memory (array, programmable), communication systems, peripherals. Microprocessor-based systems: buses, addressing. Systems interrupts. Signal processing. Design and programming of microprocessor control systems for sample applications in the areas of production, operation and measurements in different processes.

Designing and programming in high level language microprocessors for specific tasks.

laboratories:

Getting to know the architecture of an exemplary microcontroller and microcontroller programming in C in terms of handling internal and external devices. Basics of C51 language specification, implementation programs, use of selected internal systems, among others, timers and interrupt system, serial, AC transducer. Implementation of external devices, among others, LCD, LED, matrix keyboard. Implementation of the exemplary cooperation project microprocessor system with an external device.

Basic bibliography:

1. Gałka P., Gałka P., Podstawy programowania mikrokontrolera 8051, MIKOM, Warszawa 2000.
2. Gazarkiewicz R., Kowalik R., Dydaktyczny System Mikroprocesorowy DSM-51 - ćwiczenia języku C dla mikrokontrolera 8051 w praktyce, PWN, 2006
3. Majewski J., Programowanie mikrokontrolerów 8051 w języku C, pierwsze kroki, Wyd. BTC, Warszawa 2005
4. Bogusz J., Programowanie mikrokontrolerów 8051 w języku C w praktyce, Wyd. BTC, Warszawa 2005

Additional bibliography:

1. Bogusz J.: Programowanie mikrokontrolerów 8051 w języku C w praktyce, BTC, Warszawa 2005.
2. Rydzewski A.: Mikrokomputery jednoukładowe rodziny MCS-51, WNT, Warszawa 1997.
3. Doliński J., Mikrokomputer jednoukładowy INTEL 8051, PLJ: Warszawa 1993
4. Starecki T., Mikrokontrolery 8051 w praktyce, Wyd. BTC, 2005
5. Krzyżanowski R.: Układy mikroprocesorowe, Mikom, Warszawa 2004.
6. Prace dyplomowe IEiEP
7. Internet.

Result of average student's workload

Activity	Time (working hours)
1. participation in class lecture	15
2. participation in laboratory classes	15
3. consultation on the lecture	3
4. consultation on the laboratory	5
5. przygopreparation for the exam	10
6. grade the laboratory and exam	6
7. preparation for laboratory exercises and pass the laboratory	8

Student’s workload

Source of workload	hours	ECTS
Total workload	62	2
Contact hours	44	2
Practical activities	31	1