STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Fundamentals of electronic processing of signals**	Code **1010341761010329417**

Field of study **Mathematics in Technology**	Profile of study (general academic, practical) **general academic**	Year /Semester **3 / 6**

Elective path/specialty **Electronic circuits and measurement**	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 **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**	Basic knowledge of algebra and mathematical analysis, electrical engineering and basic knowledge of electronic analog circuits and digital techniques.
2	**Skills**	Proper selection of electronic components and layout design for the implementation of a simple electronic engineering task
3	**Social competencies**	He is aware of the need to broaden his / her competence and shows willingness to cooperate within the team and ability to meet the requirements of participation in the didactic process realized by the university.

Assumptions and objectives of the course:

- Learn about the characteristics and application possibilities of analog, digital-to-analog and digital-analog converters.

- Learn about modern measurement signal processing techniques

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

Knowledge:

1. Well-ordered knowledge on the classification of basic electronic components and methods of processing electrical signals..
 - [[K_W25, K_W26]]

2. Can explain principles and techniques of acquisition and processing of measurement signals for industrial applications - [[K_W26]]

Skills:

1. Can design and implement signal processing for simple measurement engineering applications and diagnose the cause of technical malfunction - [[K_U23]]

2. He/she is able to work alone and in team for the proper selection of tools for signal processing tasks and to properly evaluate non-technical aspects such as time and cost of installation - [[[K_U26, K_U29]]

Social competencies:

1. He/she is able to think and act in a responsible and entrepreneurial manner in the area of electronic signal processing engineering - [[K_K03]]

Assessment methods of study outcomes

Lectures:

- Assessment of the knowledge demonstrated on the test of the course content (test, accounting and problem questions), the awarding marks in laboratory exercises.

- continuous estimation in all classes (awarding attendance in lectures, activity and quality of perception).

Laboratory exercises:

- Assessing the knowledge needed to solve problems in the field of laboratory tasks,

- continuous estimation in all classes -,

- assessment of knowledge and skills related to the implementation of the measurement task, evaluation of the report of the exercise.

Course description

Updating 2017:

Methods of education are orientated to students to motivate them to participate actively in education process by discussion and reports.

Lectures:

Multimedia presentations (including drawings, photographs, videos) supplemented by examples on the board. At the end of the assessment, the activity of students during the classes is taken into account. Theoretical issues are presented in close connection with practice.

Laboratory:

Detailed review of the report by the teacher. Performing team work and performing experiments including:

- Application of operational amplifiers for the implementation of analogue signal transducers. Analogue Signal Converters (Voltage Converters - Voltage Converters, Voltage Converters, Voltage Converters, Current Transmitters, Voltage Converters, Peak Transducers, Value Transducers, Sample Transducers). Voltage-frequency and frequency-voltage converters. Digital-to-analog converters: parameters, components and types of c / a converters. Analog-to-digital voltage transducers: parameters, components and processing methods. - Experimental studies of selected transducers.

Basic bibliography:

1. Z. Kulka, A. Libura, M. Nadachowski, Przetworniki analogowo-cyfrowe i cyfrowo-analogowe, WKŁ, Warszawa 1987

2. U. Tietze, Ch. Schenk, Układy półprzewodnikowe, WNT, Warszawa 2009

3. J. Zakrzewski, Czujniki i przetworniki pomiarowe, Wyd. Politechniki Śląskiej, Gliwice 2004

Additional bibliography:

1. J. Jakubiec, J. Roj, Pomiarowe przetwarzanie próbkujące, wyd. Politechniki Śląskiej, Gliwice 2000

2. Denton J. Dailey, Electronic Devices and Circuits, copyright 2001 by Prentice-Hall, Inc., Upper Sadle River, New Jersey 07548, USA. Warszawa 2002.

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	30
2. Participation in laboratory exercises	30
3. Participation in consulting with the teachers	4
4. Preparation to laboratory exercises and preparation of the reports	15
5. Preparation to exam and participation in exam	12

Student's workload

Source of workload	hours	ECTS
Total workload	91	4
Contact hours	65	2
Practical activities	45	2