STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Microprocessor technology		**1010324351010321118**
Field of study	Profile of study (general academic, practical)	Year /Semester
Electrical Engineering	**(brak)**	**3 / 5**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**
Cycle of study:	Form of study (full-time,part-time)	
First-cycle studies	**part-time**	
No. of hours		No. of credits
Lecture: **20** Classes: **-** Laboratory: **10** Project/seminars: **-**		**5**
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		**5 100%**
Technical sciences		**5 100%**

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. characterize the structure and principles of the basic elements and the processor - [K_W07+++, K_W09+]
2. explain the operation of processor and microprocessor systems - [K_W07+++, K_W14+]

Skills:

1. apply his knowledge of the theory of digital circuits required to determine the important parameters of of data transmission and commands - [K_U02++, K_U05+]
2. obtain information from the literature and the Internet, work individually and independently solve problems in the theory of systems analysis and design and microprocessor devices - [K_U02++, K_U03+]

Social competencies:

1. able to think and act in an entrepreneurial manner in the area of analysis microprocessors - [K_K01+, K_K02++]

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 dodatko?wych 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

Applied methods of education: lectures: 20 h., laboratories: 10 h.

Lectures:

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.

Updated 2017: Presenting innovative solutions in the field of microprocessor technology, applied in the latest solutions in various industries.

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

A multimedia presentation with figures, diagrams, photos, supplemented with practical examples on the board, slides and computer programs, facilitating the linking of theory to practice. Lecture supplemented with additional materials provided to students for self study.

Use students' knowledge of other subjects, initiate discussions, ask questions to increase student activity and autonomy.

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 2005.
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.

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. Piasecki A., Trzmiel G., Remote building control using the bluetooth technology, Monograph Computer Applications in Electrical Engineering, Poznan University of Technology 2016, vol. 14, pp. 457 ? 468.
7. Sznura Sz., Trzmiel G., Zdalne sterowanie silnikiem elektrycznym za pomocą wiadomości tekstowych sms, IC-SPETO - International Conference on Fundamentals of Electrotechnics and Circuit Theory, Ustroń, Poland, 22-25.05.2013, pp. 77.
8. Diploma theses.
9. Internet.

Result of average student's workload

Activity	Time (working hours)

1. participation in class lecture	20
2. participation in laboratory classes	10
3. consultation on the lecture	2
4. consultation on the laboratory	3
5. grade the laboratory	2
6. preparation for laboratory exercises and pass the laboratory	35
7. preparation for exam	50
8. exam	2

Student's workload

Source of workload	hours	ECTS
Total workload	124	5
Contact hours	39	1
Practical activities	47	2