Field of study Profile of study (general academic, practical) Year /Semester Electrical Engineering (brak) 3 Elective path/specialty Subject offered in: Measurement Systems in Industry and Subject offered in: polish Course (compulsory, ele obligatory Cycle of study: First-cycle studies Form of study (full-time,part-time) Course (compulsory, ele obligatory No. of hours First-cycle studies Form of study (full-time,part-time) No. of credits Lecture: Classes: - Laboratory: 2 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 science and art ECTS distribution (numt and %) ECTS distribution (numt and %) technical sciences 2 100%		STUDY MODULE DE	SCRIPTION FORM		
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	Skills:				
			esearch centres, and medical fa	acilities -	
Social competencies:					
1. Ability to think and act enterprisingly in the area of biomedical engineering - [K_K04 +, K_K05 +]	1. Ability to think and act er	terprisingly in the area of biomedica	l engineering - [K_K04 +, K_K0)5 +]	
Assessment methods of study outcomes		Assessment method	s of study outcomes		
- Tests and awarding the increase in knowledge necessary to realize the laboratory tasks,	- Tests and awarding the in				

- The evaluation of knowledge and skills connected with the measuring tasks and prepared reports

Course description

- Analog conditioners of signals.

- Cooperation of operational amplifiers with measuring sensors.
- Kinds and specificity of biological signals.
- Examples of noninvasive techiques of biomedical signals acquisition.
- Sampling of measuring signals.
- Aliasing and choice of the proper filter.
- Comparison of analog and digital filters properties.
- Basic mathematical operations using the collected samples of biosignals.
- Digital Fourier Transform and fundamentals of spectrum analysis.
- Selected problems concerned with Laplace?a transform and introduction to NOI digital filters.

- Selected questions of the statistical methods of measuring data analysis.

Basic bibliography:

- 1. J.T. Białasiewicz, Falki i aproksymacje, WNT, Warszawa 2000
- 2. Biocybernetyka i inżynieria biomedyczna, red. M. Nałęcz, Akademicka Oficyna Wyd. EXIT, Warszawa 2001-2002
- 3. U. Tietze, Ch. Schenk, Układy półprzewodnikowe, WNT, Warszawa 2001
- 4. T. Zieliński, Cyfrowe przetwarzanie sygnałów. Od teorii do zastosowań, WKŁ, Warszawa 2007

Additional bibliography:

- 1. J. Jakubiec, J. Roj, Pomiarowe przetwarzanie próbkujące, Wyd. Politechniki Śląskiej, Gliwice 2000
- 2. J. Moczko, L. Kramer, Cyfrowe metody przetwarzania sygnałów biomedycznych, Wyd. UAM, Poznań 2001
- 3. J. Szabatin, Teoria sygnałów, WKŁ, Warszawa 2000

Result of average student's workload

Activity		Time (working hours)
1. Participation in laboratory exercises	30	
2. Participation in consulting with the lecturer		9
3. Preparation to laboratory exercises and preparation of the reports		20
Student's wor	kload	
Source of workload	hour	s ECTS
Total workload	59	2
Contact hours	39	1
Practical activities	50	2