STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Computer modelling of mechatronic systems	**1010321361010326007**

Field of study	Profile of study (general academic, practical)	Year /Semester
Electrical Engineering	**general academic**	**3 / 6**

Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Electrical Systems in Mechatronics	**Polish**	**obligatory**

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

No. of hours	No. of credits
Lecture: **30** Classes: **-** Laboratory: **-** Project/seminars: **-**	**2**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
other	**university-wide**

Education areas and fields of science and art	ECTS distribution (number and %)

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge of electrical circuit theory, control, computing and numerical methods.
2	**Skills**	Knowledge of the structure and operation of electrical systems and mechatronics.
3	**Social competencies**	Awareness of the need to broaden their competence, willingness to work together as a team.

Assumptions and objectives of the course:

Acquiring modern methods of design, testing and analysis of mechatronics and actuators electromagnetic and electromechanical devices. The acquisition of skills in computing package selected.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. He has the necessary knowledge for the description and analysis of mechatronic components and systems as well as the basic phenomena occurring in them - [K_W01+++]

2. It has a basic knowledge of numerical methods allow to solve simple tasks in the field of mechatronics engineering. Knows tools used to perform numerical computations and analysis and design of technical systems selected - [K_W02+++]

Skills:

1. He can use the known methods and mathematical models and computer simulations to analyze and evaluate the performance of mechatronic components and systems - [K_U10+++]

2. It can be used properly chosen servants development environments for simulation, design and analysis of simple electrical and mechatronical systems - [K_U13 ++]

Social competencies:

1. He can think and act in an entrepreneurial manner in the area of electrical engineering - [K_K04++]

Assessment methods of study outcomes

Lecture

written exam

Course description

Classification models of electromechanical transducers. General description of the models of disease. Mathematical models of electromechanical transducers and complex mechatronic systems. Regulators. Control systems with feedback. Methods of solving equations of state. Differential equations of the form write the loop and nodal electric circuits. Methods for solving nonlinear differential equations. Simulation algorithm electromechanical transducers operating conditions with two degrees of freedom.

Update 2017: Introduction to modelling of physics phenomena in MatLab-Simulink environment.

The applied methods of education: lectures - presentation of issues using multimedia resources, discussion of problematic tasks; laboratory - simulation of transient states of electromagnetic devices.

Basic bibliography:

1. Shetty D., Kolk R.A., Mechatronics system design. Cengage Learning, 2011.

2. Mikołajewicz J., The impact of speed as well as selected parameters of slot insulation on the distribution of temperature in linear motion converters, Archives of Electrical Engineering, VOL. 65(4), pp. 855-864 (2016)

3. Mikołajewicz J., 2013, Model of dynamic operations of stepper linear reluctance motor based on field approach, COMPEL: The International Journal for Computation and Mathematics in Electrical and Electronic Engineering, Vol. 32, No. 4, s. 1255-1266.

4. Kiczkowiak T., Tarnowski W., Ociepa Z., 2009r., "Modelowanie i Symulacja Komputerowa w Mechatronice.", wyd. Wydawn. Polit. Koszalińskiej, Koszalin.

5. B. Mrozek, Z. Mrozek, MATLAB i Simulink, W Helion, Gliwice, 2004.

6. R. Burden, J.D. Faires, Numerical Analysis, PWS Publishers, Prindle, Weber&Schmidt, 1985.

7. P. Krauze, Analysis of Electric Machinery, McGraw Hill Book Company, New York 1986.

8. M. Sobierajski, M. Łabuzek, Programowanie w Matlabie dla elektryków, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2005.

Additional bibliography:

1. B. Baron, Metody Numeryczne w Turbo Pascalu, HELION, Gliwice 1995.

Result of average student's workload

Activity	Time (working hours)
1. participation in class lectures	30
2. participation in the consultation	8
3. preparation for the completion of the lecture	15

Student’s workload

Source of workload	hours	ECTS
Total workload	53	2
Contact hours	38	1
Practical activities	0	0