STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Microprocessors systems		**1010331241010332704**
Field of study: **Automatic Control and Robotics**	Profile of study (general academic, practical): **general academic**	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: **30** Classes: **-** Laboratory: **30** Project/seminars: **-**		No. of credits: **4**
Status of the course in the study program (Basic, major, other): **other**	(university-wide, from another field): **university-wide**	
Education areas and fields of science and art		ECTS distribution (number and %)

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	K_W00: has basic knowledge resulting from the secondary school program. K_W01: has basic knowledge in the field of mathematics, containing algebra, analysis, logic, probability theory, as well as elements of discrete and applied mathematics.
2	**Skills**	K_U01: is able to gain (inquire) information from literature, data bases and other sources; is able to integrate acquired information, interpret it, as well as to draw conclusions and also formulate and defend opinions. K_U06: is able to communicate in English, and also to read descriptions and instructions concerning electronic devices, computer hardware and software tools, and similar documents.
3	**Social competencies**	K_K00: has social competences resulting from the secondary school program. K_K04: is aware of responsibility for individual work, and also is prepared to respect the rules of collective work, and to bear responsibility for collective projects.

Assumptions and objectives of the course:

Knowledge of mathematical models, methods of synthesis and CAD tools of digital circuits.

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

Knowledge:

1. Has systematized and improved theoretically knowledge in the domain of basic electronic devices, analog and digital, and also selected electronic circuits and systems. - [K_W12++]

2. Has systematized knowledge in the domain of computer architectures, computer networks and systems, and also operating systems, including the real time operating systems. - [K_W13+]

3. Has basic knowledge concerning the architectures and programming of microprocessor systems. - [K_W15+++]

Skills:

1. Can prepare technical report concerning the realization of the engineering task, and also is able to prepare a text containing the discussion of the results. - [K_U03+++]

2. Can design simple mechanical elements, and also electrical and electronic circuits designated to various applications. - [K_U06++]

Social competencies:

1. Understands the need and knows possibilities of constant education, improving professional competences, personal and social, can inspire and organize the process of education of other persons. - [K_K01++]

Assessment methods of study outcomes

Credit for lectures and laboratory exercises.

Course description

Lectures: Combinatorial and sequential digital circuits. Boolean functions and finite automata as mathematical models of the circuits. Realization of Boolean functions with use of logic gates, multiplexors, demultiplexors, ROMs and logic arrays. Realization of automata with use of flip-flops. Integrated digital circuits. Microprogrammed circuits and flow diagrams. Concurrent circuits and Petri nets. CAD tools.

Laboratory program: Analysis of combinatorial circuits (UK). Synthesis of combinatoral circuits. Realization of UK with use of NAND gates. Realization of UK with use of multiplexors. Realization of UK with use of demultiplexors. Realization of UK with use of ROMs. Analysis of sequential circuits (US). Realization of US with use of D-NAND structure. Realization of US with use of JK-NAND structure. Realization of US with use of memory-register structure. Realization of asynchronous US. Realization of microprogrammed circuits ? control circuit. Realization of microprogrammed circuits ? operational circuit. Realization of concurrent circuits. Conclusion.

Basic bibliography:

Additional bibliography:

Result of average student's workload

Activity	Time (working hours)
1. Lectures.	30
2. Laboratory exercises.	30
3. Consultations and examination.	5
4. Preparation to laboratory exercises and elaboration of reports.	40
5. Preparation to tests and examination.	20

Student's workload

Source of workload	hours	ECTS
Total workload	125	5
Contact hours	65	2
Practical activities	60	2