

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Electronics and Power Electronics</b>		Code <b>1010321331010323752</b>
Field of study <b>Electrical Engineering</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>2 / 3</b>
Elective path/specialty <b>-</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>First-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>30</b> Classes: <b>-</b> Laboratory: <b>-</b> Project/seminars: <b>-</b>		No. of credits <b>2</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>2 100%</b> <b>2 100%</b>
<b>Responsible for subject / lecturer:</b>  dr hab. inż. Michał Gwóźdź email: <a href="mailto:michal.gwozdz@put.poznan.pl">michal.gwozdz@put.poznan.pl</a> tel. 61 665 2646 Faculty of Electrical Engineering ul. Piotrowo 3A 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Basic knowledge of physics, electrical engineering, and mathematical analysis
2	<b>Skills</b>	Analysis and synthesis of circuits, carrying out activities in the field of basic account of operator. The ability to effectively self-education in a field related to the chosen field of study
3	<b>Social competencies</b>	It is aware of the need to broaden their competence, willingness to cooperate within the team
<b>Assumptions and objectives of the course:</b> Getting to know the construction, parameters and applications of basic electronic components. Getting to know the principles of operation of analog and digital electronic circuits. Skills in electronic design at the basic level.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b> 1. Can describe the operating principles and parameters of basic electronic components, characterize the structure and use of basic analog and digital electronic circuits - [K_W04 + K_W07 + K_W14 +++] 2. Can describe the basic criteria for the design of electronic circuits - [K_W04 + K_W14 +++]		
<b>Skills:</b> 1. Knows how to apply the knowledge in electronics to analyze the operation of basic analog and digital electronic circuits - [K_U01 + K_U03 ++] 2. Can define the criteria necessary for the proper design of electronic system-level - [K_U01 ++ K_U03 +]		
<b>Social competencies:</b> 1. Is able to think and act in an entrepreneurial way in the area of electronic design - [K_K02 ++]		
<b>Assessment methods of study outcomes</b>		
Assessment of the knowledge and skills shown on the written test		
<b>Course description</b>		

Updated 2017. The lecture with multimedia presentation (drawings, equations, basic content) supplemented by the content on the blackboard. The properties and characteristics of the basic elements and electronic devices: passive components, semiconductor diodes, bipolar transistors - their operation and application. Semiconductor optoelectronic devices - their properties and application examples. The feedback in analog circuits. Operational amplifiers - the ideal and the real, properties, parameters, applications. Power amplifiers - properties and applications. Electronics generators: excitation conditions, types and application generators. Linear circuits. Analog filters: types, design rules, and the use of filters. Basics of digital technique: binary system of writing numbers, logic states, logical operations, elements of logic, truth table, digital combinational and sequential circuits. TTL Family. Semiconductor memories: general classification, basic properties of certain types of memory.

**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. J. Kalisz, Podstawy elektroniki cyfrowej, WKiŁ, Warszawa, 2002

**Additional bibliography:**

1. M. P. Kaźmierkowski, J. T. Matysik, Wprowadzenie do elektroniki i energoelektroniki, Oficyna Wyd. PW, Warszawa, 2005
2. Michał Gwóźdź, Dominik Matecki, Power Electronics Inverter with a Modified Sigma-Delta Modulator and an Output Stage Based on GaN E-HEMTs, Advanced Control of Electrical Drives and Power Electronic Converters, Springer, London, ISBN: 978-3-319-45735-2, pp. 327-338

**Result of average student's workload**

Activity	Time (working hours)
1. Participation in lecture classes	30
2. Participation in consultations	5
3. Przygotowanie do egzaminu	15

**Student's workload**

Source of workload	hours	ECTS
Total workload	50	2
Contact hours	35	1
Practical activities	0	0