

## DESCRIPTION OF THE COURSES

- Course code: ELR3266
- Course title: ELEKTROMECHANICAL DRIVE SYSTEMS
- Language of the lecturer: polish

<i>Course form</i>	<i>Lecture</i>	<i>Classes</i>	<i>Laboratory</i>	<i>Project</i>	<i>Seminar</i>
<i>Number of hours/week*</i>	<i>1</i>		<i>1</i>	<i>1</i>	
<i>Number of hours/semester*</i>	<i>11</i>		<i>11</i>	<i>11</i>	
<i>Form of the course completion</i>	<i>exam</i>		<i>Completion of all labs</i>	<i>Written projects</i>	
<b><i>ECTS credits</i></b>	<i>3</i>		<i>1</i>	<i>1</i>	
<b><i>Total Student's Workload</i></b>	<i>150</i>				

- Level of the course (/advanced): basic
- Prerequisites: Electrical machines, Electrical drives
- Name, first name and degree of the lecturer/supervisor: Krzysztof Pieńkowski, D.Sc.
  
- Names, first names and degrees of the team's members:  
 Teresa Orłowska-Kowalska, Prof. D. Sc.  
 Stanisław Azarewicz, Ph.D.  
 Krzysztof Dyrz, Ph.D.
  
- Year:.....I..... Semester:.....1.....
- Type of the course (obligatory/optional): obligatory
- Aims of the course (effects of the course):  
 Learning of analysis and modeling methods of electromechanical drive systems. Knowledge of choosing proper parameters and knowledge of design of electromechanical drive systems.
- Form of the teaching (traditional/e-learning): traditional
- Course description:  
 Presentation of electromechanical drive systems with special including of design problems and application of drive systems in industry. Principles of equivalent values determination, analysis of motion equation, modeling and calculation of mechanical transients in complex electromechanical systems. Preparation of projects of electromechanical drive systems for chosen types of machines and technological processes. Study of electromechanical drive systems in industrial applications.
  
- Lecture:

<i>Particular lectures contents</i>	<i>Number of hours</i>
1.Structures and components of electromechanical drive systems	<i>1</i>
2.Determination of equivalent parameters and modeling of complex and nonlinear electromechanical drive systems	<i>2</i>

3. Analysis of motion equations and calculation of mechanical processes in complex electromechanical drive systems	2
4. Principles of selection of required power and proper parameters for various types of electromechanical drive systems	1
5. Power electronics control systems in DC and AC electromechanical drive systems	2
6. Modeling of power electronics control systems of electromechanical drive systems	2
7. Principles of parameter identification and controllers setting in power electronics electromechanical drive systems	2
8. Analysis of electromechanical drive systems in selected industrial applications	2
9. Problems of optimization and efficiency in electromechanical drive systems	1

- Classes – the contents:
- Seminars – the contents:
- Laboratory – the contents:

Identification of mechanical and electromagnetic parameters in electromechanical drive systems. Testing of selected states of operation of electromechanical drive systems with converter fed DC motor. Testing of selected states of operation of electromechanical drive systems with converter fed induction motor. Verification of controllers setting in converter fed electromechanical drive systems.

- Project – the contents:

Project of electromechanical drive system with AC or DC traction vehicle. Project of electromechanical drive system with pumps unit of controlled flow. Project of electromechanical drive system of crane or elevator. Project of electromechanical drive system of long belt conveyor.

- Basic literature:

- o Bisztyga K.: Sterowanie i regulacja silników elektrycznych. WNT, Warszawa, 1989.
- o Orłowska-Kowalska T.: Bezczujnikowe układy napędowe z silnikami indukcyjnymi. Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 2003.
- o Praca zbiorowa pod red. Z. Grunwalda: Napęd elektryczny, WNT, Warszawa, 1987

- Additional literature:

- o Kałuza E.: Zbiór zadań i ćwiczeń projektowych z trakcji elektrycznej. Skrypt Politechniki Śląskiej nr 1848, Gliwice, 1994.
- o Praca zbiorowa pod red. T. Orłowskiej-Kowalskiej: Napęd elektryczny. Ćwiczenia laboratoryjne. Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 2002.
- o Tunia H., Kaźmierkowski M.: Automatyka napędu przekształtnikowego. PWN, Warszawa, 1987

- Conditions of the course acceptance/creditation:

Lecture – exam  
Laboratory – written reports;  
Project – written project;

\* - depending on a system of studies