STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Signal processors**		Code **1010322331010322112**
Field of study **Electrical Engineering**	Profile of study (general academic, practical) **(brak)**	Year /Semester **2 / 3**
Elective path/specialty **Microprocessor Control Systems in**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**
Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time) **full-time**	
No. of hours Lecture: **15** Classes: **-** Laboratory: **15** Project/seminars: **15**		No. of credits **4**
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 %) **4 100%** **4 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	The knowledge of the architecture of microprocessor systems and principles of programming in high level languages at a basic level
2	**Skills**	The ability to apply knowledge of the basics of computer programming microprocessor systems
3	**Social competencies**	The ability to think and act in an entrepreneurial way in the area of software design for microprocessor systems

Assumptions and objectives of the course:

Become familiar with the architecture and applications of digital signal processors. Acquisition of skills to design digital signal processing algorithms in real time. Skills in programming of digital signal processors based on the selected runtime.

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

Knowledge:

1. Can describe the architecture, operation, and describe applications of digital signal processors - [K_W07 ++ K_W08 +++]
2. Can describe the basic design criteria for digital signal processing algorithms - [K_W06 +]

Skills:

1. Knows how to apply the knowledge in the field of signal processing techniques for the design of digital signal processing algorithms - [K_U13 +]
2. Can apply the selected runtime programming signal processors for specific applications - [K_U15 +]

Social competencies:

1. Able to think and act in an entrepreneurial way in the area of design of digital signal processing algorithms - [K_K01 ++]

Assessment methods of study outcomes

Lecture

? assess the knowledge and skills indicated in a written test

Project classes and laboratory exercises:

? test and rewarding knowledge necessary for the accomplishment of the problems in the area of ??tasks in the laboratory,

? continuous assessment, rewarding gain skills they met the principles and methods

? assess the knowledge and skills related to the implementation of laboratory exercises, evaluation reports performed exercise.

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

? propose to discuss additional aspects of the subject;

? effectiveness of the application of 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

Updated 2017. The lecture with multimedia presentation (drawings, equations, basic content) supplemented by the content on the blackboard. The essence of a digital signal processor. Types and division of DSP. Arithmetic fixed- and floating. Algorithms for digital filtering (FIR, IIR) and spectrum analysis of signals (DFT, FFT). Architecture of digital signal processors based processor family floating Analog Devices Inc. ADSP-21000. Cooperation digital signal processor with external systems. The process of initializing the processor. List of orders. Applications of DSP to process signals in real time. Design tools and runtime. Construction microcomputer system based on DSP.

Detailed reviewing of reports by leading labs and commentary discussions.

Projects - teamwork.

Students carry out projects related to research conducted at the ZEiS.

Basic bibliography:

1. A. Dąbrowski, Przetwarzanie sygnałów przy użyciu procesorów sygnałowych, Wydawnictwo Politechniki Poznańskiej, Poznań, 1997

2. A. V. Oppenheim, R. E. Schafer, Cyfrowe przetwarzanie sygnałów, WKŁ, Warszawa,1979

3. R. G. Lyons, Wprowadzenie do cyfrowego przetwarzania sygnałów, WKŁ, Warszawa, 1999

4. P. Barański, Przekształcenie Z. Zastosowania w filtracji cyfrowej sygnałów ? zbiór zadań. Wydawnictwo Politechniki Łódzkiej, 2014. ISBN 978-83-7283-638-0

Additional bibliography:

1. S.W. Smith, The Scientist and Engineer?s Guide to Digital Signal Processing (Second Edition), California Technical Publishing, San Diego CA, 1999

2. J.G.Proakis, D.G. Manolakis, Digital Signal processing, Upper Saddle River, New Jersey, 2007

3. M. Gwóźdź, Controller for balancing of current distribution in multi-channel converters, Conference Progress in Applied Electrical Engineering, Kościelisko, 2016, IEEE, DOI: 10.1109/PAEE.2016.7605127

Result of average student's workload

Activity	Time (working hours)
1. Participation in lecture classes	45
2. Participation in consultations	10
3. Individual development of the project (project classes)	15
4. Participation in the development of reports (laboratory classes)	5

Student’s workload

Source of workload	hours	ECTS
Total workload	75	4
Contact hours	55	3
Practical activities	15	3