STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Basics of microprocessor engineering**	Code **1010331541010332695**

Field of study **Information Engineering**	Profile of study (general academic, practical) **(brak)**	Year /Semester **2 / 4**

Elective path/specialty **-**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**

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

No. of hours Lecture: **15** Classes: **-** Laboratory: **-** Project/seminars: **30**	No. of credits **3**

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

Education areas and fields of science and art **technical sciences** **Technical sciences**	ECTS distribution (number and %**)** **3 100%** **3 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

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

Assumptions and objectives of the course:

An in-depth introduction to theoretical and practical problems associated with miocroprocessor system design and programming.

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

Knowledge:

1. Knowledge about architecture and most common modules of microcontrollers - [K_W02 ++, K_W03 +++]

2. Knowledge about programming of microcontrollers and design of embedded systems - [K_W16 +++]

Skills:

1. Ability to apply the knowledge about structure and modules of microcontrollers - [K_U08 ++, K_U19 +]

2. Skills and abilities to acquire new knowledge about microcontrollers - [K_U01 +++, K_U03 +]

Social competencies:

1. Ability to commercialize solutions from embedded systems - [K-K01 ++, K_K02 +]

Assessment methods of study outcomes

Lecture:
assessment of knowledge - a written exam at the end of semester

Project:
evaluation of the prepared hardware/software project

Faculty of Electrical Engineering

Course description

Power supply and clocking of microprocessor systems. Operation and connection of input-output devices to microprocessor systems. Specifics of embedded systems firmware. Methodologies and selected standards related to software development for embedded systems. Introduction to heterogeneous microprocessor chips and hardware-software codesign approaches. Real-time systems. Arithmetic in microprocessor systems with limited resources. Energy losses and energy management in microprocessor-based systems. Examples of the use of microprocessor systems in research and development work at the Institute.

Basic bibliography:

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

Additional bibliography:

Result of average student's workload

Activity	Time (working hours)
1. Lecture	15
2. Project	30
3. Preparation for the exam	15
4. Project development	60

Student's workload

Source of workload	hours	ECTS
Total workload	120	3
Contact hours	45	1
Practical activities	90	2