

Course syllabus

binding for the doctoral students of the CUT Doctoral School commencing their studies
in the academic year 2022/2023

Information on the course

Name of the course in Polish	Synteza układów aktywnych
Name of the course in English	Synthesis of active circuits
Number of the ECTS points	1
Language of instruction	Polish
Category of the course	Elective
Field of education	Engineering and Technology
Discipline of education	Automatic Control, Electronics and Electrical Engineering
Person responsible for the course Contact	Marcin Jaraczewski, <i>doctor habilitatus</i> in Engineering, prof. of CUT marcin.jaraczewski@pk.edu.pl

Type of course, number of hours in the study programme curriculum

Semester	Credit type (G / NG)*	Lecture	Practical class	Laboratory	Computer laboratory	Project class	Seminar
2, 3, 4, 5	G	9	0	0	6	0	0

*G – graded credit, NG – non-graded credit

Course objectives

Code	Objective description
Objective 1	Introduction to the problems of active filter synthesis
Objective 2	Presentation of methods for designing second-order sections of active filters

Learning outcomes

Code	Description of the learning outcome adjusted to the specific characteristics of the discipline	Learning outcome symbol in the CUT DS	Methods of verification
OUTCOMES RELATED TO KNOWLEDGE			
EUW1	The doctoral student knows and understands the theoretical foundations of active filter synthesis.	E_W01 E_W02	Attendance in class, written test
EUW2	The doctoral student knows and understands methods for designing second-order sections of active filters.	E_W01 E_W02	Attendance in class, written test
OUTCOMES RELATED TO SKILLS			
EUU1	The doctoral student is able to take into account the tolerance and calculate the sensitivity of basic filter parameters.	E_U01	A computer laboratory report
OUTCOMES RELATED TO SOCIAL COMPETENCES			

EUK1	The doctoral student is prepared to independently evaluate the usefulness of selected implementations of active RC filters and to emphasize the significance of knowledge in scientific research.	E_K01 E_K03	Discussion
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Course outline

No.	Contents	Learning outcomes for the course	No. of hours
LECTURE			
W1	The fundamentals of active filter synthesis.	EUW1	3
W2	Positive feedback biquadratic circuits. Negative feedback biquadratic circuits. Active networks based on passive ladder structures.	EUW2	3
W3	The effects of real operational amplifiers on active filters. Optimisation of active filters.	EUW1, EUW2	3
COMPUTER LABORATORY			
Lk1	Modelling of axial and rotational magnetisation reversal of isotropic sheet metal and anisotropic sheet metal.	EUW1, EUW2, EUU1, EUK1	2
Lk2	Determination of magnetic field distribution in isotropic sheet allowing for hysteresis.	EUW1, EUW2, EUU1, EUK1	2
Lk3	Determination of magnetic field distribution in anisotropic sheet allowing for hysteresis and anisotropy.	EUW1, EUW2, EUU1, EUK1	2

The ECTS points statement

WORKING HOURS SETTLEMENT	
Type of activity	Average number of hours (45 min.) dedicated to the completion of an activity type
SCHEDULED CONTACT HOURS WITH THE ACADEMIC TEACHER	
Hours allotted in the syllabus	15
Consultations	1
Course credit assignment	2
HOURS WITHOUT THE PARTICIPATION OF THE ACADEMIC TEACHER	
Independent study of the course contents	6
Preparation of a paper, report, project, presentation, discussion	6
ECTS POINTS STATEMENT	
Total number of hours	30
The ECTS points number	1

Preliminary requirements

No.	Requirements
1	Knowledge of the operator method

Course credit assignment conditions / method of the final grade calculation

No.	Description
COURSE CREDIT ASSIGNMENT CONDITIONS	
1	Attendance in class, passing the test on knowledge covered in the lecture, successful completion of the computer laboratory class
METHOD OF THE FINAL GRADE CALCULATION	
The final grade is a weighted average of the grade on the test of knowledge covered in the lecture (weight 2) and the final grade in the computer laboratory class (weight 1)	

Additional information

None

The course reading list

1	G. C. Temes., <i>Teoria i projektowanie filtrów</i> , Wyd. WNT, Warszawa 1978
2	Wai-Kai Chen, <i>Passive, Active, and Digital Filters</i> , CRC Press 2009