STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Analog and digital electronic systems**		Code **1010311361010321814**
Field of study **Electrical Engineering**	Profile of study (general academic, practical) **(brak)**	Year /Semester **3 / 6**
Elective path/specialty **Microprocessor Control Systems in**	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: **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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Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Knows the rules of operation and parameters of the basic elements of electronic and microelectronic
2	**Skills**	Knows how to apply the knowledge in electronics to analyze the operation of analog and digital electronic circuits in the primary
3	**Social competencies**	Is able to think and act in an entrepreneurial way in the area of electronic design

Assumptions and objectives of the course:

Getting to know the principles of operation of complex analog and analog-to-digital electronic circuits. Acquisition of skills to design analog-to-digital electronic systems at the primary level.

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

Knowledge:

1. Can describe the operating principles and parameters of specialized microelectronics circuits, characterize the structure and the use of electronics analog-and-digital systems at basic level - [K_W02 + K_W07 ++ K_W14 +++]
2. Can describe the basic criteria of the design of electronic systems - [K_W04 + K_W014+++]

Skills:

1. Knows how to apply the knowledge in the field of electronics design of electronics anlog-and-digital systems - [K_U03 ++ K_U17 ++]
2. Can define the criteria necessary for the proper design of electronics analog-and-digital systems at the basic level - [K_U03 ++ K_U07 ++]

Social competencies:

1. Able to think and act in an entrepreneurial way in the area of design of electronics systems - [K_K02 ++]

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:

- Proposing to discuss additional aspects of the subject;
- The effectiveness of the application of knowledge when solving a given problem;
- 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 tasks? 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. Properties of specialized microelectronic circuits for analog signal processing. Introduction to the analog-to-digital signals. Construction and performance analog-to-digital and digital-to-analog. Construction and design principles of signal path from a transmitter physical quantity into an electrical signal. Analog-to-digital and digital-to-analog system microprocessor. Principles of designing analog-to-digital electronic systems.

Detailed reviewing of reports by leading labs and commentary discussions.

Projects - teamwork.

Basic bibliography:

1. P. Horowitz, W. Hill, Sztuka elektroniki. Część 1 i 2, WKŁ, 2014
2. Z. Kulka, M. Nadachowski, Analogowe układy scalone, WKŁ, W-wa, 1980
3. P. Górecki, Wzmacniacze operacyjne, Wydawnictwo BTC, Warszawa, 2004
4. F. Maloberti, Przetworniki danych, WKŁ, 2010

Additional bibliography:

1. W. Kester, The Data Conversion Handbook, ISBN: 978-0-7506-7841-4, Elsevier, 2005
2. http://www.analog.com/en/parametricsearch/10785
3. Michał Krystkowiak, Adam Gulczyński, Michał Gwóźdź, Model and Research of Power Electronics Solar Converter Working with Power Grid, Proceedings of the 2016 IEEE International Power Electronics and Motion Control Conference (PEMC), Bulgaria, Varna, 25-30 September, 2016, ISBN: 978-1-5090-1797-3, pp. 186-191. DOI: 10.1109/EPEPEMC.2016.7752176.

Result of average student's workload

Activity	Time (working hours)
1. Participation in classes	60
2. Participation in consultations	10
3. Individual development of the project (project classes)	15
4. Udział w opracowaniu sprawozdań (zajęcia laboratoryjne)	10

Student's workload

Source of workload	hours	ECTS
Total workload	95	4
Contact hours	70	3
Practical activities	15	3