Name of the module/subject         Code 1010322321010322648           Field of study         Profile of study (general academic, practical) (brak)         Year /Semester (general academic, practical) (brak)         Year /Semester (general academic, practical) (brak)         Year /Semester (brak)         1/2           Electrical Engineering         Subject offered in: Subject offered in: Second-cycle studies         Subject offered in: Profile of study (full-time, part-sime)         Course (computery, elective obligatory)           Cycle of study:         Second-cycle studies         No. of credits         2           Status of the course in the study program (Basic, major, other) (brak)         (university-wide, from another field) (brak)         No. of credits           Education areas and fields of science and art         ECT3 distribution (number and %)         ECT3 distribution (number and %)           technical sciences         2         100%         2         100%           Responsible for subject / lecturer: dr hab, inz. Ryszard Porada, prof. nadzw. email: ryszard porada 8pt poran.pl tet. 48 61 665 2360         Easic knowledge, skills and social competencies:         1           1         Knowledge         Basic knowledge of electrical engineering, automated technology and mathemathics analysis           2         Skills         It knows to use basic knowledge from the range of electrical engineering, automated technology and mathemathics analysis           3         Social competencies)<			STUDY MODULE D	ESCRIPTION FORM	
Field of study     Profile of study (general academic, practical) (brak)     Year /Semester (general academic, practical) (brak)     Year /Semester (general academic, practical) (brak)     Year /Semester (brak)       Cycle of study:     Subject offered in: Second-cycle studies     Subject offered in: Project/seminars:     Course (computeory, elective obligatory)       No. of nours     Second-cycle studies     Form of study (full-time,part-time)     No. of credits       Lecture:     15     Classes:     - Laboratory:     15     Project/seminars:     2       Status of the course in the study program (Basic, major, other)     (university-wide, from another field)     ECTS statubution (number and %)       Education areas and fields of science and at technical sciences     ECTS statubution (number and %)     ECTS statubution (number and %)       Technical sciences     2     100%     2     100%       Responsible for subject / lecturer: dr hab. in2. Ryszard porada, prof. nadzw. email: ryszard porada@put,poznan,pl tech 48 61 665 2380     Honwledge of electrical engineering, automated technology and mathemathics analysis       1     Knowledge     Basic knowledge, skills and social competencies:       1     Knowledge     There has the consciousness of the necessity of extending of her competences, a readiness to technology and mathemathics analysis       3     Social competencies     There has and frequency field - [K_W04+++]       3     Social competencies     There has and f			anal processing		
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Butche path/speciality       Course (computatory, elective obligatory)         Cycle of study:       Course (computatory, elective obligatory)         Course (computatory, elective obligatory)         Second-cycle studies       No: of credits         No: of credits       No: of credits         Laboratory: 15       Project/seminars: -       2         Status of the course in the study program (Basic, major, other)       (university-wide, from another field)         Course (computatory, elective and stat         Education areas and fields of science and ant       ECTS distribution (number and %)         Education areas and fields of science and ant       ECTS distribution (number and %)         Course (computatory, elective and and the sciences)       2       100%       2         Responsible for subject / lecturer:       dr hab. intz, Ryszard Porada, prof, nadzw. email: ryszard, porada @put, poznan,PI tie. 48 of 665 2360       Wydzial Elektryczny         U. Norwledge       Skills       It knowledge of electrical engineering, automated technology and mathemathics analysis         3       Skills       It knowle	Elec	trical Engineerin	g		
Cycle of study:       Form of study (till-time part-time)         Second-cycle studies         No. of hours         Lecture:       15       Classes:       -       Laboratory:       15       Project/seminars:       -       2         Status of the course in the study program (Basic, major, other)       (unversity-wide, from another field)         Core at the course in the study program (Basic, major, other)       (unversity-wide, from another field)         Education areas and fields of science and art       ECTS distribution (number and %)         technical sciences       2       100%         Technical sciences       2       100%         Responsible for subject / lecturer:       dr hab. in2, Ryszard porada (prof, nadzw.         main: argue at the study course at the colspan="2">ECTS distribution (number and %)         Video to a 36 0-965 Poznari         Prerequisites in terms of knowledge, skills and social competencies:         1       Knowledge       Basic knowledge of electrical engineering, automated technology and mathemathics analysis         3       Social competencies       There has the consciousness of the necessity of extending of her competences, a readiness the consci	Elective path/specialty			Subject offered in:	Course (compulsory, elective)
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Lecture:       15       Classes:       Laboratory:       15       Project/seminars:       2         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 at       (Drak)       (Drak)       2       100%         technical sciences       2       100%       2       100%       2       100%         Responsible for subject / lecturer:         dr hab. in2. Ryszard Porada, prof. nadzw. emai: nyszard, porada @put.poznan,pl tel. 48 61 665 2360       2       100%       2       100%         Prerequisites in terms of knowledge, skills and social competencies:         1       Knowledge       Basic knowledge of electrical engineering, automated technology and mathemathics analysis         2       Skills       It knows to use basic knowledge from the range of electrical engineering, automated technology and mathemathics analysis         3       Social competencies       There has the consciousness of the necessity of extending of her competences, a readiness to the collection of the cooperation within the framework of the group         Study of the propriety of signals and systems in time and frequency domain, rules of the designing of filters and other discree tructures         Study of the propriety of signals and systems in time and frequency field - [K_W04+++]         1.		Second-c	vcle studies	full-time	
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(brak)         (brak)           Education areas and fields of science and art         ECTS distribution (number and %)           technical sciences         2 100%           Technical sciences         2 100%           Responsible for subject / lecturer:         2 100%           dr hab. in2. Ryszard Porada, prof. nadzw. email: ryszard.porada @put.poznan.pl         2 100%           Le. 48 61 65 2360         Wydział Elektryczny           ul. Piotrow 3A 60-965 Poznań         Pererequisites in terms of knowledge, skills and social competencies:           1         Knowledge         Basic knowledge form the range of electrical engineering, automated technology and mathemathics analysis           2         Skills         It knows to use basic knowledge from the range of electrical engineering, automated technology and mathemathics analysis           3         Social competencies         There has the consciousness of the necessity of extending of her competences, a readiness to the collection of the cooperation within the framework of the group           Assumptions and objectives of the course:         Study outcomes and reference to the educational results for a field of study           Knowledge:         1         to make analyses and syntheses signals in the time and frequency field - [K_W04+++]           2. to characterize basic criteria of the analysis and designing of digital filters, particularly in the aspect of discreet closed systems - [K_W14++]           Skills: <t< td=""><td colspan="3"></td><td>Project/seminars:</td><td>- 2</td></t<>				Project/seminars:	- 2
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technical sciences       2       100%       2       100	Educatio		· /		
Technical sciences       2 100%         Responsible for subject / lecturer:       dr hab. in2. Ryszard Porada, prof. nadzw.         email: ryszard.porada@put.poznan.pl       tel. 48 61 665 2360         Wydzial Elektryczny       ul. Piotrowo 3A 60-965 Poznań         Prerequisites in terms of knowledge, skills and social competencies:       1         1       Knowledge         2       Skills         3       Social competencies         There has the consciousness of the necessity of extending of her competencies, a readiness to the collection of the cooperation within the framework of the group         Assumptions and objectives of the course:         Study outcomes and reference to the educational results for a field of study         Knowledge:         1. to make analyses and syntheses signals in the time and frequency field - [K_W04+++]         2. to characterize basic oriteria of the analysis and designing of digital filters and discreet closed systems - [K_W14++]         Skills:         1. to use the knowledge within the range analyses and syntheses of signals in the time and frequency field - [K_W04+++]         2. to characterize basic criteria of the analysis and designing of digital filters, particularly in the aspect of discreet closed systems - [K_W14++]         2. to use the knowledge within the range analyses and syntheses of signals in the time and frequency field - [K_U01+]         2. to use methods of signals theory to designing of digital f	Edubativ				
Responsible for subject / lecturer:         dr hab. in2. Ryszard Porada, prof. nadzw.         email: ryszard.porada@put.poznan.pl         tel. 48 61 665 2360         Wydział Elektryczny         ul. Piotrowo 3A 60-965 Poznań         Prerequisites in terms of knowledge, skills and social competencies:         1       Knowledge         8asic knowledge of electrical engineering, automated technology and mathemathics analysis         2       Skills         1       knowledge         2       Skills         3       Social competencies         There has the consciousness of the necessity of extending of her competences, a readiness to the collection of the cooperation within the framework of the group         Assumptions and objectives of the course:         Study of the propriety of signals and systems in time and frequency domain, rules of the designing of filters and other discret structures         Study outcomes and reference to the educational results for a field of study         Knowledge:         1. to make analyses and syntheses signals in the time and frequency field - [K_W04+++]         2. to characterize basic criteria of the analysis and designing of digital filters and discret closed systems - [K_W14++]         Skills:         1. to use the knowledge within the range analyses and syntheses of signals in the time and frequency field - [K_W04+++]         2. to characterize	technical sciences				2 100%
dr hab. inž. Ryszard Porada, prof. nadzw. email: ryszard.porada@put.poznan.pl tel. 48 61 665 2360 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań         Prerequisites in terms of knowledge, skills and social competencies:         1       Knowledge         2       Skills         3       Social competencies         3       Social competencies         3       Social competencies         5       There has the consciousness of the necessity of extending of her competences, a readiness to the collection of the cooperation within the framework of the group         Assumptions and objectives of the course:       Study of the propriety of signals and systems in time and frequency domain, rules of the designing of filters and other discrete structures         1       to make analyses and syntheses signals in the time and frequency field - [K_W04+++]         2. to characterize basic criteria of the analysis and designing of digital filters and discreet closed systems - [K_W14++]         Skills:       1         1. to make analyses and syntheses signals in the time and frequency field - [K_W04+++]         2. to characterize basic criteria of the analysis and designing of digital filters and discreet closed systems - [K_U01+]         2. to use methods of signals theory to designing of digital filters, particularly in the aspect of discreet closed systems - [K_U01+]         2. to use methods of signals theory to designing of digital filters, particularly in the aspect of discreet closed systems - [K_U01+]		Technical scie	ences		2 100%
dr hab. inž. Ryszard Porada, prof. nadzw. email: ryszard.porada@put.poznan.pl tel. 48 61 665 2360 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań         Prerequisites in terms of knowledge, skills and social competencies:         1       Knowledge         2       Skills         3       Social competencies         3       Social competencies         5       There has the consciousness of the necessity of extending of her competences, a readiness to the collection of the cooperation within the framework of the group         Assumptions and objectives of the course:       Study of the propriety of signals and systems in time and frequency domain, rules of the designing of filters and other discrete structures         5       Study outcomes and reference to the educational results for a field of study Knowledge:         1       to make analyses and syntheses signals in the time and frequency field - [K_W04+++]         2. to characterize basic criteria of the analysis and designing of digital filters and discret closed systems - [K_W14++]         Skills:       1. to use the knowledge within the range analyses and syntheses of signals in the time and frequency field - [K_U01+]         2. to use methods of signals theory to designing of digital filters, particularly in the aspect of discreet closed systems - [K_U01+]         2. to use methods of signals theory to designing of digital filters, particularly in the aspect of discreet closed systems - [K_U01+]         2. to use methods of signals theory to designing of digital filters, particularly in	Resp	onsible for subj	ect / lecturer:		
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structures         Study outcomes and reference to the educational results for a field of study         Knowledge:         1. to make analyses and syntheses signals in the time and frequency field - [K_W04+++]         2. to characterize basic criteria of the analysis and designing of digital filters and discreet closed systems - [K_W14++]         Skills:         1. to use the knowledge within the range analyses and syntheses of signals in the time and frequency field - [K_U01+]         2. to use methods of signals theory to designing of digital filters, particularly in the aspect of discreet closed systems - [K_U03+]         Social competencies:         1. Has the consciousness of importance and understands different aspects and results of activity of electrician engineer, in	Assu	mptions and obj	ectives of the course:		
Knowledge:         1. to make analyses and syntheses signals in the time and frequency field - [K_W04+++]         2. to characterize basic criteria of the analysis and designing of digital filters and discreet closed systems - [K_W14++]         Skills:         1. to use the knowledge within the range analyses and syntheses of signals in the time and frequency field - [K_U01+]         2. to use methods of signals theory to designing of digital filters, particularly in the aspect of discreet closed systems - [K_U03+]         Social competencies:         1. Has the consciousness of importance and understands different aspects and results of activity of electrician engineer, in			als and systems in time and frequ	ency domain, rules of the desig	gning of filters and other discreet
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2. to characterize basic criteria of the analysis and designing of digital filters and discreet closed systems - [K_W14++]      Skills:     1. to use the knowledge within the range analyses and syntheses of signals in the time and frequency field - [K_U01+]     2. to use methods of signals theory to designing of digital filters, particularly in the aspect of discreet closed systems -     [K_U03+]     Social competencies:     1. Has the consciousness of importance and understands different aspects and results of activity of electrician engineer, in	Know	/ledge:			
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<ul> <li>2. to use methods of signals theory to designing of digital filters, particularly in the aspect of discreet closed systems - [K_U03+]</li> <li>Social competencies:         <ol> <li>Has the consciousness of importance and understands different aspects and results of activity of electrician engineer, in</li> </ol> </li> </ul>			in the range analyses and synthes	and of signals in the time and fr	aquency field [K 104.1
Social competencies: 1. Has the consciousness of importance and understands different aspects and results of activity of electrician engineer, in	2. to us	se methods of signals		-	
1. Has the consciousness of importance and understands different aspects and results of activity of electrician engineer, in	-	-			
	1. Has	the consciousness of	importance and understands diffe		

## Assessment methods of study outcomes

Lecture				
? the credit of the lecture preceded with the credit of occupations	s laboratory exercises			
Designing work and laboratory exercises:	,			
? the test and awarding the knowledge of need-to-know to realiz	ation of placed problems			
in the given area of tasks,				
? verification skills on every exercises				
<ul> <li>evaluation of the knowledge and skills related to the realization</li> </ul>	of laboratory exercise the	evaluation of the report		
from done exercises.				
Obtaining additional points for activity during exercises, in particular way	for:			
? proposing to discuss additional aspects of the subject				
? effective use of knowledge obtained during solving of given pro	oblem;			
? comments related to improve teaching material,				
? aesthetics of solved problems and reports ? within homework.				
Course descripti	ion			
Systems and signals. The classification property of the signal. The introd Approximation of the signal. Presents of signals at the use Fourier's form damain. The convolution. Singular functions: impulses and jumps. The in and spectrum transfer functions. Series of Fourier's. Analysis in the frequ spectrum. Impulses in the time and frequency domain. Systems with the frequency responce. Nyquist and Body diagram. Sampling and discrete s models. Differece equations. The Z transform. The inverse z transform. T control. Lineal discrete systems. The impulse response. Discrete transfe systems. Digital filters. SOI filters. NOI filters. Designing of digital filters.	nula. Linear stationary syster npulse respons. Transfer fur uency domain. Fourier's tran feedback and their transfer signals. The discreet Fourier The application of the digital	ns. Analysis in the time nctions. Line spectrum sform and continuous functions. The analysis o transform. Discrete filtration and the impulse		
Basic bibliography:				
1. Borodziewicz J., Jaszczak K.: Cyfrowe przetwarzanie sygnałów. WNT	. Warszawa, 1987.			
2. Haykin S.: Modern Filters. MacMillan, New York, 1989.	, ,			
3. Izydorczyk J.: Płonka G., Tyma G., Teoria sygnałów, Wstęp, Wyd. Hel	lion, 1999.			
<ol> <li>Marven C., Ewers G.: Zarys cyfrowego przetwarzania sygnałów, WKi</li> </ol>				
5. Szabatin J.: Podstawy teorii sygnałów, WKiŁ, Warszawa 1982.	,			
Additional bibliography:				
1. Lyons R.G.: Wprowadzenie do cyfrowego przetwarzania sygnałów, W	KiT Marczawa 1000			
2. Oppenheim A.V., Schafer R.W.: Cyfrowe przetwarzanie sygnałów, W				
	NL, Waiszawa 1979.			
3. Osiowski J.: Zarys rachunku operatorowego, WNT, Warszawa 1981.				
Result of average student	t's workload			
Activity		Time (working hours)		
		15		
1. participation in the lectures	2. participation in the laboratory exercises			
	3. participation in consultations on the lecture			
2. participation in the laboratory exercises		5		
<ol> <li>participation in the laboratory exercises</li> <li>participation in consultations on the lecture</li> </ol>		5 10		
<ol> <li>participation in the laboratory exercises</li> <li>participation in consultations on the lecture</li> <li>participation in consultations on the laboratory exercises</li> </ol>				
<ol> <li>participation in the laboratory exercises</li> <li>participation in consultations on the lecture</li> <li>participation in consultations on the laboratory exercises</li> <li>preparation for the laboratory exercises</li> </ol>		10		
<ol> <li>2. participation in the laboratory exercises</li> <li>3. participation in consultations on the lecture</li> <li>4. participation in consultations on the laboratory exercises</li> <li>5. preparation for the laboratory exercises</li> <li>6. preparation for the exam</li> </ol>		10 10		
<ol> <li>2. participation in the laboratory exercises</li> <li>3. participation in consultations on the lecture</li> <li>4. participation in consultations on the laboratory exercises</li> <li>5. preparation for the laboratory exercises</li> <li>6. preparation for the exam</li> <li>7. preparation for the laboratory exercises pass</li> </ol>		10 10 10		
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<ol> <li>2. participation in the laboratory exercises</li> <li>3. participation in consultations on the lecture</li> <li>4. participation in consultations on the laboratory exercises</li> <li>5. preparation for the laboratory exercises</li> <li>6. preparation for the exam</li> <li>7. preparation for the laboratory exercises pass</li> <li>8. participation in the exam</li> </ol>	oad hours	10 10 10 10		
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