STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Selected issues of signal processing	**1010322321010322648**

Field of study	Profile of study (general academic, practical)	Year /Semester
Electrical Engineering	**(brak)**	**1 / 2**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Microprocessor Control Systems in	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
Second-cycle studies	**full-time**

No. of hours	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)
(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:

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 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 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

Lecture

? the credit of the lecture preceded with the credit of occupations laboratory exercises

Designing work and laboratory exercises:

? the test and awarding the knowledge of need-to-know to realization of placed problems

in the given area of tasks,

? verification skills on every exercises

? evaluation of the knowledge and skills related to the realization 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 problem;

? comments related to improve teaching material,

? aesthetics of solved problems and reports ? within homework.

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 damain. 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 responce. Nyquist and Body diagram. Sampling and discreet signals. The discreet Fourier transform. Discrete models. Differece 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, WKiT, Warszawa 1999.
5. Szabatin J.: Podstawy teorii sygnałów, WKiŁ, Warszawa 1982.

Additional bibliography:

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

Result of average student's workload

Activity	Time (working hours)
1. participation in the lectures	15
2. participation in the laboratory exercises	15
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	80	2
Contact hours	50	1
Practical activities	15	1