

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Selected issues of signal processing		Code 1010325331010322648
Field of study Electrical Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 2 / 3
Elective path/specialty Microprocessor Control Systems in	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time,part-time) part-time	
No. of hours Lecture: 10 Classes: - Laboratory: 10 Project/seminars: -		No. of credits 3
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 %) 3 100% 3 100%
Responsible for subject / lecturer: dr hab. inż. 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	Basic knowledge of electrical engineering, automated technology and mathematics analysis
2	Skills	It knows to use basic knowledge from the range of electrical engineering, automated technology and mathematics 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 of the propriety of signals and systems in time and frequency domain, rules of the designing of filters and other discreet 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 this of the influence on the medium, and related to this of responsibility for undertaken decisions - [K_K01 ++]		
Assessment methods of study outcomes		

<p>Lecture</p> <p>? the credit of the lecture preceded with the credit of occupations laboratory exercises</p> <p>Designing work and laboratory exercises:</p> <p>? the test and awarding the knowledge of need-to-know to realization of placed problems in the given area of tasks,</p> <p>? verification skills on every exercises</p> <p>? evaluation of the knowledge and skills related to the realization of laboratory exercise, the evaluation of the report from done exercises.</p> <p>Obtaining additional points for activity during exercises, in particular way for:</p> <p>? proposing to discuss additional aspects of the subject</p> <p>? effective use of knowledge obtained during solving of given problem;</p> <p>? comments related to improve teaching material,</p> <p>? aesthetics of solved problems and reports ? within homework.</p>

Course description

Systems and signals. The classification property of the signal. The introduction into problems of the space signals. Approximation of the signal. Presents of signals at the use Fourier's formula. Linear stationary systems. Analysis in the time domain. The convolution. Singular functions: impulses and jumps. The impulse respons. Transfer functions. Line spectrum and spectrum transfer functions. Series of Fourier's. Analysis in the frequency domain. Fourier's transform and continuous spectrum. Impulses in the time and frequency domain. Systems with the feedback and their transfer functions. The analysis of frequency response. Nyquist and Body diagram. Sampling and discrete signals. The discrete Fourier transform. Discrete models. Difference equations. The Z transform. The inverse z transform. The application of the digital filtration and the impulse control. Lineal discrete systems. The impulse response. Discrete transfer functions. The causality and the stability of digital systems. Digital filters. SOI filters. NOI filters. Designing of digital filters.

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. Helion, 1999.
4. Marven C., Ewers G.: Zarys cyfrowego przetwarzania sygnałów, WKiŁ, Warszawa 1999.
5. Szabatin J.: Podstawy teorii sygnałów, WKiŁ, Warszawa 1982.

Additional bibliography:

1. Lyons R.G.: Wprowadzenie do cyfrowego przetwarzania sygnałów, WKiŁ, Warszawa 1999.
2. Oppenheim A.V., Schafer R.W.: Cyfrowe przetwarzanie sygnałów, WKiŁ, Warszawa 1979.
3. Osowski J.: Zarys rachunku operatorowego, WNT, Warszawa 1981.

Result of average student's workload

Activity	Time (working hours)
1. participation in the lectures	9
2. participation in the laboratory exercises	9
3. participation in consultations on the lecture	5
4. participation in consultations on the laboratory exercises	10
5. preparation for the laboratory exercises	10
6. preparation for the exam	10
7. preparation for the laboratory exercises pass	10
8. participation in the exam	5

Student's workload

Source of workload	hours	ECTS
Total workload	68	3
Contact hours	38	1
Practical activities	9	1