

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Theory of the discrete signals		Code 1010341761010329416
Field of study Mathematics in Technology	Profile of study (general academic, practical) General academic	Year /Semester 3 / 6
Elective path/specialty Device diagnostics	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies (Polish Qualifications Framework level six)	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 30 Classes: 15 Laboratory: 15 Project/seminars: -		No. of credits 4
Status of the course in the study program (Basic, major, other) other		(university-wide, from another field) University - wide
Education areas and fields of science and art Technical sciences Technical sciences		ECTS distribution (number and %) 4 100% 4 100%
Responsible for subject / lecturer: Dr inż. Michał Bołtrukiewicz email: Michal.Boltrukiewicz@put.poznan.pl tel. 61 6652032, 61 6652632 Faculty of Electrical Engineering ul. Piotrowo 3A, 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Mathematical analysis, complex numbers, calculus of probability. Binary system. Metrology. [K_W01 (P6S_WG)].
2	Skills	Makes of symbolic calculation and also complex number calculation [K_U01 (P6S_UW)].
3	Social competencies	Understand necessity of education and systematization of knowledge in scope of processing of information [K_K02 (P6S_KK)].
Assumptions and objectives of the course: knowledge in scope of mathematical description of discrete systems and also in scope of methods of discrete signal processing.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Has a basic knowledge in scope of theory of discrete of single-dimensional and two-dimensional signal [K_W07 (P6S_WG)]. 2. Knows a selected methods of signal processing in a time domain and a frequency domain and also knows a selected methods of time-frequency analysis [K_W07 (P6S_WG)].		
Skills:		
1. Can calculate basic parameters of deterministic and stochastic signals. Can design of FIR filter and IIR filter and also can realize a digital filtration [K_U07 (P6S_UW)]. 2. Can interpret results of signal processing in a time domain and a frequency domain [K_U07 (P6S_UW)].		
Social competencies:		
1. Can ask a precisely questions with the purpose of understanding of problems [K_K01 (P6S_KK), K_K02 (P6S_KK)].		
Assessment methods of study outcomes		

<p>Lecture: Examination in writing. Classes: Currently estimating of knowledge and skills. Final test in writing. Laboratories: Currently estimating of knowledge and skills. Evaluation of prepared reports from laboratories.</p>		
Course description		
<p>Last update 2018 Methods of education are orientated to students to motivate them to participate actively in education process by discussion and reports. Lectures: Multimedia presentations expanded by examples shown on a board. Activity of students is taken into consideration in final students evaluation. Theoretical questions are presented in the exact reference to the practice. Laboratory: Detailed reviewing of particular exercises reports. Realization of laboratory tasks in teams. Specific computational experiments. The definition of single dimensional and two dimensional discrete signal. The block diagram of acquisitions system of discrete signals. Theorem of sampling. Notation of samples in memory of computer. Evaluate of selected parameters of data set. The description of discrete LTI systems in a time domain and also a frequency domain. The impulse response of discrete LTI system. Design of FIR and IIR filters. The discrete convolution in a time domain and a frequency domain. The interpretation of DFT. The selected transforms of discrete signals and their interpretation. Adaptive filtration. The block diagram of imaging system. The acquiring and sampling of image. Histogram of image and its application. Selected linear and non-linear methods of processing of images.</p>		
<p>Basic bibliography: 1. Zieliński T., Cyfrowe przetwarzanie sygnałów. Od teorii do zastosowań. WKiŁ, Warszawa 2014. 2. Lyons R.G. Wprowadzenie do cyfrowego przetwarzania sygnałów, WKiŁ, Warszawa 2010.</p>		
<p>Additional bibliography: 1. Szabatin J. Teoria sygnałów. WKiŁ., Warszawa 2015. 2. Stranneby D., Cyfrowe przetwarzanie sygnałów, Wyd. BTC, Warszawa 2004.</p>		
Result of average student's workload		
Activity	Time (working hours)	
1. Lectures	30	
2. Classes	15	
3. Laboratories	15	
4. Consultations	8	
5. Preparation of reports from laboratories	10	
6. Preparation for the laboratories	10	
7. Preparation for the classes	5	
8. Preparation for the examination	15	
9. Examination	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	110	4
Contact hours	70	3
Practical activities	35	1