Name of the modulesculged:         Code:           Analog and digital electronic systems         Profile of study Ugeneral academic, practical (brak)         Year.Remester           Electrical Engineering         (brak)         Subject offend in:         Course (compulsory, elective) obligatory           Cycle of study:         First-cycle studies         Project/seminars:         9         3           Cycle of study (ful-kine.part-time)         No. of credits         3         3           Lecture:         18         Classes:         -         Laboratory:         9         Project/seminars:         9         3           Status of the course in the study program (Basic, major, other)         (university-wide, from another field)         (brak)           Education areas and fields of sciences         3         100%         3         100%           Technical sciences         a         3         100%         3         100%           Responsible for subject / lecturer:         responsible for subject / lecturer:         mgr init, addam guldzynski email: addam guldzynski electronic and microelectronic           1         Knowledge         Knows the rules of operation and parameters of the basic elements of electronic and microelectronic         1         Introno			STUDY MODULE DI	ESCRIPTION FORM			
Field of study     Profile of study (brack)     Year /Semester       Electrical Engineering     4 / 8       Electrical Engineering     Subject offend in: Polish     Course (computsory, elective) obligatory       Cycle of study:     Ferr of study (ful-lime,part-time)     Course (computsory, elective)       Text.org     Project/seminars:     9       Status of the course in the study program (Basic, major, other) (brak)     (university-wide, from another field)     No. of credits       Education areas and fields of sciences Technical sciences     1     Course (computsory)     3       Technical sciences     3     100%       Technical sciences     3     100%       Responsible for subject / lecturer:     Responsible for subject / lecturer:     mgrin2. Adam Gulczynskii email: michal gwozdz gput poznan.pl tel. 61 665 2265       Faculty of Electrical Engineering u. Piotrow 3A 60-965 Poznan     U. Piotrow 3A 60-965 Poznan       1     Knowledge     Knows the rules of operation and parameters of the basic elements of electronic and microelectronic       2     Skills     Knows the rules of operation and parameters of the basic elements of electronic design       3     Social competencies     Is able to think and act in an entrepreneurial way in the area of electronic design       3     Social competencies     Is able to think and act in an entrepreneurial way in the area of electronic design       4     Now boy to appl			ectronic systems				
Electrical Engineering       (Iorak)       4 / 8         Elective pathyspecially       Subject offered in: Polish       Course (compulsory, elective) obligatory         Cycle of study:       First-cycle studies       Portient       Course (compulsory, elective) part-time         No. of oradits       part-time       Image: compulsory, elective)       3         Status of the course in the study program (Basic, major, other)       (university-wide, from another field)       No. of credits         Education areas and fields of science and art       (university-wide, from another field)       ECT 5 distribution (number and %)         Education areas and fields of sciences       3       100%       3       100%         Responsible for subject / lecturer:       Responsible for subject / lecturer:       mgr in2. Adam Gulozyriski email: adam.gulozyriski@put.poznan.pl tel. 61 665 2285       3       100%         Forequisites in terms of knowledge, skills and social competencies:       1       Knows the rules of operation and parameters of the basic elements of electronic and microelectronic       1       Knows the rules of operation and parameters of the basic elements of electronic design         2       Skills       Knows the rules of operation and parameters of the basic for a field of study electronic incurs in the primary level.       Study outcomes and reference to the educational results for a field of study electronic incurs analog-to-digital electronic scincuits, characterize the structure and the				Profile of study	Year /Semester		
Microprocessor Control Systems in         Polish         obligatory           Cycle of study:         First-cycle studies         Form of study (full-time, part-time)         part-time           No. of ours         Lecture:         18         Classes: - Laboratory:         9         Project/seminars:         9         3           Satus of the course in the study program (Basic, major, other)         (university-wide, from another field)         No. of credits           Education areas and fields of science and art         (brak)         (brak)         ECTS distribution (number and %)           Education areas and fields of sciences         mgr in2. Adam Gulczyński emait: adam.gulczyński emait. eda electronic and microelectronic and microelectronic ada ema	Elec	trical Engineerin	g				
Cycle of study:         First-cycle studies         Form of study (full-time,part-time)           No. of hours         part-time           Lecture:         18         Classes:         -         Laboratory:         9         Project/seminars:         9         3           Status of the course in the study program (Basic, major, other)         (university-wide, from another field)         (brak)           Education areas and fields of science and art         (brak)         (brak)         ECTS distribution (number and %)           technical sciences         Technical sciences         and %)         3         100%           Responsible for subject / lecturer:         Responsible for subject / lecturer:         mgrin2. Adam Guiczyński emai: adam.guiczyński goutpoznan.pl         tel. 61 665 2866         Faculty of Electrical Engineering         ul. 81 665 2285         Faculty of Electrical Engineering         ul. 81 665 2285         Faculty of Electrical Engineering         ul. 81 665 2286         Faculty of Electrical Engineering         ul. 81 665 2285         Faculty of Electrical Engineering         ul. 81 665 2286         Fa	Elective		and Control Systems in				
First-cycle studies     part-time       No. of hours     Lacture:     18     Classes:     -     Laboratory:     9     Project/seminars:     9     3       Status of the course in the study program (Basic, major, other)     (university-wide, from another field)     (brak)       Education areas and fields of science and art     (brak)     (brak)       technical sciences     3     100%       Technical sciences     3     100%       Responsible for subject / lecturer:     Responsible for subject / lecturer:     mgr in2. Adam Gulczyniski       dr hab. inz. Michal Gwóżdz     mgr in2. Adam Gulczyniski     mail: adam.gulczyniski@put.poznan.pl       tel. 61 665 2285     Faculty of Electrical Engineering     Faculty of Electrical Engineering       ul. Piotrowo 3A 60-965 Poznań     ul. Piotrowo 3A 60-965 Poznań       Prerequisites in terms of knowledge, skills and social competencies:       1     Know how to apply the knowledge in electronics to analyze the operation of analog and digital electronic circuits in the primary       3     Social     Is able to think and act in an entrepreneurial way in the area of electronic design       A doescribe the operating principles and parameters of specialized microelectronic circuits. Acquisition of skills to design analog-to-digital electronic circuits. Acquisition of skills to design analog-to-digital electronic circuits. Acquisition of skills to design analog-to-digital electronic systems at the primary level. <t< td=""><td>Cycle of</td><td>•</td><td>ssor Control Systems in</td><td></td><td></td></t<>	Cycle of	•	ssor Control Systems in				
No. of hours       No. of credits         Lacture:       18       Classes:       -       Laboratory:       9       Project/seminars:       9       3         Status of the course in the study program (Basic, major, other)       (university-wide, from another field)       (brak)         Education areas and fields of science and art       (brak)       ECTS distribution (number and %)         Education areas and fields of science and art       ECTS distribution (number and %)       3       100%         Technical sciences       3       100%       3       100%         Responsible for subject / lecturer:       Responsible for subject / lecturer:       mgr in2. Adam Gulczynski@put.poznan.pl       email: adam.gulczynski@put.poznan.pl         tel. 61 665 2285       Faculty of Electrical Engineering       ul. Piotrowo 3A 60-965 Poznan       Proteopies Foznan         Prerequisites in terms of knowledge, skills and social competencies:       Increelectronic       Increelectronic circuits in the primary         3       Social       Rnows how to apply the knowledge in electronics to analyze the operation of analog and digital electronic circuits in the primary         3       Social       Is able to think and act in an entrepreneurial way in the area of electronic design         3       Social competencies       Is able to think and parameters of specialized microelectronic circuits. Acquisition of skills to design	Oyole o	-	le studies				
Lecture:       18       Classes:       -       Laboratory:       9       Project/seminars:       9       3         Status of the course in the study program (Basic, major, other) (brak)       (university-wide, from another field)       (university-wide, from another field)         Education areas and fields of science and at       (university-wide, from another field)       ECTS distribution (number and %)         technical sciences       3       100%       3       100%         Technical sciences       3       100%       3       100%         Responsible for subject / lecturer:       Responsible for subject / lecturer:       and %)       3       100%         renal:       main inchal gwozdz @put.poznan.pl       email: adam.gulczynski@put.poznan.pl       email: bic field 552285       Eschild 52285       Eschil	N (1			pur			
Status of the course in the study program (Basic, major, other)       (University-wide, from another field)         Education areas and fields of science and at       (brak)         technical sciences       3 100%         Technical sciences       3 100%         Responsible for subject / lecturer:       Responsible for subject / lecturer:         dr hab. in2. Michal Gwóźdź       mgr in2. Adam Gulczyński         email: michal gwoźdź @put.poznan.pl       email: adam.gulczyński         email: michal gwoźdź       mgr in2. Adam Gulczyński         email: adam.gulczyński       email: adam.gulczyński         gult. Piotrowo 3A 60-965 Poznań       ul. Piotrowo 3A 60-965 Poznań         Prerequisites in terms of knowledge, skills and social competencies:         1       Know the rules of operation and parameters of the basic elements of electronic and microelectronic         2       Skills       Knows the rules of operation and parameters of specialized microelectronic design         3       Social competencies       Isable to think and act in an entrepreneurial w		4.0	s: - Laboratory: 9	Project/seminars			
Education areas and fields of science and art       ECTS distribution (number and %)         technical sciences       3 100%         Technical sciences       3 100%         Responsible for subject / lecturer:       Responsible for subject / lecturer:         dr hab. inž. Michal Gwóźdź       mgr inž. Adam Gulczyński         email: michal.gwożdź@put.poznan.pl       email: adam.gulczyński@put.poznan.pl         tel. 61 665 2846       tel. 161 665 2285         Faculty of Electrical Engineering       Faculty of Electrical Engineering         ul. Piotrowo 3A 60-965 Poznań       ul. Piotrowo 3A 60-965 Poznań         Prerequisites in terms of knowledge, skills and social competencies:         1       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:       Study outcomes and reference to the educational results for a field of study         Knowledge       I. 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. Ca		010000	Eaboratory.		-		
technical sciences       and %)         Technical sciences       3 100%         at box       3 100%         Responsible for subject / lecturer:       Responsible for subject / lecturer:         dr hab. in2. Michal Gwóźdź       mgr in2. Adam Gulczyński         email: adam.gulczynski@put.poznan.pl       email: adam.gulczynski@put.poznan.pl         tel. 61 665 2646       Faculty of Electrical Engineering         Faculty of Electrical Engineering       Faculty of Sciences         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         Social competencies         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         Nowledge:       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_W04 + K_W014 +++]         Skills:          1. Can describe the operating principles and parameters of specialized microelectronics an			(brak)		(brak)		
Technical sciences       3 100%         Responsible for subject / lecturer:       Responsible for subject / lecturer:         dr hab. inz. Michal Gwóżdź       mgr inż. Adam Gulczyński         email: michal.gwożdz @put.poznan.pl       email: adam.gulczynski@put.poznan.pl         tel. 61 665 2646       tel. 161 665 2285         Faculty of Electrical Engineering       Faculty of Electrical Engineering         ul. Piotrowo 3A 60-965 Poznań       ul. Piotrowo 3A 60-965 Poznań         Prerequisites in terms of knowledge, skills and social competencies:         1       Knowledge         Knows her rules of operation and parameters of the basic elements of electronic and microelectronic         2       Skills         A social competencies:         3       Social competencies         Geting to know the principles of operation of complex nalog and analog-to-digital electronic design analog-to-digital electronic scircuits. Acquisition of skills to design analog-to-digital electronic scircuits. Acquisition of skills to design analog-to-digital electronic scircuits, characterize the structure and the use of electronics analog and -Igital systems at basic level - IK_W02 + K_W07 ++ K_W14 +++]         2. Can describe the operating principles and parameters of specialized microelectronics circuits, characterize the structure and the use of electronics analog-and-digital systems - IK_W03 + K_W07 ++ K_W14 +++]         2. Can describe the obasic cirteria of the design of electronics design of electronics analog-and-digital systems	Educati	on areas and fields of sci	ence and art				
Responsible for subject / lecturer:       Responsible for subject / lecturer:         dr hab. in2. Michai Gwóźdź       mgr in2. Adam Gulczyński         email: michal.gwoźdź@put.poznan.pl       email: adam.gulczyński@put.poznan.pl         tel. 61 665 2646       tel. t61 665 2285         Faculty of Electrical Engineering       ul. Piotrowo 3A 60-965 Poznań         ul. Piotrowo 3A 60-965 Poznań       ul. Piotrowo 3A 60-965 Poznań         Prerequisites in terms of knowledge, skills and social competencies:         1       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 of peration of 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 electronic sanalog-and-digital systems at basic level - [K_W02 + K_W07 + H_W14 + ++]         2. 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_W03 + K_W114 + ++]         2. Can describe the operating principles and p	techr	nical sciences			3 100%		
dr hab. inż. Michał Gwóźdź       mgr inż. Adam Gulczyński         email: michał.gwozdz@put.poznan.pl       tel. 61 665 2664         Faculty of Electrical Engineering       tel. t61 665 2285         Faculty of Electrical Engineering       Liel t61 665 2285         ul. Piotrowo 3A 60-965 Poznań       ul. Piotrowo 3A 60-965 Poznań         Prerequisites in terms of knowledge, skills and social competencies:         1       Knowledge         2       Skills         3       Social competencies         4       Knows how to apply the knowledge in electronics to analyze the operation of analog and digital electronic circuits in the primary         3       Social competencies         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 electronic systems at basic level - [K_W02 + K_W07 ++ K_W14 +++]         2. Can describe the operating of the field of electronic systems - [K_W04 + K_W014 +++]         Skills:         1. Can describe the operating of the field of electronics design of electronics analog-and-d		Technical scie	ences		3 100%		
dr hab. inż. Michał Gwóźdź       mgr inż. Adam Gulczyński         email: michał.gwozdz@put.poznan.pl       tel. 61 665 2664         Faculty of Electrical Engineering       tel. t61 665 2285         Faculty of Electrical Engineering       Liel t61 665 2285         ul. Piotrowo 3A 60-965 Poznań       ul. Piotrowo 3A 60-965 Poznań         Prerequisites in terms of knowledge, skills and social competencies:         1       Knowledge         2       Skills         3       Social competencies         4       Knows how to apply the knowledge in electronics to analyze the operation of analog and digital electronic circuits in the primary         3       Social competencies         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 electronic systems at basic level - [K_W02 + K_W07 ++ K_W14 +++]         2. Can describe the operating of the field of electronic systems - [K_W04 + K_W014 +++]         Skills:         1. Can describe the operating of the field of electronics design of electronics analog-and-d	Resp	onsible for subi	ect / lecturer:	Responsible for subie	ct / lecturer:		
email: michal.gwozd2@put.poznan.pl       email: adam.gulczynski@put.poznan.pl         tel. 61 665 2646       tel. t61 665 2285         Faculty of Electrical Engineering       Faculty of Electrical Engineering         ul. Piotrowo 3A 60-965 Poznań       ul. Piotrowo 3A 60-965 Poznań         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 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 cirteria of the design of electronic systems - [K_W03 ++ K_W014 +++]       Skills:         1. An own how to apply the knowledge in the field of electronics analog-and-digital systems at basic level - [K_W03 ++ K_W014 +++]       Skills:         2. Can define the criteria necessary for the pr	•	-					
Faculty of Electrical Engineering ul. Piotrowo 3A 60-965 Poznań       Faculty of Electrical Engineering ul. Piotrowo 3A 60-965 Poznań         Prerequisites in terms of knowledge, skills and social competencies:       Image: 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 cirteria of the design of electronic systems - [K_W04 + K_W014+++]         Skills:         1. Knows how to apply the knowledge in the field of electronics analog-and-digital systems at the basic level - [K_U03 ++ K_U17 ++]         2. Can define the criteria necessary for the proper design of electronics analog-and-digital systems at the basic	ema	ail: michal.gwozdz@pu		email: adam.gulczynski@put.poznan.pl			
ul. Piotrowo 3A 60-965 Poznań       ul. Piotrowo 3A 60-965 Poznaň         Prerequisites in terms of knowledge, skills and social competencies:       Image: 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_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:       Social competencies:			neering				
Knows       Knows the rules of operation and parameters of the basic elements of electronic and microelectronic         Knows       Knows how to apply the knowledge in electronics to analyze the operation of analog and digital electronic circuits in the primary         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         Knows the 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 electronics design of electronics analog-and-digital systems - [K_U03 ++ K_U17 ++]         3. Can define the criteria necessary for the proper design of electronics analog-and-digital systems at the basic level - [K_U03 ++ K_U07 ++]		, 0	0	, 0	0		
1       Knowledge       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 electronics design of electronics analog-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:	Prere	quisites in term	s of knowledge, skills and	d social competencies:	:		
2       Skills       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 electronics design of electronics analog-and-digital systems - [K_W04 + K_W014 +++]         Skills:         1. Knows how to apply the knowledge in the field of electronics design of electronics analog-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	Knowledge		parameters of the basic elem	nents of electronic and		
S       competencies         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 analog-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:	2	Skills		lge in electronics to analyze th	e operation of analog and digital		
competencies         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 analog-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:	3	Social	Is able to think and act in an entr	epreneurial way in the area of	electronic design		
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 analog-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:		-					
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 analog-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:		• •					
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:					circuits. Acquisition of skills to		
<ol> <li>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 +++]</li> <li>Can describe the basic criteria of the design of electronic systems - [K_W04 + K_W014+++]</li> <li>Skills:         <ol> <li>Knows how to apply the knowledge in the field of electronics design of electronics anlog-and-digital systems - [K_U03 ++ K_U17 ++]</li> <li>Can define the criteria necessary for the proper design of electronics analog-and-digital systems at the basic level - [K_U03 ++ K_U07 ++]</li> </ol> </li> <li>Social competencies:</li> </ol>		Study outco	mes and reference to the	educational results for	r a field of study		
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+++] <b>Skills:</b> 1. Knows how to apply the knowledge in the field of electronics design of electronics analog-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 ++] <b>Social competencies:</b>	Knov	/ledge:					
<ul> <li>2. Can describe the basic criteria of the design of electronic systems - [K_W04 + K_W014+++]</li> <li>Skills: <ol> <li>Knows how to apply the knowledge in the field of electronics design of electronics analog-and-digital systems - [K_U03 ++ K_U17 ++]</li> <li>Can define the criteria necessary for the proper design of electronics analog-and-digital systems at the basic level - [K_U03 ++ K_U07 ++]</li> </ol> </li> <li>Social competencies:</li> </ul>							
<ol> <li>Knows how to apply the knowledge in the field of electronics design of electronics anlog-and-digital systems - [K_U03 ++ K_U17 ++]</li> <li>Can define the criteria necessary for the proper design of electronics analog-and-digital systems at the basic level - [K_U03 ++ K_U07 ++]</li> <li>Social competencies:</li> </ol>							
<ul> <li>[K_U03 ++ K_U17 ++]</li> <li>2. Can define the criteria necessary for the proper design of electronics analog-and-digital systems at the basic level - [K_U03 ++ K_U07 ++]</li> <li>Social competencies:</li> </ul>	Skills	:					
[K_U03 ++ K_U07 ++] Social competencies:							
•	[K_U03 ++ K_U07 ++]						
1. Able to think and act in an entrepreneurial way in the area of design of electronics systems - [K_K02 ++]							
	1. Abl	e to think and act in a	n entrepreneurial way in the area o	f design of electronics system	s - [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-todigital 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		36		
2. Participation in consultations	5			
3. Individual development of the project (project classes)	10			
4. Udział w opracowaniu sprawozdań (zajęcia laboratoryjne)	5			
Student's workload				
Source of workload	hours	ECTS		
Total workload	56	3		

Total workload	56	3
Contact hours	41	2
Practical activities	9	2