	of the module/subject			ode			
Sem	iconductor Devi	ces	10	10804131010840023			
Field of	study	communications	Profile of study (general academic, practical)	Year /Semester			
Flective	a nath/specialty	communications	Subject offered in:	Course (compulsory elective)			
LICOUVC	, pair specially	-	Polish	obligatory			
Cycle o	f study:		Form of study (full-time,part-time)				
First-cycle studies			part-time				
No. of h	nours			No. of credits			
Lectu	re: <b>20</b> Classes	s: 15 Laboratory: 15	Project/seminars:	6			
Status o	of the course in the study	program (Basic, major, other)	(university-wide, from another field	)			
		major	fron	field			
Education areas and fields of science and art				ECTS distribution (number and %)			
techr	nical sciences			6 100%			
	Technical scie	ences		6 100%			
Resp	onsible for subj	ect / lecturer:					
dr inž. Krzysztof Klimaszewski email: kklima@et.put.poznan.pl tel. +48 61 665 3895 Wydział Elektroniki i Telekomunikacii							
ul. F	Piotrowo 3A 60-965 Po	oznań					
Prere	equisites in term	s of knowledge, skills and	d social competencies:				
1	Knowledge	nd theory of probability.					
	Knowledge Has a detailed, systematic knowledge of the fundamentals of circuit theory, together with necessary mathematical background; this knowledge allows him/her to understand, anal and evaluate the operation of electrical circuits.						
I		necessary mathematical backgro and evaluate the operation of ele	bund; this knowledge allows him/h actrical circuits.	it theory, together with er to understand, analyze			
2	Skills	and evaluate the operation of ele ls able to extract information fror sources. Is able to synthesize g	n Polish or English language litera athered information, draw conclus	it theory, together with er to understand, analyze ature, databases and other ions, and justify opinions.			
2	Skills Social competencies	As a detailed, systematic know necessary mathematical backgro and evaluate the operation of ele Is able to extract information fror sources. Is able to synthesize g Is aware of the limitations of his/ study.	n Polish or English language liter athered information, draw conclus her current knowledge and skills;	it theory, together with er to understand, analyze ature, databases and other ions, and justify opinions. is committed to further self-			
2 3 <b>Assu</b>	Skills Social competencies mptions and obj	necessary mathematical backgro and evaluate the operation of ele Is able to extract information fror sources. Is able to synthesize g Is aware of the limitations of his/ study.	her current knowledge and skills;	it theory, together with er to understand, analyze ature, databases and other ions, and justify opinions.			
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2 3 Acqua electro	Skills Social competencies imptions and obj intaining students with nic circuits. Calculatio Study outco	<ul> <li>has a detailed, systematic known ecessary mathematical backgroand evaluate the operation of electron of electron extract information from sources. Is able to synthesize gives a source of the limitations of his/study.</li> <li>ectives of the course: basic electronic components, the n examples for basic circuit design mes and reference to the source of the source</li></ul>	n Polish or English language liter athered information, draw conclus her current knowledge and skills; principles of their operation and p are given. educational results for a	it theory, together with er to understand, analyze ature, databases and other ions, and justify opinions. is committed to further self- ossible applications in <b>field of study</b>			
2 3 Acqua electro Knov	Skills Social competencies imptions and obj intaining students with onic circuits. Calculatio Study outco vledge:	necessary mathematical backgro and evaluate the operation of ele Is able to extract information fror sources. Is able to synthesize g Is aware of the limitations of his/ study. ectives of the course: basic electronic components, the n examples for basic circuit design mes and reference to the	n Polish or English language liter athered information, draw conclus her current knowledge and skills; principles of their operation and p are given. educational results for a	it theory, together with er to understand, analyze ature, databases and other ions, and justify opinions. is committed to further self- ossible applications in <b>field of study</b>			
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2 3 Acqua electro Knov 1. Has semico circuits 2. Kno	Skills Social competencies mptions and obj intaining students with onic circuits. Calculatio Study outco vledge: the basic knowledge a onductor components. s [K1_W08] ws history and conter	<ul> <li>Plas a detailed, systematic known ecessary mathematical background and evaluate the operation of elements of elements and evaluate the operation of elements and evaluate the operation of elements of the same end of the limitations of his/study.</li> <li>Ectives of the course: basic electronic components, the nexamples for basic circuit designed and reference to the about electonic components, their Has the knowledge about electronic porary developments in application application.</li> </ul>	elege of the fundamentals of circl bund; this knowledge allows him/h actrical circuits. In Polish or English language litera athered information, draw conclus her current knowledge and skills; principles of their operation and p n are given. educational results for a properties and basic characteristi nic devices applications. Is familia on and production of electronic con	it theory, together with er to understand, analyze ature, databases and other ions, and justify opinions. is committed to further self- ossible applications in <b>field of study</b> cs. Is familiar with basic r with the most basic typical nponents [K1_W24]			
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## Assessment methods of study outcomes

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1. AUDITORY EXERCISES :				
written final test,				
short tests during the term.				
2. LECTURES :				
Course description				
LECTURES:				
1. Basic properties of the semiconductors				
2. Properties of a PN junction				
3. Types of diodes and their applications				
4. Bipolar transistor properties				
5. JFET transistor properties				
6. MOSFET transistor properties				
7. MESFET transistor properties				
8. Operational amplifier properties				
9. Thyristor types and properties				
10. IGBT transistor and its applications in power electronics				
AUDITORY EXERCISES:				
1. Using load lines and current-voltage curves to calculate quiescent point of diode and transistor circuit	S.			
2. Using maximum power hyperbole to establish an optimal working area for a semiconductor device.				
3. Calculating voltage gain in CE, CS circuits as well as in operational amplifier circuits (inverting and non-inverting configuration).				
4. Calculating large signal properties of transistors from current-voltage curves.				
LABORATORY EXERCISES:				
1 Multimeter perameters massuring bipolar transistor properties				
2. Transistor amplifiors				
2. Characterial amplifier circuite				
Basic bibliography:				
1. P. Horowitz, W. Hill, ?Sztuka Elektroniki?, WKiŁ 2006				
2. T.L. Floyd, ?Electronic Devices: Conventional Current Version", Pearson Education 2011				
3. S. Kuta ?Elementy i Układy Elektroniczne cz. I?, Wydawnictwo AGH 2000				
4. U. Tietze, Ch. Schenk, ?Układy Półprzewodnikowe?, WNT 2009				
5. A. Guzinski, Liniowe elektroniczne układy analogowe, WNT 1994				
6. A. Hilipkowski, ?Układy elektroniczne analogowe i cyfrowe", WNT 1995				
7. K. Antoszkiewicz, Z. Nosal, ?Zbiór zadań z układów elektronicznych liniowych", WNT 1997				
Additional bibliography:				
1. A.S. Sedra, K.C. Smith, ?Microelectronic Circuits?, Oxford University Press 2004				
2. R.C. Jaeger, ?Microelectronic Circuit Design?, McGraw-Hill 1997				
Result of average student's workload				
	Time (working			
Activity	hours)			

1. lectures attendance	20				
2. auditory exercises attendance	15				
3. laboratory exercises attendance	15				
4. preparation for labs	5				
5. preparation of lab reports	10				
6. homeworks, literature study		45			
7. preparation for auditory exercises		15			
8. exam preparations	30				
9. exam		3			
Student's workload					
Source of workload	hours	ECTS			
Total workload	158	6			
Contact hours	53	2			
Practical activities	30	2			