GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Continuous-Time Active Filters , PG_00064012		
Field of study	Electronics and Telecommunications		
Date of commencement of studies	February 2025	Academic year of realisation of subject	2025/2026
Education level	second-cycle studies	Subject group	Optional subject group Specialty subject group Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	2	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Microelectronic Systems -> Faculty of Electronics, Telecommunications and Informatics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Bogdan Pankiewicz	
	Teachers	dr hab. inż. Bogdan Pankiewicz	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	0.0	0.0	30

E-learning hours included: 0.0

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	30	4.0	16.0	50

Subject objectives

Analysis and design of continuous time integrated filters.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U08] while identifying and formulating engineering tasks specifications and solving these tasks, can: - apply analytical, simulation and experimental methods, - notice their systemic and non-technical aspects, - make a preliminary economic assessment of suggested solutions and engineering work	K_U30 Can design continuous-time integrated filter of second or higher order. Can verify design of the filter using PSPICE simulations.	[SU1] Assessment of task fulfilment
[K7_U03] can design, according to required specifications, and make a complex device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment	K_U30 Can design continuous-time integrated filter of second or higher order. Can verify design of the filter using PSPICE simulations.	[SU1] Assessment of task fulfilment
[K7_W03] knows and understands, to an increased extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum	K_W27 Knows theory regarding approximation of filter frequency responses, knows methods of frequency transformations and synthesis of filters.	[SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td>1. Introduction, classification of continuous-time active filters. 2. Building blocks and properties of operational amplifiers (i.e. Amps, OTAs and operational transresistance amplifiers). 3. Introduction to synthesis of active filters, normalization procedures, frequency transformations, approximation methods. 4. The synthesis of cecond-order active filters. 5. Cascade realizations of high-order filters. 6. Methods for LC ladder simulations. 7. LP-HP frequency transformation. 8.LP- BP frequency transformation.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Written exam</td><td>51.0%</td><td>75.0%</td></tr>
<tr><td>Laboratory exercises</td><td>51.0%</td><td>25.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>1. Białko M., Guziński A., Sieńko W., Żurada J, Filtry aktywne RC, WNT, Warszawa, 1979
2. Schaumann Rolf, Van Valkenburg Mac E., Design of Analog Filters , Oxford University Press, N.Y, 2001</td></tr>
<tr><td>Supplementary literature</td><td>Razavi Behzad, Design of Analog CMOS Integrated Circuits, McGraw-Hill, 2003</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
</table>
</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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